School of Population Health

Interprofessional identity development in healthcare students and its influence on subsequent practice as professionals

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Declaration

To the best of my knowledge and belief, this thesis contains no material previously published by any other person except where due acknowledgement has been made. This thesis contains no material which has been accepted for the award of any other degree or diploma in any university. The research presented and reported in this thesis was conducted in accordance with the National Health and Medical Research Council National Statement on Ethical Conduct in Human Research (2007) – updated March 2014. The proposed research study received human research ethics approval from the Curtin University Human Research Ethics Committee (EC00262), Approval Number #2016-0407.

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Abstract

Demand for healthcare professionals capable of effective collaboration to improve health outcomes is growing globally. Universities have responded by including interprofessional education in health professional courses to equip students with the capabilities for interprofessional practice as future professionals. Whilst promising, there remains longstanding recognition in the global interprofessional literature that the long term effects of interprofessional education on subsequent interprofessional practice have not been conclusively determined. Undertaking longitudinal identity research within an interprofessional context is one way to understand the long term effects of interprofessional education on graduates' subsequent practice as healthcare professionals. The overarching aim of this research was, therefore, to explore healthcare students' interprofessional identity development during their health professional education and its influence on subsequent practice as professionals during their first year of work. This aim was addressed through six studies using a longitudinal mixed methods triangulation design.

Study One was a scoping review of professional and interprofessional identities to understand how both identities were defined, conceptualised, theorised, and measured. Findings indicated that neither a universal definition of interprofessional identity nor a shared understanding of its relationship with professional identity exist. Another key finding was existing interprofessional identity definitions, conceptualisations, theories, and measures are poorly aligned. In response to this gap in the literature, a definition of interprofessional identity is proposed.

Study Two explored the interprofessional and professional identity strengths of 253 healthcare students within the first six weeks of a faculty-wide interprofessional first year programme. An existing social identity measure was adapted and validated to determine professional and interprofessional identities. Findings highlighted that students entered

university with self-rated strength in both identities. Hierarchical multiple regression analyses demonstrated that professional identity strength was associated with the quality of contact and positive perceptions students held about their own profession (autostereotypes). Interprofessional identity strength was associated with quality of contact and gender.

Study Three explored professional and interprofessional identity development in 108 first year students involved in the same interprofessional programme. Students who participated in Study Three also participated in Study Two. Paired samples *t*-tests demonstrated that by the end of the year, all professions experienced a small decline in professional identity. All professions except nursing also experienced a large decline in interprofessional identity. Hierarchical multiple regression analyses indicated that quality of contact and autostereotypes were associated with interprofessional identity strength. Findings from Studies Two and Three support the inclusion of introductory interprofessional education that includes opportunities for students to form positive perceptions of their own profession and experience quality interprofessional contact to facilitate interprofessional identity development.

Study Four explored the influence of different placement arrangements (only profession-specific or a combination of profession-specific placements and one dedicated interprofessional placement) on final year students' professional and interprofessional identity strengths between the start and end of the year. Findings should be interpreted with caution because they were based on an underpowered sample of 30 students. Two one-way analyses of covariances (ANCOVA) were conducted to measure the effects of placement arrangement (only profession-specific placements or a combination of profession-specific placements and one dedicated interprofessional placement) on students' professional and interprofessional identity strengths across the year. There were two main findings. First, placement arrangement had no statistically significant effect on professional or

interprofessional identity strengths. Second, results from the paired samples *t*-tests indicated that, across the year, students from both groups (only profession-specific placements or a combination of profession-specific placements and one dedicated interprofessional placement), experienced a significant and large increase in their professional identity. While there was a slight decrease in interprofessional identity regardless of placement arrangement, this change was not significant. Further research with an adequately powered sample is required.

Study Five qualitatively explored interprofessional identity development in 38 final year students during dedicated interprofessional placements. Each student participated in one semi-structured interview at the end of the placement. Students also drew images representing their perceptions of interprofessional identity and its relationship to professional identity as part of data collection. Drawings were included for illustrative purposes only. Interview data was analysed inductively to identify themes. Findings indicated that students progressed from conceptualising interprofessional identity as a requirement of the placement at the start of the placement, toward internalising an interprofessional identity by the end of the placement. This mindset shift occurred as students formed cognitive, followed by affective, and psychological ties to an interprofessional identity. Context influenced the students' ability to enact their interprofessional identity consistently in practice. Commitment from healthcare professionals to model interprofessional practice in the workplace, combined with explicitly facilitating interprofessional identity development during students' health professional education, are two strategies recommended to facilitate further interprofessional identity development post placement.

Study Six qualitatively explored interprofessional identity development in eight graduates during their first year of work and the influence of interprofessional identity on

their practice. All graduates had prior interprofessional experiences as students. A total of 14 individual, semi-structured interviews were conducted at three time points during the year. Data was analysed cross-sectionally using inductive thematic analysis. Findings indicated that interprofessional identity development occurred through a continuum that was influenced by the practice context and the individual's commitment to client-centred care. Confidence as professionals underpinned interprofessional identity development. Maintaining identification as interprofessional practitioners involved navigating barriers to interprofessional practice in the workplace to ensure practice remained client-centred.

Overall, the findings from my research demonstrated that students enter university with an interprofessional identity that may represent a superficial understanding of interprofessional practice. Students continued to develop their interprofessional identity through interprofessional education, graduating from university to enter the health workforce as professionals with an interprofessional identity that represented, what can be described as, an interprofessional mindset. Maintaining identification as interprofessional practitioners involved recognising, exploiting, and responding to opportunities in different health service delivery contexts to ensure care remained client-centred. An interprofessional curricula designed to facilitate students' development of an interprofessional identity, combined with commitment from health service employers to ensure an interprofessional approach to service delivery, are recommended as key strategies to develop an interprofessional health workforce.

Key terms and definitions

Term	Definition
Capability	"An integration of knowledge, skills, personal qualities and understanding used appropriately and effectively ... in response to new and changing circumstances." (Oliver, 2010, p. 16)
Clinical placement	"The placement of a student within a clinical venue such as a hospital, aged care facility or other non-university location to support an aspect of experiential learning. As discrete episodes of experiential learning, the timing, duration, venue and setting used for each clinical placement may be highly variable however on each occasion a learning opportunity is expected." (Donnelly & Wiechula, 2012, p. 873)
Dedicated interprofessional placement	"A dedicated and prearranged opportunity for a number of students from health, social care and related professions to learn together for a period of time in the same setting as they perform typical activities of their profession as a team focused on a client-centred approach." (Brewer & Barr, 2016, p. 747)
Interprofessionalism	"A process by which professionals from different disciplines collaborate to provide an integrated and cohesive approach to patient care." (Légaré et al., 2011, p. 18)
Interprofessional education	"Occasions when members or students of two or more professions learn with, from and about each other to improve collaboration, and the quality of care and services." (Centre for the Advancement of Interprofessional Education [CAIPE], 2016, p.1)
Interprofessional field	This term encompasses both interprofessional education and practice (Goldman et al., 2009).
Interprofessional identity	"The development of a robust cognitive, psychological and emotional sense of belonging to an interprofessional community(s), necessary to achieve shared context-dependent goals." (Tong et al., 2020, p. 6)
Interprofessional practitioner	An individual who is committed to navigate barriers to interprofessional practice in different health service delivery contexts to ensure care remains client-centred. This term was adapted from Hammick et al.'s (2009) notion of being interprofessional.
Interprofessional practice	"Two or more professions working together as a team with a common purpose, commitment and mutual respect." (Freeth et al., 2005, pp. xiv-xv)

Term	Definition
Interprofessional socialisation	"The process in which individuals develop a dual professional and interprofessional identity (dual identity) through acquisition of both professional and interprofessional beliefs, values, behaviours and commitments to become 'collaborative practice-ready' to practice collaboratively with others to improve quality of care and services." (Khalili, Gilbert et al., 2019, p. 27)
Interprofessional thinking	Commitment to provide client-centred care by applying a range of interprofessional capabilities flexibility as a member of the healthcare team. These capabilities include teamwork, reflection, conflict resolution, communication, and role clarification. This definition was developed based on the participants' perceptions of the term and aligns with the broader literature on the importance of interprofessional practice to improve health outcomes (Frenk et al., 2010; Khalili et al., 2019).
Meaning-making lens	"Mental lenses used for meaning-making according to Kegan's (1982) model of adult development… these lenses determine the way people take in and integrate complex influences into forming their adult identities…" (Lewin et al., 2019, p. 1299)
New graduate	An individual who has completed an entry-level degree qualification in their chosen health profession; has met the accreditation requirements of the professional body that one is a member of; and is in their first 12 months (or equivalent) of clinical practice. This definition was adapted from Murray et al.'s (2018) definition of a new graduate registered nurse in Australia.
Professions	"Professions are occupational groups who in general provide services to others, such as nurses or social workers. It can be used as a term of self-ascription to avoid the need to apply regulatory criteria which differ between groups." (Khalili, Gilbert et al., 2019, p. 30)
Professional identity	An orientation towards one's chosen profession. This definition was developed based on conceptions of professional identity in the wider identity literature in health (Leedham-Green, 2020; Monrouxe, 2016; Trede et al, 2012).
Profession-specific placement	A clinical placement where students typically spend a majority of the placement learning from clinical educators, peers, and professionals from the same profession. This definition was adapted from Hansen et al.'s (2020) description of uniprofessional learning and Rodger et al.'s (2008) definition of clinical education.

Term	Definition
Professional socialisation	"A complex socialisation process by which a person acquires the knowledge, skills and sense of professional identity that are characteristic of a member of that particular profession." (Cohen, 1981, p. 14)
Stereotype	"Social categorical judgment(s)... of people in terms of their group memberships" (Turner, 1999, p. 26)
Transition to practice	"A trajectory of identity formation, much of which is a tacit process" (Brown et al., 2020, p. 993). This process involves moving from identifying as a student to identifying as a qualified professional.
Uniprofessional identity	"The development of strong favouritism towards own profession (In-Profession Favourtism) while developing bias and prejudice against those in other related profession (Out-Profession Discrimination) to improve own self-concept." (Khalili, Gilbert, et al., 2019, p. 31)

Publications included as part of the thesis

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Tong, R., Roberts, L. D., Brewer, M., & Flavell, H. (2020). Quality of contact counts: The development of interprofessional identity in first year students. *Nurse Education Today, 86*(March), 104328. https://doi.org/10.1016/j.nedt.2019.104328

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Statement of author contribution

The nature and extent of the intellectual input by the candidate and co-authors have been validated by all authors and can be found in Appendix E.

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Chapter One – Introduction

The importance of growing an interprofessional health workforce is well documented in the international interprofessional literature (Frenk et al., 2010; Institute of Medicine, 2015; Khalili, Thistlethwaite et al., 2019). Interprofessional education and collaborative practice are proposed as strategies to enhance client care, improve health providers' work experiences, lower the cost of healthcare, and improve the health of populations (Berwick et al., 2008; Brandt et al., 2014; Sikka et al., 2015). However, the long term effects of interprofessional education on subsequent practice as healthcare professionals has not been conclusively determined (Frenk et al., 2010; Institute of Medicine, 2015; Khalili, Thistlethwaite et al., 2019). To begin to address this knowledge gap, this thesis presents a critical longitudinal exploration of healthcare students' interprofessional identity development during their education and first year of practice.

This chapter provides an introduction to the research and is described in five distinct sections. First, the background to the research is presented followed by the rationale for the research in section two. Third, the aim of the research and objectives are outlined. Fourth, the significance of the research for advancing the interprofessional identity scholarship is presented. Section five, the final section of Chapter One, comprises an overview of the thesis and an outline of the studies undertaken.

1.1   Background

Demand for healthcare professionals capable of collaborating effectively in teams to deliver safe, high-quality, client-centred services is increasing globally (Maeda & Socha-Dietrich, 2021; Thistlethwaite et al., 2019; World Health Organization, 2016). This demand is driven by multiple inter-related factors including an aging population (Dall et al., 2013; Fuster, 2017), a rapid rise in the prevalence and incidence of chronic and complex health conditions (Institute of Medicine, 2015; Thistlethwaite et al., 2014), technological

advancements in healthcare (Aceto et al., 2018; Khezr et al., 2019; Talukder et al., 2020), and, more recently, the unprecedented impact of the COVID-19 pandemic on health systems around the world (Haldane & Morgan, 2020; Shamasunder et al., 2020; World Health Organization, 2020). Collectively, these factors reinforce the importance of ensuring healthcare professionals are equipped with the capabilities and commitment to work interprofessionally to improve health systems and outcomes for service users (clients, families, and communities) (Institute of Medicine, 2015; Thistlethwaite, 2016; World Health Organization, 2010).

To date, a range of terms including interprofessional collaboration, interprofessional collaborative practice, interprofessional practice, interprofessional teamwork, and collaborative practice have been used in the literature to describe interprofessional work (Khalili, Gilbert, et al., 2019; Reeves et al., 2010; Thistlethwaite et al., 2013; Xyrichis et al., 2018). Given the diverse terminology used to describe different professions working together, it is not surprising that no uniform definition of interprofessional practice exists (Leathard, 2003; Reeves et al., 2011; Xyrichis et al., 2018). Further complicating the lack of definitional clarity is the notion that interprofessional work represents a spectrum of interprofessional activities (Reeves et al., 2010; Xyrichis et al., 2018) that can be broadly categorised into teamwork, collaboration, coordination, and networking (Reeves et al., 2010). On this spectrum, interprofessional teamwork can be understood as being at one end and networking at the other. Interprofessional teamwork involves a high degree of integrated work practices among individuals (students, professionals) from different professions, as everyone in the team is highly interdependent on one another to achieve shared goals (Reeves et al., 2010). For example, interprofessional teamwork can be found in emergency departments (Reeves et al., 2010; Xyrichis et al., 2018).

To highlight the continuum of interprofessional work, in contrast, interprofessional networking places less emphasis on interdependence, integration of work practices, and shared responsibility to achieve common goals (Reeves et al., 2010). Interprofessional networks may comprise a group of individuals from different professions that share information across different institutions (Xyrichis et al., 2018). Due to the heterogenous nature of interprofessional work (Xyrichis et al., 2018) and the need for consistent terminology in this thesis, the term interprofessional practice is used. Interprofessional practice includes interprofessional teamwork, collaboration, coordination, and networking (Reeves et al., 2010), and is defined as occasions where "two or more professions working together as a team with a common purpose, commitment and mutual respect." (Freeth et al., 2005, pp. xiv-xv)

Interprofessional practice and interprofessional education are inter-related concepts in the literature (Abu-Rish et al., 2012; D'Amour & Oandasan, 2005; Thistlethwaite, 2016). Interprofessional education is posited to prepare students for interprofessional practice (Frenk et al., 2010; Institute of Medicine, 2015; World Health Organization, 2010) and is defined as "occasions when members or students of two or more professions learn with, from and about each other to improve collaboration and the quality of care and services." (Centre for the Advancement of Interprofessional Education [CAIPE], 2016, p.1) Although interprofessional education should, in theory, provide the foundation for interprofessional practice (Khalili, Thistlethwaite, et al., 2019; McNaughton, 2018; World Health Organization, 2010), limited evidence exists regarding the long term effects of interprofessional education on learners' behaviours and commitment to interprofessional practice and the impact of this practice on client outcomes (Cox et al., 2016; McNaughton, 2018; Reeves et al., 2016).

The prevalence of attitude-based studies focused on interprofessional initiatives that occur at a single snapshot in time, further limits our understanding of the effects of interprofessional education on interprofessional practice and client outcomes over an extended period (Khalili, Thistlethwaite, et al., 2019; Reeves et al., 2016; Thistlethwaite et al., 2015). Attitude changes represent transient changes in perceptions (Reeves et al., 2016). As a result, changes in attitudes toward interprofessional education do not reliably predict whether interprofessional learning transfers to clinical practice settings and/or leads to improved health service outcomes (Barr et al., 2005; Reeves et al., 2016).

To address the limitations of attitude-based studies, longitudinal research into interprofessional identity development during health professional education is needed; specifically, identity development during health professional courses that include interprofessional education. Identity studies are important as identity represents who one is and guides thoughts, commitment, and behaviours (Cruess et al., 2016; Monrouxe, 2010; Rees & Monrouxe, 2018). Identity is, as a result, a more stable construct than attitudes (Barrow, 2006). It can therefore be argued that exploring interprofessional identity development over a sustained period, and the influence of this identity on subsequent practice, is a more reliable way of understanding the long term effects of interprofessional education on learners' behaviours and commitment to interprofessional practice.

1.1.1 Interprofessional identity

Interprofessional identity and the mechanisms associated with its development are relatively new areas of research. Scant research exploring interprofessional identity when I commenced my research in 2016. Of the publications available at the time, some explored interprofessional identity conceptually by associating it with interprofessional practice and professional identity (Barnard, 2015; Khalili et al., 2014; Oliver, 2013). For example, Barnard (2015) proposed a dual professional identity, defined as an individual who is both

"a competent and confident representative of his or her own profession and a constructive collaborator within a team." (p. 244) Oliver (2013) conceptualised interprofessional identity as belonging to individuals who are capable of working at the boundaries of their profession whilst maintaining commitment and sense of belonging to their own profession.

The emphasis on being willing and capable of working interprofessionally while maintaining a sense of belonging to one's chosen profession was reiterated in Thistlethwaite's (2016) description of interprofessional identity. According to Thistlethwaite (2016), interprofessional identity development represents a process of "becoming a collective identity that acknowledges the values of all involved in care" (p. 1085). Thistlethwaite (2016) went on to explain that individuals can 'become' a collective identity by learning together to engage in interprofessional practice.

Khalili et al. (2013), however, conceptualised interprofessional identity as part of a dual—professional and interprofessional—identity. Individuals with a dual identity have a sense of belonging to one's chosen profession and the interprofessional community (Khalili et al., 2013). Khalili and colleagues (Khalili, 2013; Khalili et al., 2013) argued that uniprofessional identity transforms into a dual professional and interprofessional identity during interprofessional socialisation. An interprofessional socialisation framework (Khalili, 2013; Khalili et al., 2013) was developed to guide the proposed identity transformation. This framework is underpinned by social identity theory (Tajfel & Turner, 1986) and intergroup contact theory (Pettigrew, 1998). Both theories and their relevance to the interprofessional identity research undertaken in this thesis are discussed in detail on pages 14.

Khalili et al.'s (2013) notion of dual identity development was based on three conceptions. First, according to social identity theory (Tajfel & Turner, 1986), dual identity and uniprofessional identity are types of social identity. Second, at the start of an interprofessional education initiative, students possess a uniprofessional identity. Khalili and

colleagues (Khalili, 2013; Khalili et al., 2013) conceptualised uniprofessional identity as an outcome of a uniprofessional model of health professional education, where students engage in profession-specific socialisation for most of their course. Whilst profession-specific socialisation is important for students to acquire the skills, knowledge, beliefs and values of their chosen profession, Khalili, Gilbert, et al. (2019) and others (e.g., O'Keefe et al., 2020; Thistlethwaite et al., 2019) argued that graduates with a uniprofessional identity are not adequately prepared for the interprofessional health workforce.

Individuals with a uniprofessional identity have limited understanding of the roles and contributions of different professions in the healthcare team (Khalili et al., 2013; Khalili et al., 2014). Consequently, overlapping scopes of practice are perceived as threats to professional identity, which result in individuals becoming more territorial about their practice and less willing to collaborate interprofessionally (Baker et al., 2011; Khalili et al., 2014; Lloyd et al., 2011; McNeil et al., 2013). Of note, uniprofessional identity was explicitly defined in a later paper by Khalili, Gilbert et al., (2019) as, "the development of strong favouritism towards own profession (In-Profession Favouritism) while developing bias and prejudice against those in other related profession (Out-Profession Discrimination) to improve own self-concept." (pp. 30-31)

Returning to the focus on the three key concepts underpinning Khalili et al.'s (2013) description of dual identity development, the third conception, based on intergroup contact theory (Pettigrew, 1998), is that an interprofessional learning experience that fulfils the conditions for optimal intergroup contact, represents an opportunity for students from different health professions to engage in quality intergroup interactions. These optimal contact conditions (Pettigrew, 1998) are detailed on page 13. Khalili and colleagues (Khalili et al., 2014; Khalili et al., 2013) found that by the end of the interprofessional learning experience, students who previously identified uniprofessionally may choose to adopt a dual

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identity, having a sense of belonging to their own profession and to the interprofessional community. Simultaneous identification with one's own profession and the interprofessional community reduces an individual's fear of 'identity loss' and increases their willingness to engage in interprofessional teamwork as future health professionals (Khalili, 2013; Khalili et al., 2013).

Moving on from a conceptual discussion of interprofessional identity, interprofessional identity has also been investigated empirically in papers by Clouder et al. (2012) and Sims (2011). Clouder et al. (2012) explored the effects of interprofessional peer facilitation on students' perceptions of professional and interprofessional identity. Their work was grounded in social identity theory (Tajfel & Turner, 1986) and social categorisation theory (Turner, 1985). Students in the senior years of their health professional education were given the opportunity to facilitate an online interprofessional learning programme for students in their early years of their course. Findings indicated that peer facilitation supported the facilitators' development of a clear understanding of professional identity, which provided the foundation for interprofessional identity development (Clouder et al., 2012).

Sims (2011) explored the impact of joint mental health training programmes on nursing and social work students' perceptions of professional identity. Identity was viewed through the lens of social identity theory (Tajfel & Turner, 1986). Graduates from these programmes had more fluid professional boundaries due to their dual identification as a nurse and a social worker. Identifying as a member of both professions (nurse, social work) provided insight into how both professions can work together to deliver interprofessional care. Sim's (2011) work suggests fluid professional boundaries facilitates interprofessional identity development.

To conclude the background to my research, these early conceptual and empirical studies on interprofessional identity had three things in common. First, interprofessional identity coexists with professional identity. Both identities develop concurrently and are necessary to guide the delivery of interprofessional care. Second, interprofessional education provides a mechanism for facilitating learners' development of interprofessional identity. Third, following an interprofessional education initiative, learners are purported to develop an interprofessional orientation to practice, enacted through an openness to engage in interprofessional teamwork. Whilst these findings are important, they highlight two knowledge gaps in the contemporary interprofessional identity literature.

First, the term 'professional identity' is used in two different ways in the interprofessional field. It is used to refer to a uniprofessional identity (Khalili et al., 2013) and a professional identity that included an interprofessional orientation to practice (Barnard, 2015; Khalili et al., 2013; Sims, 2011). Given ongoing terminology ambiguity in the field and growing research interest in interprofessional identity scholarship, the term 'professional identity' is used throughout this thesis to refer to an orientation towards one's chosen profession. This description of professional identity is consistent with extant conceptions of professional identity in the wider identity literature in health (Leedham-Green, 2020; Monrouxe, 2016; Trede et al, 2012).

The second knowledge gap in the interprofessional identity literature is, do learners with an interprofessional identity maintain identification with this identity over an extended period? Given identity development is fluid and influenced by socio-cultural factors in the environment (Best & Williams, 2019; Dunston et al., 2019; Khalili et al., 2013; Trede et al., 2012), it remains unclear from these early studies of interprofessional identity, whether a single interprofessional education experience is sufficient for learners to maintain identification with their interprofessional identity. Therefore, to address these knowledge

gaps, the following questions need to be answered. What is an interprofessional identity? How does interprofessional identity develop during health professional education? Is interprofessional identity relevant to health professional practice in different service delivery contexts? If interprofessional identity is relevant to professional practice, how does the relationship between interprofessional and professional identity evolve over time?

To facilitate an in-depth exploration of these questions in-depth, one needs to first consider the theoretical orientation associated with identity research. Theory is important because theories provide the foundation for explaining observations and making predictions about relationships (Hean et al., 2016). According to Monrouxe & Rees, (2015), theories about identity differ depending on their ontological and epistemological assumptions. Ontology is a branch of philosophy that relates to the study about what constitutes reality, while epistemology is a branch of philosophy that explores the nature of knowledge (Bryman, 2016). For example, some theorists draw attention to the constructive nature of identity development (Erikson, 1968; Kegan, 1982; Marcia, 1966), while others emphasise the constructionist approach to identity formation (Pettigrew, 1998; Roccas & Brewer, 2002; Tajfel & Turner, 1986). Broadly, constructivists view identity as a process that centres on how individuals construe and construct meaning from what they experience in the environment (Burr, 2015; Rees et al., 2020), whereas constructionists view social processes (e.g., social interactions, language, culture, history) in the environment as instrumental in shaping how individuals construct their identity (Monrouxe & Rees, 2015; Rees et al., 2020; Talja et al., 2005). A description of some identity theories that are associated with each philosophical perspective, followed by a rationale of the theoretical approach and theories selected for this body of longitudinal interprofessional identity research, is presented next.

1.1.2 Theories associated with identity development

Identity from a constructivist perspective

Two key constructivist identity theories are Erikson's (1968) lifespan theory of psychosocial development and Kegan's (1982) constructive developmental theory of self. Erikson's (1968) lifespan theory of psychosocial development highlights that individuals develop their identity by making sense of their world and their place in the world. Identity develops as an individual progresses through eight sequential stages of human development (Erikson, 1968; 1994). Each stage is described as a psychosocial crisis (Erikson, 1968; 1994); progression from one stage to the next is dependent on whether the individual successfully resolves the psychosocial crisis associated with each stage (Erikson, 1968; 1994). A review of the theories used in the interprofessional field indicated that Erikson's (1968) theory has, to date, not been used to inform healthcare students and professionals' identity development.

Similar to Erikson's (1968) staged approach to identity development, Kegan's (1982) constructive developmental theory of self argues that identity development involves a continuous process of creating meaning. Kegan (1982) noted that identity develops as individuals progress through five distinct developmental stages of constructing meaning. Each stage has a specific mental lens that individuals use to know and construct meaning from events encountered (Kegan, 1982). Progression from one stage to the next involves a lens transformation, which is triggered when an individual realises that their current lens impedes their ability to understand and successfully navigate new challenges. In other words, Kegan's (1982) theory is useful for explaining why individuals who are at cognitively different developmental stages, respond differently to the same situation. Kegan's (1982) theory has been used in health to understand professional identity development in medicine

(Cruess et al., 2014; Kalet et al., 2017; Wald et al., 2015), nursing (Marañón & Pera, 2015), and dentisty (Stull & Blue, 2016).

To conclude this section, both theories (Erikson, 1968; Kegan, 1982) are rooted in constructivism (Burr, 2015; Rees et al., 2020), which means that identity is an internal, knowable construct. Individuals construct their identity by understanding and creating meaning from events (Burr, 2015; Rees et al., 2020).

Identity from a constructionist perspective

In contrast to the constructivist view of identity, constructionists argue that social processes (interactions between individuals, context) influence how identity develops (i.e., constructionism) (Burr, 2015; Rees et al., 2020). Constructionists believe that factors such as language, culture, and social interactions in the environment that one is in, influence how identity develops (Burr, 2015; Rees et al., 2020). For example, social identity theorists argue that identity is influenced by the social groups that one chooses to be a member of (Turner, 1985; Tajfel & Turner, 1986). Group-based identity (i.e., the social self) takes precedence over the individual identity (Turner, 1985; Tajfel & Turner, 1986).

Social identity theory (Tajfel & Turner, 1986) and social categorisation theory (Turner, 1985) are complimentary theories used to explain how individuals define their sense of self relative to others in a social environment (Abrams & Hogg, 1990). Social identity theory (Tajfel & Turner, 1986) was developed to explain how individuals define their social identity through the three psychological processes of social categorisation, social comparison, and social identification with a desired group (Abrams & Hogg, 1990; Tajfel & Turner, 1986; Turner, 1985).

Group identification is motivated by self-enhancement (Tajfel & Turner, 1986; Turner, 1985). To maintain membership with a chosen group, individuals may alter their personal behaviours in favour of the behavioural norms, values, and beliefs of the group that

they are a member of (ingroup) (Turner & Onorato, 1999). Further to this, Abrams and Hogg (1990) and others (Turner, 1985; Turner & Onorato, 1999; Tajfel & Turner, 1986) noted that the pursuit for self-enhancement may lead to biased positive perceptions of ingroup members, whilst reinforcing the misconceptions and negative stereotypes of other groups that they are not a member of (outgroups).

As described in section 1.1.1, social identity theories (Pettigrew, 1998; Turner, 1985; Tajfel & Turner, 1986) underpinned early studies of interprofessional identity. Within the context of interprofessional identity research, ingroup and outgroup distinctions may perpetuate pre-existing myths, misconceptions and stereotypes about one's own and other professions, and limit the development of an interprofessional identity (Khalili, 2013; Khalili et al., 2014; Khalili et al., 2013). Researchers in interprofessional education (Carpenter & Dickinson, 2016; Khalili, 2013; Khalili et al., 2020) applied intergroup contact theory (Pettigrew, 1998) and/or the contact hypothesis (Allport, 1954) to explain how students re-categorise from being members of a uniprofessional group, to identifying as members of their own profession and the interprofessional community following an interprofessional educational initiative.

Allport's (1954) contact hypothesis states that to reduce hostility between different racial groups, group members need to be of equal status and engage in face-to-face meetings to work on common goals, with support from relevant authorities. Hean and Dickinson (2005) highlighted the potential of grounding interprofessional education research in Allport's (1954) contact hypothesis as a way to rectify misconceptions and inaccurate stereotypes about different professions and facilitate positive attitudes towards interprofessional education. More recently, Michalec and Lamb (2020) drew on the contact hypothesis (Allport, 1954) to explain why professionals were more willing to engage in interprofessional teamwork during the COVID-19 pandemic.

Pettigrew (1998) extended Allport's (1954) work by demonstrating that in addition to the conditions of contact outlined, the contact situation needs to have potential for cross-group friendships to form to sustain the attitude changes that occur during contact, beyond the immediate contact situation. Intergroup contact theory (Pettigrew, 1998) has been applied to explain interprofessional interactions during interprofessional education (Carpenter & Dickinson, 2016) and used together with social identity theory (Tajfel & Turner, 1986) to inform dual—professional and interprofessional—identity research (Khalili & Orchard, 2020; McGuire et al., 2020; Reinders et al., 2020).

Central to dual identity research is the notion that dual identity is an outcome of a uniprofessional transformation that is facilitated through interprofessional interactions (Khalili et al., 2013; Khalili & Orchard, 2020). The transformation occurs as individuals shift from identifying uniprofessionally to identifying as members with a dual identity (Khalili et al., 2013; Khalili & Orchard, 2020). Whilst valuable, conceptualising interprofessional identity as an outcome of a single group membership change from the uniprofessional group to the dual identity group, does not adequately explain the interplay between interprofessional and professional identities over an extended period. Social identity complexity (Roccas & Brewer, 2002) was considered as a possible theory to address this knowledge gap.

Social identity complexity theory outlines four ways of organising multiple ingroup identities (Roccas & Brewer, 2002). These are intersection, where different identities come together to form an intersecting ingroup; dominance, which refers to the domination of one identity over others; compartmentalization, where identity salience is context dependent; and merger, all identities constitute the individual's in-group. This theory has, to date, been used extensively to inform research on intergroup relations within the context cultural, religious, and cultural diversity (Brewer, 2010; Miller et al., 2009; Spiegler et al., 2021). This theory

has not been adopted in the interprofessional literature (Barr, 2013; Hean et al., 2016; Khalili et al., 2021). Within the context of this research, social identity complexity theory (Roccas & Brewer, 2002) may be useful for explaining the relationship between professional and interprofessional identities in different health service delivery contexts (e.g., uniprofessional, multiprofessional, interprofessional). It should be noted that this theory is not suitable for explaining *how* individuals acquire both identities.

Another concept that resides within a constructionist approach of understanding identity is intersectionality (McCall, 2005; Monrouxe, 2015). Intersectionality has roots in the racialised experiences of minority ethnic women in the United States and desire by black feminists to address power inequalities as a result of gender and race (Crenshaw, 1989). According to Tsouroufli et al. (2011), intersectionality refers to "the interactions between gender, race and other categories of difference in individual lives, social practices, institutional arrangements and cultural ideologies, and the outcomes of these interactions in terms of power." (p. 214) Tsouroufli et al. (2011) went on to explain how intersectionality can be applied within medical education research to understand how gender and power relations influence professional identity development in medical students and doctors. To date, intersectionality has not been used in the interprofessional field to understand how identity development may be influenced by gender and power imbalances between the professions (Barr, 2013; Hean et al., 2018; Konrad et al., 2019).

Theories underpinning this longitudinal interprofessional identity research

Having critically discussed two theoretical orientations and theories related to identity in the previous section, I now explain why I have decided to explore longitudinal interprofessional identity development from a constructionist orientation using social identity theory (Tajfel & Turner, 1986) and intergroup contact theory (Pettigrew, 1998). Both theories were selected as they were the dominant theories underpinning identity

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research in the interprofessional field when I began my research in 2016. Previous studies drew on these theories to describe how interprofessional identity developed during interprofessional education (Khalili 2013; Khalili et al., 2013; Khalili et al., 2014), and predict the conditions of contact that facilitated interprofessional identity development during an interprofessional learning experience (Burford, 2012; Carpenter & Dickinson, 2016; Clouder et al., 2012).

1.1.3 Factors that may influence interprofessional identity development

Closely related to the theories that underpin interprofessional identity research are some factors that may influence how this identity develops. In particular, contact with other professions and team-based interprofessional practice placements were raised in the literature on interprofessional education as factors that may influence students' future identity as healthcare professionals with an interprofessional orientation to practice (Brewer & Barr, 2016; Burford, 2012; Khalili et al., 2013; Reeves et al., 2016).

Contact with other professions.

As described earlier, interprofessional education can be conceptualised as an intergroup encounter (Carpenter & Dickinson, 2016; Hean & Dickinson, 2005; Tajfel & Turner, 1986). When learners from two or more professions learn with, from and about each other during interprofessional education, previously held misconceptions, myths, and negative stereotypes about their own and other professions are corrected (Conroy, 2019; Gunaldo et al., 2020; Price et al., 2021). According to Khalili et al. (2013), role clarity provides the foundation for individuals to learn about interprofessional practice and develop a dual identity.

Apart from the forementioned work by Khalili and colleagues (Khalili, 2013; Khalili et al., 2014; Khalili et al., 2013), most studies measured the influence of interprofessional contact on the individual's attitudes towards members from their own and other professions

(Barnes et al., 2000; Curran et al., 2008; Lockeman et al., 2017). Attitudinal changes, however, represent transient changes in perceptions (Reeves et al., 2016). Attitude changes do not reliably predict learners' commitment to a more collaborative approach to delivering health services following the interprofessional contact experience (Khalili, Thistlethwaite, et al., 2019; Reeves et al., 2016; Thistlethwaite et al., 2015).

Team-based interprofessional practice placements

Previous studies of team-based interprofessional practice placements have found that team-based interprofessional practice placements influence learners' perceptions of their identity as future healthcare professionals (Brewer & Stewart-Wynne, 2013; Jakobsen, 2016; Jakobsen & Hansen, 2014). Brewer and Barr (2016) defined a team-based interprofessional practice placement as "a dedicated and prearranged opportunity for a number of participants from health, social care and related professions to learn together for a period of time in the same setting as they perform typical activities of their profession as a team focused on a client-centred approach" (p. 747). Examples of team-based interprofessional practice placements that accord with this definition include hospital-based student interprofessional training wards (Brewer & Stewart-Wynne, 2013; Jakobsen, 2016; Oosterom et al., 2019), and interprofessional placements in residential aged care (Brewer & Flavell, 2020; Kent et al., 2016; Seaman et al., 2017) or primary schools (Brewer & Flavell, 2020; Salm et al., 2010).

Team-based interprofessional practice placements differ from traditional clinical placements (Rodger et al., 2008) in that the latter are typically profession-specific in nature. Students on profession-specific placements typically spend a majority of the placement developing their professional identity by learning from clinical educators, peers, and other professionals from the same profession (Hansen et al., 2020; Rodger et al., 2008). Opportunities to observe healthcare professionals engage in interprofessional practice, or

experience being a member of an interprofessional team tend to be unplanned, unlike team-based interprofessional practice placements.

Of note, extant studies regarding team-based interprofessional practice placements explored their effect on students developing professional identity and their understanding of interprofessional practice, rather than if and how such placements influenced interprofessional identity development (Brewer & Stewart-Wynne, 2013; Jakobsen, 2016; Jakobsen & Hansen, 2014). Exploring the relationship between interprofessional practice placements and students' development of interprofessional identity may provide insight into whether engaging in supervised interprofessional practice facilitates interprofessional identity development and, if so, understand how this identity develops during placement. Educators can use findings from these studies to inform the design of an interprofessional placement experience that explicitly supports student development of an interprofessional identity. Having provided the background to this research, the rationale for the research follows.

1.2   Rationale

As discussed earlier, interprofessional identity research is an emerging area. In 2016 when I started this work, scant research existed on interprofessional identity, how it develops during interprofessional education, its relationship with professional identity, and the impact of interprofessional identity on health professional practice. Rather than exploring interprofessional identity explicitly, most studies explored the impact of interprofessional education on: (a) modifying learners' professional identity to include an interprofessional orientation (Bridges et al., 2011; Clark, 2014; Joynes, 2018; Reinders et al., 2018); (b) altering stereotypes of own and other professions (Carpenter, 1995; Hind et al., 2003; Lidskog et al., 2008; McNeil et al., 2013); or (c) changing learners' attitudes towards

interprofessional education (Berger-Estilita et al., 2020; Coster et al., 2008; Hood et al., 2014).

These studies share two things in common. First, individuals with positive attitudes and stereotypes of their own and other professions were more receptive to interprofessional education and practice. Second, the impact of attitudinal changes on learners' commitment to interprofessional practice following interprofessional education was not clearly established. Researching the impact of interprofessional education on learners' development of interprofessional identity is one way to understand the long term effects of interprofessional education on subsequent practice as healthcare professionals.

Other empirical studies of interprofessional identity (McGuire et al., 2020; Reinders et al., 2018; Woltenberg et al., 2019) and interprofessional socialisation for identity development (Bloomfield et al., 2021; Khalili & Orchard, 2020) have been published since the commencement of this research. These studies focused on exploring interprofessional identity development in healthcare students during a single interprofessional learning experience. Whilst adding to our knowledge base, the if and how interprofessional identity influences health professional practice remains unknown.

1.3   Research aim

My research addresses this knowledge gap identified by exploring healthcare students' interprofessional identity development during their health professional education and its influence on subsequent practice as professionals during their first year of work.

1.4   Significance

This research is significant as it represents the first longitudinal study of interprofessional identity development in healthcare students and graduates in the field. Professional and interprofessional identities are tracked at various points from university entry to the end of the first year of professional practice. This body of work is grounded in

social identity theory (Tajfel & Turner, 1986) and intergroup contact theory (Pettigrew, 1998), as well as a longitudinal mixed methods research design. The rationale for the mixed methods design is explained in Chapter Two, the methodology chapter.

Through providing insight into the long term effects of interprofessional education on graduates' practice during their first year of work, this body of research represents an original contribution to the interprofessional literature. The research outcomes have implications for researchers, educators, employers, and policy makers wishing to prepare students to join the interprofessional health workforce needed for the 21st century (Forman, 2020; Fraher & Brandt, 2019; Institute of Medicine, 2015).

1.5   Overview of thesis and outline of studies

I present a hybrid thesis comprised of three publications and six supporting chapters including this introduction and a methodology, discussion, and three as yet unpublished studies. To ensure a logical and consistent presentation of my research, all published papers are presented as individual chapters. A summary of each chapter follows.

This **introduction**, presented in Chapter One, provides the background for this research and sets out the overarching aim and significance. Following on from this, the research **methodology** is presented in Chapter Two. This chapter details my approach to designing and conducting the research, as well as my positioning as a researcher.

Study One, presented in Chapter Three, is a scoping review of interprofessional identity and professional identity within an interprofessional context. The aim of this review was to establish how professional and interprofessional identities were defined, conceptualised, theorised, and measured within the interprofessional literature. This manuscript was published in the *Journal of Interprofessional Care* in 2020.

Study Two, presented in Chapter Four, explored the interprofessional and professional identity strengths of healthcare students within the first six weeks of a faculty-

wide interprofessional first year programme, and the influence of stereotype, contact, and demographic factors on both identities. Identity strength refers to the extent to which students identify with their professional and interprofessional identity, based on their identity scores obtained from an interprofessional measure and a professional identity measure. As there were no suitable measures of professional or interprofessional identity that were grounded in social identity theory (Tajfel & Turner, 1986) at the commencement of this research in 2016, an interprofessional identity measure and a professional identity measure were adapted and validated for use in this study. Both measures were adapted with permission from the author (see Appendix D, page 302) of the three-factor social model of social identity measure (Cameron, 2004). Two hundred and fifty-three first-year, first semester students from nursing, medicine and 10 allied health professions (i.e., 12 health science professions in total) participated in this study. The manuscript of this study is in the later stages of a peer review with a journal.

Study Three, presented in Chapter Five, measured changes in first year healthcare students' professional and interprofessional identities between the start and end of a faculty-wide interprofessional first year programme, and identified the factors that influenced interprofessional identity strength at the end of the programme. All students who participated in this study also participated in the previous study, **Study Two**. One hundred and eight students from nursing, medicine and 10 allied health professions participated by completing the same online survey with social identity measures of professional and interprofessional identity that was used in the Study Two at each of the two time points. This study was published in *Nurse Education Today* in 2020.

Study Four, presented in Chapter Six, explored the influence of different placement arrangements on 30 final year students' professional and interprofessional identity strengths between the start and end of the year. These students were from a different cohort from the

first year students who participated in Studies Two and Three. Given only 30 students participated in both the pre and post components of this study, the findings need to be interpreted with caution and within the context of this study.

Study Five, presented in Chapter Seven, qualitatively explored final year health care students' perceptions of interprofessional identity development during a dedicated interprofessional placement. Individual, in-person, semi-structured interviews were conducted with 38 students from five allied health professions. Each participant took part in one semi-structured interview at the end of their placement. Drawings were used to facilitate in-depth discussions about identity during interviews and to illustrate key findings from the participants' narratives about interprofessional identity and its relationship with professional identity. This study was published in the *Journal of Interprofessional Care* in 2021.

Building on from the previous study, **Study Six**, presented in Chapter Eight, explored graduates' perceptions of interprofessional identity development at three time points during their first year as healthcare professionals, and the impact of interprofessional identity on practice. Graduates who participated in this study participated in **Study Five**. Fourteen semi-structured interviews were conducted with eight new graduates from four allied health professions. All graduates had prior interprofessional education experiences as students and entered the workforce with an interprofessional identity. The manuscript of this study is in the later stages of a peer review with a journal.

Discussion, the final chapter (Chapter Nine) in the thesis is organised in four sections beginning with an integrated summary of key findings from Studies One to Six in relation to the current literature and the overarching aim of this research. Next, the methodological, theoretical, educational, practice, and policy implications for advancing interprofessional identity scholarship are discussed. Following on from the implications of this research, key strengths, limitations, and recommendations for future interprofessional identity research are

explained in the third section. The chapter ends with concluding comments about the significance of this body of research for advancing the interprofessional field.

Chapter Two – Methodology

Having established the need for this research in the previous chapter, I move on to discuss the methodology underpinning my research over five sections. The aim and objectives of this research are outlined in section one. My positioning as a researcher and the context of this research are explained in sections two and three respectively. The research design is explained in section four followed by the rigour considerations associated with this research in section five.

2.1   Aim and objectives

The aim of this research is to explore healthcare students' interprofessional identity development during their health professional education and its influence on subsequent practice as professionals during their first year of work. Five objectives are linked to this aim:

1) To explore the influence of demographic, placement, contact and stereotype variables on the development of first year healthcare students' professional and interprofessional identities.

2) To measure changes in the professional and interprofessional identity strengths of students involved in a faculty-wide interprofessional first year programme.

3) To measure changes in the professional and interprofessional identity strengths of final year students involved in clinical placements between the start and end of the year.

4) To explore final year students' perceptions of interprofessional identity during a dedicated interprofessional placement.

5) To explore interprofessional identity development in graduates at three time points during their first year of work and the influence of interprofessional identity on practice.

2.2 Researcher positioning

My research was grounded in constructionism (Burr, 2015; Rees et al., 2020). Constuctionism views knowledge and reality as knowable (Burr, 2015; Rees et al., 2020). Knowledge is shaped by the environment within which individuals interact in and the people involved in these interactions (Burr, 2015; Rees et al., 2020). Applied to inform this research, constructionists argue that students' understanding of interprofessional identity and its relevance for future practice as professionals is shaped by their interprofessional socialisation experiences during health professional education. For example, interprofessional identity develops through social interactions and dialogue with health professionals, peers, lecturers, clients, and societal views of what it means to be a professional with an interprofessional orientation to practice (Monrouxe, 2009; Monrouxe & Rees, 2015). Of note, this view of identity development is also consistent with early studies of identity in the interprofessional literature (Clouder et al., 2012; Khalili et al., 2013; Sims, 2011).

In addition to considering the theoretical precedence in the interprofessional identity literature, my choice of philosophical positioning was also influenced by my own experiences of interprofessional practice and identity development. I bring my background as a practicing speech pathologist and a clinical educator to this research. As a professional, for the past 16 years, I have been working interprofessionally to meet the communication and mealtime needs of clients with complex disabilities. I also clinically supervise final year speech pathology students on clinical placements and early career speech pathologists working in the disability sector. Earlier in my career, I taught interprofessional education as an interprofessional facilitator for final year healthcare students involved in international clinical fieldwork placements. During the placement, I supervised students as they delivered care interprofessionally in a rehabilitation center and a hospital. Collectively, these

experiences reinforced my understanding of the importance of working interprofessionally to improve care outcomes and were instrumental in shaping my understanding that identity development is fluid.

As a new graduate, I adopted a uniprofessional approach to practice. I now identify as a speech pathologist with an interprofessional mindset. This mindset shift occurred as I was socialised in different workplaces and experienced delivering speech pathology services within different models of care (e.g., uniprofessional, multiprofessional, interprofessional) throughout my career. The shift from a uniprofessional to an interprofessional view of practice led me to question whether students' experiences of interprofessional education made a difference to subsequent practice as professionals working within an interprofessional health workforce (Fraher & Brandt, 2019; Institute of Medicine, 2015; O'Keefe et al., 2020). To answer my question, I decided to undertake longitudinal interprofessional identity research as identity is a more stable construct than attitudes (Barrow, 2006). I chose to ground my research in constructionism (Burr, 2015; Rees et al., 2020).

I spent the last five years undertaking this research in parallel to clinical work. I acknowledged that my understanding of interprofessional identity development as a research student could have been influenced by unintentional assumptions and biases that I brought to the research as a practising speech pathologist and educator. For example, during interviews I could have unintentionally asked leading questions about interprofessional practice and identity. Similarly, I acknowledged that my interpretations of the interview data obtained from participants who participated in **Studies Five and Six** could have been influenced by my view of interprofessional practice, rather than the participants' view of practice.

To minimise researcher bias, I engaged in researcher reflexivity throughout the research (Bryman, 2016). For example, I maintained a reflexive journal whilst conducting interviews with the participants that took part in **Studies Five and Six**. Through reflective journaling, I uncovered the assumptions made and experienced revelations, about my own and the participants' perceptions of identity and practice. For example, I assumed students knew what identity meant within an interprofessional context, given their interest in my research. Yet, it became obvious early in the interviews that most students and some graduates had not thought about identity and the relationship between identity and practice. This revelation led me to re-conceptualise how I approached these interviews. Following discussions with my supervisors, I made a conscientious effort to avoid asking participants leading questions. I learned to appreciate periods of silence after asking a question. I learned to let the participant initiate clarification following an extended period of silence, as silence suggests the underlying concept (e.g., identity, the relationship between identity and practice) could have been novel for the participant. Further to this, I met my supervisors regularly throughout the research process to ensure that my findings were data-driven.

2.3   Context

This research was conducted at Curtin University, a large metropolitan university located in Perth, Western Australia. In the first year of health professional education, all students from the 26 courses within the University's Faculty of Health Sciences are involved in a faculty-wide interprofessional first year programme. This programme was informed by an interprofessional capability framework (Brewer & Jones, 2013). An objective of the programme is to provide students from different courses (and professions) in the faculty with an understanding of interprofessional practice, through opportunities to observe staff model interprofessional working relationships, engage in case-based learning, and learn cultural knowledge for effective interprofessional practice (Curtin University, 2021a). In addition to

participating in the interprofessional first year programme, students are required to attend lectures and tutorials related to their own profession, as a requisite component of the first year of their health professional education (Curtin University, 2021a).

Following the completion of students' first year of study, interprofessional education experiences in the middle years (second and third) of courses at Curtin are less of a focus, with the emphasis shifting to profession-specific knowledge and skills (Curtin University, 2021b). Students engage in interprofessional learning if these opportunities are part of core profession-specific units associated with their health professional education (Curtin University, 2021b), including the Faculty of Health Sciences interprofessional workshops (Brewer et al., 2014). These workshops are facilitated by facilitators with health science qualifications and delivered through fully online or blended modes (Brewer et al., 2014).

At Curtin University, many students enrolled in health professional courses are expected to complete a range of practice-based learning experiences in different health workplaces (Curtin University, 2021b). The aim of these practice-based learning opportunities, often referred to as clinical placements, is for students to gain experiences working as members of a healthcare team and further develop the capabilities/competencies necessary to become a qualified member of their chosen health profession (Thistlethwaite, 2013). Within the context of this research, some final year students were involved in clinical placements that comprised only profession-specific placements during the year, while other final year students had a combination of profession-specific placements and one dedicated interprofessional placement. Students were assigned clinical placements depending on their clinical learning needs and the placement availability.

As explained in the introduction chapter, a dedicated interprofessional placement is intentionally designed to provide dedicated and prearranged opportunities for students from different professions to learn together for a period of time to deliver interprofessional care

in a health service delivery setting (Brewer & Barr, 2016). At Curtin University, students may complete an assigned team-based interprofessional placement at one of four student-led health service delivery settings: two primary schools, an aged care facility, and a community health facility (Brewer & Barr, 2016; Brewer & Flavell, 2020). In comparison to dedicated interprofessional placements, not all students on profession-specific placements have opportunities to engage in, or observe, different healthcare professionals in healthcare teams engage in interprofessional practice (Brewer & Barr, 2016). Profession-specific placements are designed to provide students with opportunities to apply applying knowledge and skills that are unique to the profession to meet the needs of the client (Rodger et al., 2008; Thistlethwaite, 2013).

To conclude this section on the context of my research, all students from 26 health professional courses within the University's Faculty of Sciences complete a faculty-wide interprofessional first year programme. (Curtin University, 2021a). Students in the middle years (second and third) of courses at may engage in interprofessional learning if these opportunities are part of core profession-specific units associated with their health professional course (Curtin University, 2021b). Within the context of this research, some final year students were involved in clinical placements that comprised only profession-specific placements during the year, while other final year students had a combination of profession-specific placements and one dedicated interprofessional placement. The research design is presented next.

2.4 Research design

A longitudinal mixed methods triangulation design (Creswell & Plano Clark, 2017; Plano Clark et al., 2014) was used to address the aim and objectives of this research. Longitudinal research is defined in the thesis as "data collected for the same set of research units (which might differ from the sampling units/respondents) for (but not necessarily at) two or more occasions, in principle allowing for intra-individual comparison across time" (Taris, 2000, pp. 1-2). The longitudinal component of this research provided quantitative insight into changes in identity strengths in first and final year students over the year, and qualitative insight into graduates' perceptions of interprofessional identity development during their first year of work.

By grounding this work in mixed methods research, I was able to obtain further insight into interprofessional identity, its development, and influence on professional practice, compared to the potential knowledge that may be obtained by using quantitative or qualitative research approaches alone (Creswell & Plano Clark, 2017; O'Cathain et al., 2010). Insight was obtained by integrating the findings from individual quantitative and qualitative study of interprofessional identity whilst ensuring equal value was placed on all findings from both types of data (Bryman, 2016; Creswell & Plano Clark, 2017; Woolley, 2009).

Data was integrated using triangulation, a method for integrating quantitative and qualitative data from mixed methods research (Bryman, 2016). Triangulation was done after all studies were completed and findings from each study analysed. Triangulating the findings from quantitative and qualitative studies of interprofessional identity increases the credibility (i.e., trustworthiness) and validity (i.e., the accuracy in which the phenomenon of interest is studied) of the overall research findings and their implications for advancing interprofessional identity research (Bryman, 2016, Creswell & Plano Clark, 2017). A

summary of how the longitudinal mixed methods triangulation design (Creswell & Plano

Clark, 2017; Plano Clark et al., 2014) was applied to address the aim and objectives of this

research is presented in Figure 1.

Figure 1
The mixed methods research design used to address the research aim and objectives
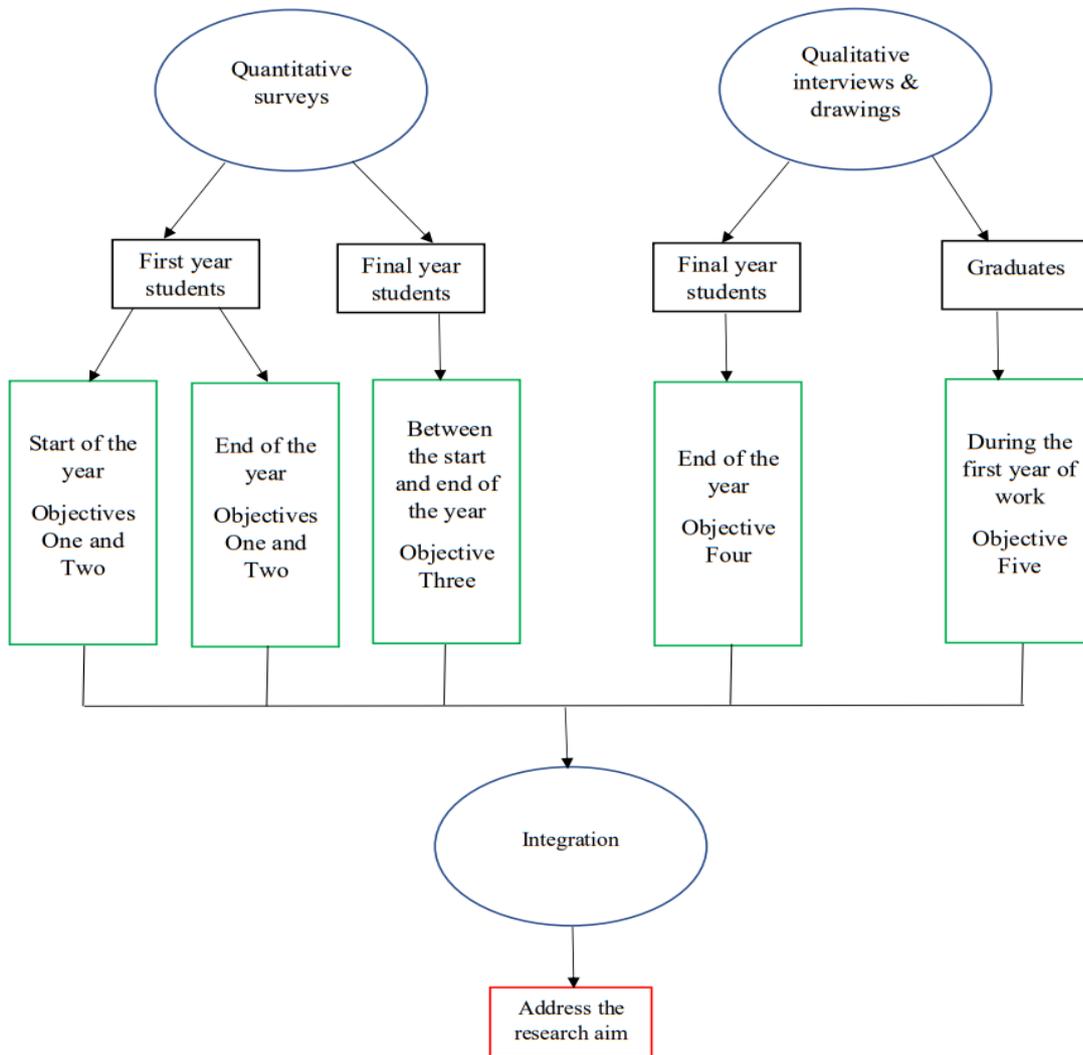
Note. Figure A was adapted from Creswell (2007, p.63). Creswell, J.W. (2007) Choosing a mixed methods design. In John W Creswell, Vicki L. & Plano Clark (Ed.). Designing and conducting mixed methods research (pp. 58-88). Sage Publications.

2.5 Rigour considerations

To maintain rigour throughout this research, a variety of strategies that aligned with recommendations from the mixed methods research (Creswell & Plano Clark, 2017) and scoping review (Levac et al., 2010) literatures were implemented (see Table 1).

Table 1

A summary of how methodological and interpretative rigour was maintained in each study

Study	Description of study	Methodological rigour	Interpretative rigour
One	A scoping review of professional and interprofessional identities to establish how both identities are defined, conceptualised, theorised, and measured within the interprofessional literature.	Papers were identified, screened, and selected for inclusion according to a scoping review protocol by Levac et al. (2010) as follows: 1. Developed the eligibility criteria and search strings following an extensive review of the interprofessional literature. 2. Ensured each supervisor read a random selection of abstracts identified when determining whether the abstract met the paper selection criteria. 3. Divided shortlisted papers equally among all supervisors, who read full papers independently. 4. Maintained an audit trail regarding how papers were selected. 5. Ensured consensus was reached before analysing shortlisted papers.	1. Findings were interpreted according to the aim of the research and contemporary literature on identity development in an interprofessional context(s).

Table 1 (continued)

Two and Three	Explore professional and interprofessional identity developments in first year students and identify the factors that influence identity strengths, at the start of the year (**Study Two**), and between the start and end of the year (**Study Three**).	1. Measures of professional and interprofessional identity, stereotypes, and quality of contact were adapted with permission, and validated prior to use. 2. Over sampling of participants was done during the pre-intervention phrase to ensure a minimum sample size was maintained in the post-intervention phase. 3. Recruitment strategies were clearly reported in each study. 4. Participants were presented with randomly-ordered measures to control for order effects. 5. Data analyses comprised data cleaning followed by conducting confirmatory factor analyses, internal reliability checks (Cronbach's alpha), and assumptions testing, before conducting the statistical analyses to address each hypothesis.	1. All findings were checked by my supervisors for accuracy. 2. The Transparent Reporting of Evaluations with Nonrandomised Designs (TREND) statement checklist (Des Jarlais et al., 2004) was completed for each study prior to manuscript submission to *Nurse Education Today* (**Study Two**) and the other journal (**Study Three**).

Table 1 (continued)

Four	Explore the influence of different placement arrangements (only profession-specific or a combination of profession-specific placements and one dedicated interprofessional placement) on final year students' professional and interprofessional identity strengths between the start and end of the year.	1. Same as the strategies used for **Studies Two and Three**.	1. All findings were checked by my supervisors for accuracy.
Five and Six	Qualitative exploration of interprofessional identity development in final year students during a dedicated interprofessional placement (**Study Five**), and in graduates during their first year of work (**Study Six**).	1. Interview questions were developed following an extensive review of the identity, socialisation, and interprofessional literatures to ensure that the questions were dependable and credible (Dellinger & Leech, 2007; Nowell et al., 2017). 2. Transcripts were read by at least two people (one of my supervisors and me) independently, before my supervisors and I met, regularly, to discuss the data (Calman et al., Fadyl et al., 2017). 3. Data from both studies were analysed according to the thematic analysis procedures outlined by Braun and Clarke (2006). 4. A rationale for the analytic approach used to analyse the longitudinal qualitative data from Study Six was provided.	1. The themes for each study were developed by my supervisors and I through an iterative process of discussing the findings, addressing unintentional bias and assumptions about the findings, and refining themes over time (Bryman, 2016). 2. I engaged in research reflexivity throughout the research process by maintaining an audit trail of the key decisions and rationale underpinning the decisions for each study.

Chapter Three

Tong, R., Brewer, M., Flavell, H., & Roberts, L. D. (2020). Professional and

interprofessional identities: a scoping review. *Journal of Interprofessional Care*.

https://doi.org/10.1080/13561820.2020.1713063

Abstract

Identity development within the interprofessional field is an emerging area of research. This scoping review aims to establish how professional and interprofessional identities are defined, conceptualised, theorised and measured within the interprofessional literature. Six databases were systematically searched for papers focusing on professional and/or interprofessional identities in interprofessional healthcare and education using a scoping review methodology. A total of 84 papers were included. Most papers discussed professional identity only; the minority discussed both identities. There were three key findings. First, no universal definition of interprofessional identity exists. Second, there is no shared understanding of interprofessional identity and its relationship with professional identity. Third, poor alignment between definitions, conceptualisations, theories and measures of interprofessional identity exists. The absence of a psychometrically robust instrument that specifically measures interprofessional identity and the short-term focus of current interprofessional identity research further limits understanding. Research that critically examines professional and interprofessional identity development should be underpinned by clear definitions, concepts, theories and measures of both identities. High quality research will allow greater understanding of interprofessional identity development and its impact on interprofessional practice.

Keywords: professional identity, interprofessional identity, healthcare, scoping review

Introduction

Interprofessional education is increasingly evident in health professional training (Dunston et al., 2019; Paradis & Whitehead, 2018; Thistlethwaite, 2016). Despite this trend, little is known about the longer-term effects of interprofessional education on individuals' willingness and confidence to engage in interprofessional practice (Paradis & Whitehead, 2018; Reeves et al., 2016). To address the knowledge gap, a growing number of studies are examining interprofessional and professional identity developments in interprofessional healthcare contexts (Adams et al., 2006; Best & Williams, 2018; Joynes, 2018; Khalili et al., 2013; Rees et al., 2019).

The notion of interprofessional identity first surfaced in the late 1990s and was conceptualised as professional identity with permeable boundaries to accommodate interprofessionalism (Biggs, 1997) and interprofessional collaboration (Clark, 1997). These conceptualisations suggest identity development is fluid, consistent with the wider identity literature (Trede et al., 2012). Since then, the term 'interprofessional identity' appears to have multiple meanings often based on theories from the field of psychology. For example, Khalili et al. (2013) defined 'interprofessional identity' as a "sense of belonging to own profession and interprofessional community." (p. 451)

However, despite growing interest in interprofessional identity, no conceptual and definitional clarity exists. Establishing a shared understanding of terms commonly used in the interprofessional field, such as interprofessional identity, may facilitate greater alignment between the learning outcomes of interprofessional education and interprofessional practice (Khalili, Gilbert, et al., 2019). This study, therefore, aims to review the current literature on identity in interprofessional healthcare and education contexts, to understand how professional and interprofessional identities are defined, conceptualised, theorised and measured. We operationalise identity conceptualisation within interprofessional healthcare

and education contexts as: the perceptions of self and perceptions of others on the self, within settings that focus on interprofessional education, learning, practice and care. This conceptualisation applies to individuals (students, professionals) and professions.

Methods

A scoping review, following the procedures outlined by Arksey and O'Malley (2005), was conducted to address this study's aims. This type of review was selected to map the key concepts underpinning this area of research in relation to time, location (country or context), source (peer reviewed or grey literature) and origin (healthcare or academia) (Anderson et al., 2008), and to inform future research (Arksey & O'Malley, 2005). Scoping reviews can be particularly useful for consolidating extant literature about interprofessional and professional identities, as scant published studies in this area makes it difficult to perform a systematic review (Levac et al., 2010).

Procedure

Step 1. The research question. The research question was: 'How are professional and interprofessional identities defined, conceptualised, theorised and measured within the interprofessional literature?'

Step 2. Identifying relevant studies. To balance the research question with comprehensiveness and feasibility of resources (time, personnel) (Levac et al., 2010), the inclusion criteria for this search were: 1) peer reviewed papers published in English from January 1997 to January 2018, 2) papers that define, conceptualise, theorise or measure the professional and/or interprofessional identities of healthcare students and professionals, 3) papers accessible through the university's databases, and 4) papers set within an interprofessional context such as hospital training wards (Brewer & Stewart-Wynne, 2013; Jakobsen, 2016) and university-based interprofessional programmes (Roberts et al., 2018). We define an interprofessional context as "a setting where members or students of two or

more professions gather to learn with, from and about each other to improve collaboration and the quality of care and services" This definition was adapted from the Centre for the Advancement of Interprofessional Education's (2016) statement of purpose. The inclusion criteria was developed by all authors, and refined *post hoc* during the study selection process (step 3), to ensure relevance to the research question (Levac et al., 2010).

The search commenced in January 2018 within six health databases: SCOPUS, Psychinfo, ProQuest, MedLine, Informit, and CINAHL. These databases were selected to facilitate a broad and comprehensive search of the interprofessional literature in health. The search terms used were: 'interprofessional*' AND 'identity*' AND 'health*'. The first author consulted a faculty librarian on three occasions to develop and refine the search string. The research team decided to focus on papers with the terms 'interprofessional' and 'identity' to understand how these terms are conceptualised within the interprofessional field, rather than the literature in multidisciplinary or interdisciplinary contexts.

A total of 3074 papers were identified which included 1768 duplicates. A secondary search in Google Scholar was conducted in March 2018, using the same search terms. Of the 16,900 'hits' identified, only the first 200 articles were screened as recommended by Haddaway et al. (2015). Following the removal of duplicates, 1306 abstracts were identified.

Step 3. Study selection. The first author screened all 1306 abstracts to ensure they explicitly discussed professional and/or interprofessional identities and excluded 1186 that did not meet this inclusion criteria. All authors met on a regular basis throughout the study selection process including abstract selection and screened a random selection of abstracts that the first author had identified. Disagreements regarding whether abstracts met the inclusion criteria were resolved through discussions until consensus was reached. The remaining 120 papers were read in full by the first author. To ensure reliability, the papers

were also divided equally (40 each) among the other three authors, who reviewed full papers independently based on the inclusion criteria, and recorded decisions on an Excel[©] spreadsheet. Following the completion of individual paper reviews, all authors met to compare findings and resolve any disagreements regarding study interpretation and selection. A further 36 of the remaining 120 papers were excluded as they did not explicitly define, conceptualise, theorise or measure professional and/or interprofessional identities. Group consensus was reached on all 84 papers included in this review. Figure 1 outlines the paper selection process.

Figure 1. Paper selection process
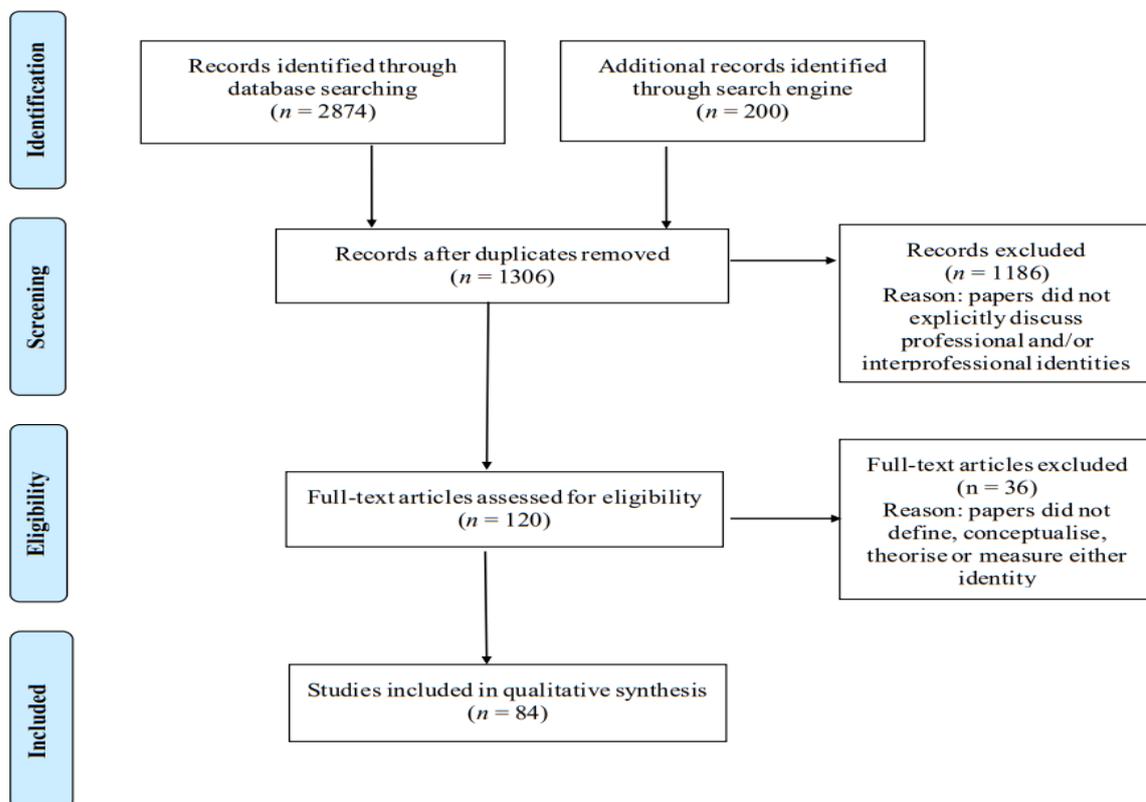
Step 4. Charting the data. Data from the 84 papers were manually extracted and recorded onto an Excel© spreadsheet as follows: a brief summary of the paper (context, participants, methods, outcomes), article type (program or research report, opinion, summary, unknown (Brandt, Lutfiyya, King, & Chioreso, 2014), professions involved, country of study, identity type and descriptors (defined, conceptualised, theorised, measured).

Results

Of the 84 papers that met inclusion criteria, 72 discussed professional identity within interprofessional contexts only, and 12 discussed professional and interprofessional identities. Most papers were published in interprofessional journals (*n*=30). A general increase in the number of professional and interprofessional identity papers was noted between January 1997 to January 2018, with 58 published from 2011. Figure 2 shows papers published from 1997 to 2017 and Table 1 contains a distribution of papers by identity descriptors.

Figure 2. Number of papers by year (1997-2017).
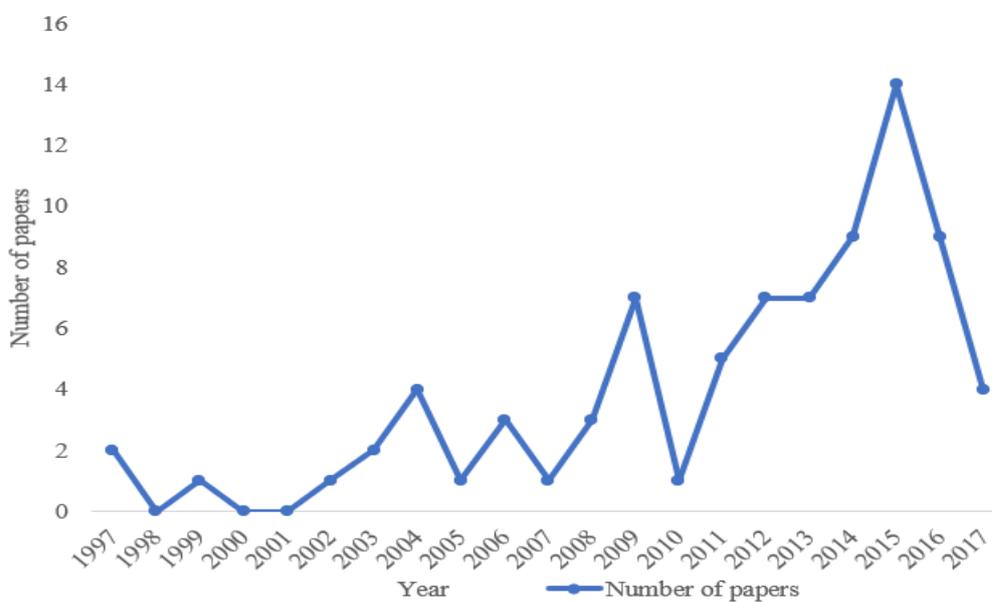
Table 1. Distribution of papers by identity descriptors (conceptualise, theorise, measure) and identity (professional, interprofessional)

	Identity descriptor					
	Conceptualise Only	Theorise Only	Measure Only	Conceptualise & Theorise	Conceptualise & Measure	Conceptualised, Theorise & Measure
Identity						
Professional	7	4	36	8	9	11
Interprofessional	2	0	1	3	4	2

Note. Some papers had more than one identity descriptor.

A variety of settings (e.g. hospitals, aged care facilities, interprofessional student training wards, universities), populations (e.g. students, practitioners, academics) and professions were represented. Of the 84 included papers, 38 comprised students participating in interprofessional programs at university. Nursing was the most frequently researched profession for professional (*n*=49) and interprofessional (*n*=49) identities. Although four papers (Oliver, 2013; Pottie et al., 2009; Roberts & Forman, 2014; Sharpless et al., 2015) discussed the professional identity development of single professions, these were included in this review as they explored professional identity within interprofessional contexts. Further information about the included papers is provided as supplementary material (Appendices A to D).

Definitions

Only three papers provided a definition of professional identity within an interprofessional context (Adams et al., 2006; Coster et al., 2008; McNeil et al., 2013). A summary of definitions is provided in Table 2. In comparison, interprofessional identity was not explicitly defined in any of the papers. Instead, definitions of dual identity were provided in two papers (Barnard, 2015; Khalili et al., 2013). Both emphasised the embodiment of interprofessional practice through concurrent identification with one's profession and the

interprofessional community. It is unclear from these definitions whether interprofessional

identity is conceived as part of a dual identity, or whether dual identity is viewed as

interprofessional identity (see Table 2).

Table 2. A summary of interprofessional identity terminologies and identity descriptors (conceptualise, theorise, define, measure)

Terminology	Dual professional identity (Barnard, 2015)	Dual identity (Khalili et al., 2014; Khalili et al., 2013; Oliver, 2013)	Interprofessional identity (Clouder et al., 2012; Green, 2013; Imafuku et al., 2018; King et al., 2010; Sterrett, 2015; Thistlethwaite, 2016)	Interprofessional professional identity (Falk et al., 2015)	Team identity (Baxter & Brumfitt, 2008)
Conceptualised	Comprises interprofessional professionalism which involves integrating professionalism with interprofessional collaborative practice (Interprofessional Education Collaborative Expert Panel, 2011).	As an outcome of uniprofessional identity transformation guided by an interprofessional socialisation framework. This results in concurrent identification with their own profession and the interprofessional community (Khalili et al., 2013). Achieving congruence between professional and interprofessional identities by being boundary spanners (Oliver, 2013).	As a *dimension of* professional, or as *additional to* professional identity (Green, 2013). An outcome of an uniprofessional identity transformation through hybridization within an interprofessional Third Space (Sterrett, 2015). Interprofessional identity co-existing with professional identity, identity dominance depending on the context (Clouder et al., 2012). A process of *becoming* a collective identity that acknowledges the contributions of all involved with the client (Thistlewaite, 2016).	Abandoning perceptions and boundaries about what constitute profession-specific knowledge and practices.	

Table 2 (*continued*)

Theorised		Social identity theory and intergroup contact theory (Khalili et al., 2013)	Social identity theory (Clouder et al., 2012) Third space theory (Bhabha, 2007)	Communities of practice (Wenger, 1998)	
Defined	Being a competent and confident representative of one's own profession and a constructive collaborator within a team.	A sense of belonging to own profession and the interprofessional community (Khalili et al., 2013)			
Measured	Narratives, pictures and metaphors to understand interprofessional professionalism, a component of dual professional identity (Barnard, 2015).		Analyses of e-portfolios (Imafuku et al., 2018), interview transcripts, reflective diaries and fieldwork observations (Clouder et al., 2012; Green, 2013). The Interprofessional Socialization and Valuing Scale (ISVS) (King et al., 2010)	Questionnaire developed by Falk et al. (2015)	Analyses of interview transcripts and fieldwork observations (Baxter &Brumfitt, 2008).

Conceptualisations

The way that professional identity was conceptualised within interprofessional contexts in the 72 papers reviewed was similar to the wider literature (Trede et al., 2012). For example, 43 papers conceptualised professional identity as being co-constructed continuously in a variety of social settings; existing at the individual (*n*=68) and group (*n*=4) levels (Wackerhausen, 2009). Professional identity within interprofessional contexts was variously conceptualised as understanding where various professions 'sit' within an interprofessional team (Olson et al., 2016); incorporating interprofessional behaviours and responsibilities within professional identity (Joynes, 2018); and as a foundation for individual interprofessional understanding (Meyer et al., 2015). Professional identity development was understood as being influenced by various factors (e.g. stereotypes, role models). For example, uniprofessional socialisation may lead to misconceptions about various professions, which if not corrected, interfere with effective interprofessional teamwork (e.g. Khalili et al., 2013; Olson et al., 2016).

The review found eight papers that conceptualised 'interprofessional identity' explicitly (Table 2). For example, Clouder et al. (2012) proposed interprofessional identity co-exists with professional identity; identity dominance varying dependent on context. Of the eight, only Khalili et al. (2013) outlined an interprofessional socialisation process to inform interprofessional identity development. The remaining seven tangentially discussed the importance of socialisation within interprofessional context(s) for interprofessional identity development.

Theories

There were 24 professional identity papers that incorporated theories (Table 1). From these, the theories utilised were drawn from sociology, psychology and education, however, the majority were from the field of psychology. These theories highlight the relevance of

social, cultural and contextual factors on identity development (Dunston et al., 2019; Trede et al., 2012). They also provide a way for understanding how professional identity may be modified to include interprofessional practice capabilities.

In comparison to professional identity, there were only six interprofessional identity papers which were informed by theory. Social identity theory (Tajfel & Turner, 1986) was used by Oliver (2013), whilst combined with social categorisation theory (Turner, 1985) by Clouder et al. (2012). Social identity theory (Tajfel & Turner, 1986) and intergroup contact theory (Pettigrew, 1998) provided the theoretical basis for two papers (Khalili et al., 2014; Khalili et al., 2013). According to these theories, interprofessional identity represents a change in group membership. Following interprofessional education, individuals who previously identified uniprofessionally may choose to join the group where members have a sense of belonging to their own professions and to the interprofessional community (Khalili et al., 2013).

Apart from social identification theories, Wenger's (1998) communities of practice and third space theory (Bhabha, 2007) were cited in two papers (Falk et al., 2015; Sterrett, 2015). Both theories highlight how social, cultural and contextual factors influence interprofessional identity development.

Measures

Professional identity within interprofessional contexts was measured qualitatively and/or quantitatively in 55 papers (Table 1). Qualitative-only approaches involving ethnography and participant interviews were reported in fifteen papers. Consistent across these studies was a focus on understanding how individuals' perceptions of professional identity were shaped through interprofessional experiences, and factors (e.g. stereotypes, intergroup distinctions) underpinning the development of a professional identity that includes interprofessional practice capabilities.

The remaining papers (*n*=40) reported one or more quantitative measures of professional identity. Sub-scale 2 – Professional identity of Parsell and Bligh's (1999) Readiness for Interprofessional Learning Scale (RIPLS) was the most commonly cited measure (*n* = 28). Professional identity was measured explicitly in five papers (Adams et al., 2006; Coster et al., 2008; Hind et al., 2003; Roberts et al., 2018; Roberts & Forman, 2014) using the Professional Identity Scale (Adams et al., 2006). These papers discussed the relationship between professional identity and attitudes towards interprofessional education.

Another interesting finding was that several papers (*n*=7) discussed professional identity using measures designed to evaluate factors (e.g. stereotypes, occupational commitment) that influenced professional identity development, rather than identity directly (Table 1).

Interprofessional identity was examined qualitatively in four papers (Barnard, 2015; Clouder et al., 2012; Green, 2013; Imafuku et al., 2018) through interviews and ethnographic research. Interprofessional identity was measured indirectly using the Interprofessional Socialization and Valuing Scale (ISVS) in King, Shaw, Orchard, and Miller (2010). This tool measures interprofessional socialisation, a dimension of interprofessional identity or interprofessional identity development.

Consistent with the short-term focus of evaluation studies within the wider interprofessional literature (Reeves et al., 2015), this review found that most studies reported interprofessional identity development over brief snap shots in time (e.g. Green, 2013), or measured identity at one time point only (e.g. Falk et al., 2015). Only Clouder et al. (2012) interviewed participants on multiple occasions over a three-year period. While Clouder et al.,'s (2012) study reported emergence of an interprofessional identity, emphasis was placed on conceptualising rather than 'measuring' identity. Therefore, it remains unclear how interprofessional identity may change over time.

Discussion

This scoping review aimed to understand how professional and interprofessional identities are defined, conceptualised, theorised and measured within the interprofessional literature. Results indicate identity development is an emerging area of research in the interprofessional field, with more than half of the papers published in the last decade. Despite the growth of research into identity in interprofessional contexts, this review found that there was no shared understanding of interprofessional identity or how it relates to professional identity. Findings suggest interprofessional and professional identity developments are underpinned by similar theoretical perspectives, and there was an over-reliance on social identity theory (Tajfel & Turner, 1986) as the sole theory ($n=12$) underpinning professional identity development within interprofessional contexts. A common understanding of how theory informs interprofessional identity was hindered by the range of terms, definitions and conceptualisations of interprofessional identity. An interrelated problem was the poor alignment between how interprofessional identity was conceptualised, theorised and measured. Findings are discussed further with reference to the definitions, conceptualisations, theories and measures associated with interprofessional identity, and recommendations for future research made.

The absence of a uniform terminology and definition of interprofessional identity indicates no common understanding of interprofessional identity exists. This lack of definitional and conceptual clarity parallels reports in the wider interprofessional education literature where different terms have been used interchangeably to discuss common interprofessional concepts (Xyrichis et al., 2018). Establishing a shared definition of interprofessional identity will provide a common starting point for building the knowledge base about interprofessional identity and its relationship with professional identity. For example, we propose the following definition for consideration: the development of a robust

cognitive, psychological, and emotional sense of belonging to an interprofessional community(s), necessary to achieve shared context-dependent goals. Our definition acknowledges the influence of context (e.g. team composition, organisational culture) on identity development, aligns with the dimensions of interprofessional work (Xyrichis et al., 2018) and proposed lexicon for the field (Khalili, Gilbert, et al., 2019). We plan to present our definition for expert review and stakeholder consultation as a first step towards managing the challenge of establishing a shared definition of interprofessional identity for the field.

Most papers reviewed adopted an uncritical application of concepts and theories from the professional identity literature to understand interprofessional identity. For example, apart from nomenclature changes, the same socialisation concepts have been used to explain professional and interprofessional identity developments (Khalili et al., 2013; King et al., 2010). This assumes a relationship exists between both identities although the interplay between them is unclear. Similarly, social identity theory (Tajfel & Turner, 1986) underpinned over half of the included papers with theory. This theory emphasises how group membership(s) contribute towards individuals' identities. Tajfel and Turner (1986) note that individuals are intrinsically motivated to achieve and maintain a positive self-concept by accentuating similarities among like-minded individuals within the group (ingroup) and enhancing differences between groups (outgroups) regularly.

Given identity development is fluid and influenced by socio-cultural factors (Best & Williams, 2018; Dunston et al., 2019; Khalili et al., 2013; Trede et al., 2012), conceptualising interprofessional identity in terms of group memberships according to social identity theory (Tajfel & Turner, 1986) may not adequately capture the facilitators and barriers associated with its development. Perhaps future studies should draw on theories from other fields such as sociology and anthropology to enable a more nuanced exploration of interprofessional identity and its relationship with professional identity.

The notion of interprofessional identity adoption can also be explored further by considering concepts (e.g. belongingness, types of interdependence, satisfaction) from the work identity literature (Miscenko & Day, 2016; Zhang et al., 2012). For example, understanding the motivational underpinnings for sustained interprofessional identity adoption in different contexts may extend current knowledge about socialisation for interprofessional identity development.

Another key finding was the absence of measures (qualitative or quantitative) that explicitly measures interprofessional identity. This mirrors critiques in the broader interprofessional education literature which argues poorly designed measures have been used to evaluate interprofessional initiatives (Dunston et al., 2019; Reeves et al., 2015). The lack of measures can be addressed by adapting psychometrically-robust measures of professional identity (e.g. the Professional Identity Scale (Adams et al., 2006) to explicitly measure interprofessional identity, or by adapting theoretically-driven measures of social identity like the Three-Factor Model of Social Identity scale (Cameron, 2004) to measure interprofessional identity.

The tools currently available that claim to measure interprofessional identity have poor construct validity. For example, the Interprofessional Socialisation and Valuing Scale (ISVS, King et al., 2010) measures interprofessional socialisation, based on the premise that interprofessional socialisation facilitates an identity transformation from professional to interprofessional (King et al., 2010). The tool does not measure identity itself. Similarly, critical examination of items within the RIPLS Sub-scale 2 – Professional Identity (Parsell & Bligh, 1999) indicate that they evaluate *attitudes* towards interprofessional education, rather than professional or interprofessional identity. The development and use of a psychometrically-robust, and theoretically-driven measure of interprofessional identity to measure changes in interprofessional identity over time is recommended to advance

interprofessional identity research. For example, at the time of publication we are undertaking research validating the Three-Factor Model of Social Identity scale (Cameron, 2004). This tool has been adapted with permission from the author to measure professional and interprofessional identity developments in healthcare students.

We also highlight the need for longitudinal studies of interprofessional identity, which is consistent with recommendations by Khalili et al., (2019). For example, instead of measuring interprofessional identity development over brief snap shots in time (e.g. Green, 2013), we recommend tracking interprofessional identity development over multiple time points and exploring its impact on interprofessional practice post qualification and quality of care.

Recent studies recommend conceptualising professional identity development as an educational objective in health professional curricula (Cruess, Cruess, & Steinert, 2019; Dunston et al., 2019). This recommendation can be applied to the interprofessional field where interprofessional identity becomes an objective of interprofessional education. There are two inter-related benefits of emphasising identity development during interprofessional education. First, this educational objective may support learners to internalise the beliefs, values and behaviours associated with interprofessional identity and progress towards becoming interprofessional practitioners. Second, it provides direction for educators to critically re-examine current interprofessional curricula and the associated theoretical constructs, to ensure that they promote interprofessional identity development.

Strengths and limitations

A strength of this review is that it explicitly explores current definitions, conceptualisations, theories and measures of interprofessional identity. This knowledge about interprofessional identity adds to the growing body of literature on identity development within interprofessional contexts (Best & Williams, 2018; Rees et al., 2019),

and responds to the call by Khalili et al., (2019) and others for consensus on terminology and conceptual clarity in the interprofessional field. The inclusion criteria meant that only papers that explicitly discussed interprofessional and/or professional identities within an interprofessional context were reviewed. The grey literature was excluded due to resource (time, personnel) constraints. Consequently, some quality papers about professional identity in healthcare contexts whose theoretical perspectives, conceptualisations and measures may be adaptable for use in interprofessional contexts may have been missed. Given the poor alignment of definitions, conceptualisations, theories and measures of interprofessional identity, and the uncritical application of professional identity concepts to understand interprofessional identity, we recommend conducting a systematic review of both identities within the broader health literature. Findings may shed light on issues related to conceptual clarity, terminology and the interplay between both identities.

Concluding comments

This review confirms the ongoing absence of conceptual clarity, inconsistent terminology and poor alignment between terminology, definitions, concepts, theories and measures associated interprofessional identity and its relationship with professional identity. Future theoretically-driven mixed-methods research is needed to develop an in-depth understanding of interprofessional identity development, and measure changes in identity over-time. Interprofessional identity can be measured by validating current identity measures or by developing an interprofessional identity measure. Findings from longitudinal identity research may clarify the professional and interprofessional capabilities associated with each identity; contribute towards the development of consistent terminology and theoretically-supported descriptors for interprofessional identity; and inform the design and evaluation of future interprofessional education initiatives to promote interprofessional identity development.

Declaration of interest

The authors have no conflict of interest to report.

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Appendices

Appendix A. Distribution of professional identity papers by country and paper type, 1997-2018 ($n = 72$).

Country	UK	Australia	US	Canada	NZ	Germany	Sweden	Italy	Japan	Denmark	UAE	Malaysia	China	Indonesia	Total
Paper classification															
Program	*17	13	11	6	1	1	*2	1	1	1	1	1	1	1	58
Opinion	2	3	4	2	1		1			1					14
			1												1
Summary															
Total	*19	16	16	8	2	1	*3	1	1	2	1	1	1	1	*73

Note. *1 paper shared by two countries so double counted

Appendix B. Distribution of interprofessional identity papers by country and paper type, 1997 – 2018 ($n = 12$).

Country	UK	Australia	US	Canada	Sweden	Japan	Total
Paper classification							
Program	3			1	1	1	6
Opinion		1	2	3			6
Total	3	1	2	4	1	1	12

Appendix C. Number of professional identity papers by profession.
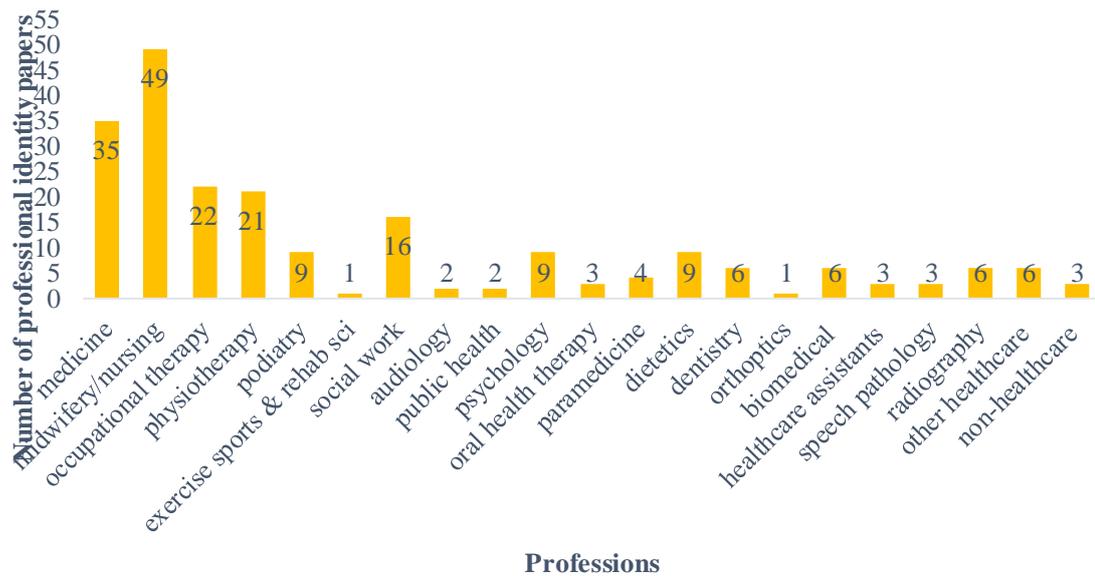
Note. Biomedical professions include laboratory science. Other healthcare professions refer to therapists (not specified), couple and family therapy, professional groups (not specified), front line administration staff, respiratory therapy and health sciences professions (not specified). Non-healthcare professions refer to law, veterinary science and education.

Appendix D. Number of interprofessional identity papers by profession.
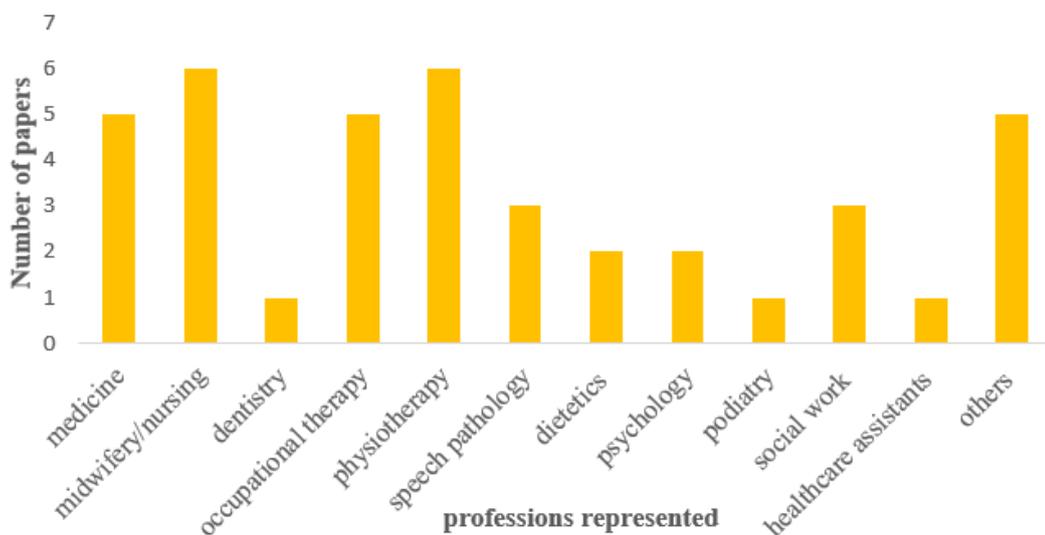
Note. Others refer to youth work, traditional chinese medicine, therapeutic recreation, clinical kinesiology and health services management.

Chapter Four

This chapter responds to the need for theoretically-driven research, a key recommendation from the scoping review (Chapter Three), in two ways. First, the chapter begins by reporting the adaptation and validation process of an existing social identity measure, a three-factor-model of social identity (Cameron, 2004), to measure interprofessional and professional identity. This measure is grounded in social identity theory (Tajfel & Turner, 1986) and fits with the social identity theories (Pettigrew, 1998; Tajfel & Turner, 1986) underpinning this body of research.

Second, the chapter details how both identity measures were used to measure students' professional and interprofessional identity strengths within the first six weeks of a faculty-wide interprofessional first-year programme. The work in this chapter is being developed for a publication titled "Students' professional and interprofessional identities at the commencement of a faculty-wide interprofessional first-year programme" with co-authors Brewer, M., Flavell, H., & Roberts, L. D. This work is in the later stages of a peer review process with a journal. This manuscript was revised and resubmitted on 29th April 2021. Harvard referencing style was used in this paper as a requirement of this journal.

Abstract

This study explores the relationship between healthcare students' professional and interprofessional identities, and the influences of stereotype, contact and demographic variables on identity at the start of a faculty-wide first year interprofessional programme. Identity was measured by adapting a validated social identity measure. Two hundred and fifty-three first-year students from 12 health science professions (including 28 nursing students) participated by completing an online survey within the first six weeks of this programme. Results showed that females had significantly higher interprofessional identity scores than males. Autostereotype and quality of contact were significant unique predictors of professional identity; quality of contact, the only significant unique predictor of interprofessional identity. Professional identity was stronger than interprofessional identity. Unexpected was a significant, positive and large correlation between both identities. Findings support an inclusion of interprofessional education into first-year nursing curricula to develop, maintain or strengthen existing professional and interprofessional identities.

Highlights

- Nursing students enter university with strong professional and interprofessional identities.
- Females had significantly stronger interprofessional identity than males.
- Quality of contact is a unique predictor of professional and interprofessional identity.
- Including interprofessional education in first-year nursing curricula supported.

1. Introduction

The Australian Nursing and Midwifery Accreditation Council (2012) has incorporated interprofessional education within the nursing curriculum. This follows recommendations from the World Health Organisation (2010) recognising interprofessional education as pivotal for all health professional training. Yet to date, studies of interprofessional education and nursing and other healthcare students' training have focused mainly on evaluating changes in attitudes, knowledge and skills associated with interprofessional learning, following short-term interprofessional education programmes (Cox et al., 2016; Dunston et al., 2018; Lim & Noble-Jones, 2018). As Coster et al. (2008) notes, attitudes may change over time with different experiences and contexts. Therefore, relying on attitude changes as a sole measure of interprofessional education outcomes is insufficient, and the examination of more stable constructs such as identity may be warranted. Understanding the factors that influence nurses' professional and interprofessional identities at the start of undergraduate nursing tertiary programmes may inform the design of future nursing curricula to graduate nurses capable of interprofessional practice.

2. Literature review

There is a paucity of studies examining interprofessional identity in undergraduate nursing and other healthcare students. The few studies conducted in this area have placed emphasis on professional identity and attitudes towards interprofessional education, rather than interprofessional identity (Hood, Cant, Leech, et al., 2014). This suggests a relationship exists between professional and interprofessional identities, however, the interplay between both is unclear.

Khalili et al. (2013) viewed dual identity (professional and interprofessional) acquisition as an outcome of interprofessional socialisation. Frameworks have been

developed to outline the guiding principles associated with interprofessional socialisation for students (Khalili et al., 2013) and educators (Stanley & Stanley, 2019). However, professional identity development and socialisation begins before university (Price, 2009). Career selection is influenced by factors such as the media, role models (Browne et al., 2018; Price, 2009) and self-concept (Johnson et al., 2012). These influences may contain misconceptions and prejudicial beliefs, such as a gendered understanding of nursing as a caring profession (Tierney et al., 2019). Consequently, students may begin university with professional identities that are incongruent with the realities of professional practice (Johnson et al., 2012; Scanlon, 2011). Furthermore, traditional profession-specific education and socialisation may result in students acquiring a professional identity with a limited understanding of other professions (Khalili et al., 2014; McNair, 2005).

Social identity theory (Tajfel & Turner, 1986) emphasises the importance of group membership(s), and has previously been used to understand nurses' professional identity development (Hoeve et al., 2014; Willetts & Clarke, 2014). Tajfel (1978) defined social identity as "that part of an individual's self-concept which derives from his [or her] knowledge of his [or her] membership of a social group (or groups) together with the value and emotional significance attached to that membership." (p.63) This definition provides the theoretical basis for conceptualising social identity as comprising centrality, ingroup affect and ingroup ties (Brown et al., 1986; Cameron, 2004; Ellemers et al., 1999). In the current study, ingroup and outgroup distinctions were conceptualised as occurring when students made positive autostereotypes (perceptions of students from the same profession) and negative heterostereotypes (perceptions of students from other professions), based on stereotype definitions by Carpenter (1995). Previous research (Carpenter, 1995; Lawlis et al., 2014) suggests stereotypes are reinforced when first-year students are involved in profession-specific education.

A related theory, Pettigrew's (1998) intergroup contact theory, has been used to explain stereotype and attitude shifts amongst health professionals following contact with other professions through interprofessional education (Barr, 2013; Hean & Dickinson, 2005). Exposing healthcare students to interprofessional education programmes early in their training is one strategy posited to 'correct' autostereotypes and heterostereotypes (Carpenter, 1995), thus preparing students for interprofessional socialisation experiences (Reeves et al., 2012; Stanley & Stanley, 2019). Khalili et al. (2013) argued simultaneous identification with one's own profession and the wider interprofessional community facilitates professional and interprofessional identity development consistent with intergroup contact theory (Pettigrew, 1998).

Research examining interprofessional identity in nursing and health care students from a social identity perspective has been hampered by the absence of appropriate validated measures. The Readiness for Interprofessional Learning Scale (RIPLS; Parsell & Bligh, 1999), widely-used in the interprofessional field (Mahler et al., 2015), has been used to measure changes in nursing students' professional identity following interprofessional education (Hood et al., 2014). This is not an appropriate measure of identity as it was designed to measure attitudes rather than identity.

Other studies (Coster et al., 2008; Roberts, Davis, Radley-Crabb, & Broughton, 2018; Roberts & Forman, 2014) have measured identity in healthcare students using the Professional Identity Scale (Adams, Hean, Sturgis, & Macleod Clark, 2006). This measure addresses only one of the three factors of social identity, despite cogent evidence supporting the multidimensionality of social identity (Ellemers, Kortekaas, & Ouwerkerk, 1999; Jackson, 2002; Tajfel, 1978). Furthermore, no previously published research has used a validated tool to specifically measure interprofessional identity.

Summarily, identity development within interprofessional contexts is an under-researched area. A lack of tools to measure interprofessional identity, scant literature about interprofessional identity and its relationship with professional identity and socialisation, limit current understanding. Findings from an exploration of nursing and other healthcare students' professional and interprofessional identity strengths, and drivers of identity development at the start of a faculty-wide interprofessional first-year programme, may inform the design and implementation of interprofessional educational initiatives within the nursing curricula. This is important given nurses and midwives constitute the largest proportion (63%) of the Australian health workforce (Australian Institute of Health and Welfare, 2012, p. 501) and work across health with a range of allied health and medical professionals.

Underpinned by social identity (Tajfel & Turner, 1986) and intergroup contact theories (Pettigrew, 1998), this study aimed to a) examine demographic, stereotype and contact predictors of professional and interprofessional identities of nursing and other healthcare students enrolled in a faculty-wide first-year interprofessional programme, and b) compare the relative strength of both identities at the beginning the programme using a social identity measure. It was hypothesized that a) demographic variables (age, gender, study mode, previous degrees, and previous work or volunteer experiences in health settings), stereotypes (autostereotype, heterostereotype), quality and quantity (within university, outside university) of contact with students from other professions would account for significant variance in the strength of students' professional and interprofessional identities, and b) professional identity will be stronger than interprofessional identity at the start of the programme. Addressing the measurement limitations of previous studies, the identity measures used in this study have been developed within a social identity framework, and the

psychometric properties of the adapted identity, stereotype and contact measures used are reported.

3. Methodology

3.1. Design

This study employed a cross sectional correlational design with criterion variables professional and interprofessional identities, and independent variables of age, gender, course enrolled, mode of study, prior degrees completed, prior work or volunteer experiences, quality and quantity of contact, autostereotype and heterostereotype.

3.2. Setting

All first-year first-semester students enrolled in a faculty-wide interprofessional programme at an Australian university[1] were invited to participate. Over 12 teaching weeks each semester, students are expected to spend at least four hours each week together in tutorials associated with core units[2] of this programme, as a way of developing their interprofessional identity.

3.3. Participants

Participants were 253 students from nursing, medicine and 10 allied health professions (see Table 1). Most were female (71%,), full-time (92.5%) domestic students (93.3%,) pursuing their first undergraduate degree (87.4%). They were between 17 and 56 years old (M = 21.5, SD = 7.26). Just over on third (36.7%) had prior work or volunteer experiences within the healthcare sector.

Note.[1]See M. L. Brewer et al. (2014) for full details of the interprofessional first-year programme. This programme was informed by an Interprofessional Practice Capability Framework (Brewer & Jones, 2013).

[2]Units in Australia are equivalent to courses in the United States of America.

Table 1: Participant composition by profession (*N* = 253)

Profession	*N*	%
Nursing	28	11.1
Paramedicine	9	3.6
Physiotherapy	14	5.6
Occupational Therapy	23	9.1
Speech Pathology	11	4.3
Exercise Science	8	3.2
Psychology single degree	69	27.3
Psychology double degree	14	5.5
Biomedical Sciences	28	11.1
Social Work	8	3.2
Pharmacy	16	6.3
Medicine	10	4.0
Public Health	15	5.9

Participants were recruited through a psychology student research participant pool, social media, tutorials and the University's learning management system. Psychology students enrolled in a student research participation pool were awarded one participation point as an incentive to participate in this study. Psychology students need to participate in psychology-related research studies and accrue participation points for doing so, as a requirement of psychology courses at this university. Non-psychology students who participated in this study could enter a prize draw to win one of three iTunes vouchers. All students, regardless of their course of study, participated in this study on a voluntary basis. Students participated between February and March 2017.

3.4. Data collection

An online survey comprising three scale measures and single-item measures of demographics was developed and hosted on Qualtrics.com. All measures were adapted and used with permission. The survey was programmed to prevent multiple entries from the same participant, and it was piloted ($N = 11$) to test the understandability of questions prior to use in this study. The mean completion time was 18.5 minutes.

Professional identity was measured using an adaptation of the Three-Factor Model of Social Identity Scale (Cameron, 2004). Minor wording changes were made to focus the measure on professional identity. This 12-item measure comprises three subscales: ingroup ties, centrality and ingroup affect. Items are scored on a 6-point Likert-type scale from *strongly disagree* (1) to *strongly agree* (6). In this sample, the adapted measure is internally reliable: total scale ($\alpha = .81$), ingroup ties ($\alpha = .78$), centrality ($\alpha = .66$) and ingroup affect ($\alpha = .87$). A total scale score was calculated with higher scores indicating stronger levels of professional identity.

Interprofessional identity was measured using the same measure used for professional identity with references to my profession changed to "health science professionals". The adapted measure is internally reliable: total scale ($\alpha = .82$), ingroup ties ($\alpha = .84$), centrality ($\alpha = .74$) and ingroup affect ($\alpha = .81$). A total scale score was calculated with higher scores indicating stronger levels of interprofessional identity.

Heterostereotype was measured by prefacing the Student Stereotype Rating Questionnaire (Hean, Macleod-Clark, et al., 2006) with "When you were in contact with students within the Faculty of Health Sciences, which *profession other than your own*, did you make frequent contact with? Please list *one* profession only. With this profession in mind, how would you rate students from this profession on the following?" The adapted questionnaire is internally reliable ($\alpha = .90$). The Student Stereotype Rating Questionnaire

(Hean, Macleod-Clark, et al., 2006) asks students to rate a profession on nine attributes (e.g., academic ability, professional competence, confidence) with a 5-point Likert-type response scale from *very low* (1) to *very high* (5). A mean scale score was calculated with higher scores representing more positive heterostereotypic perceptions.

Autostereotype was measured by prefacing items in the questionnaire for heterostereotypes with "How would you rate students from your *own profession* on the following?". The adapted questionnaire is reliable (α = .91). A mean scale score was calculated with higher scores representing more positive autostereotypic perceptions.

Five items within the Dimensions of Contact Scale (Islam & Hewstone, 1993) were used to measure quality of contact with other health science students. Items are scored on a 7-point Likert-type scale from *definitely not* (1) to *definitely yes* (7). This subscale was adapted by prefacing the items with "When you are in contact with students from other professions, was contact". This adapted measure has acceptable internal reliability (α = .75). A mean scale score was calculated with higher scores indicating greater amounts of quality contact.

Two questions were created to measure quantity of contact. These were: "How much time on average do you spend each week with students from other professions while at University?" and "How much time on average do you spend each week with students from other professions outside University?" Response options ranged from *0* to *more than 50* in one-hour increments.

Single item measures of age, gender, course enrolled, study mode, prior degrees completed and previous work or volunteer experience in health settings were included in the questionnaire.

3.5. Data analysis

The planned analyses for this study were data cleaning, confirmatory factor analysis and internal reliability checks (Cronbach's alpha) to assess the psychometric properties of the adapted professional and interprofessional identity measures, assumption testing, two hierarchical multiple regression analyses to test the first hypothesis, followed by a repeated measures t-test to test the second hypothesis.

3.5.1. Data cleaning

A total of 277 cases were received and downloaded into IBM SPSS (v. 24) at the end of the survey period. Cases with less than twenty percent complete ($N = 21$) and another three where participants were not first-year students were deleted, leaving 253 cases for analysis. There were 142 missing data points (0.79%) across the questionnaires. Little's Missing Completely At Random (MCAR) test was significant, χ^2 (1851, $n = 253) = 2083.04$, $p < .001$. Separate variance t tests indicated missingness was not related to the dependent variables, therefore missing data points were deemed missing at random and replaced using expectation-maximization (Tabachnick & Fidell, 2007).

3.6. Ethical considerations

The study was approved by the University's Human Ethics Research Committee (Approval number: HRE2016-0407) before recruitment commenced.

4. Results

4.1. Psychometric properties of the adapted measures

Confirmatory factor analysis (CFA) was conducted on the professional and interprofessional identity measures using EQS (v. 6.3) (See Tables 2 and 3 respectively for fit indices).

Table 2: Fit indices for professional identity confirmatory factor analysis models (robust statistics)

Model IFI	S-B χ^2/df	CFI	NNFI	RMSEA
Recommended cut offs ≥.90 (Kline, 2005)	$p > .05$	≥.90	≥.90	≤.08
Correlated three-factor .87 model	$p < .001$	.87	.83	.09
Uncorrelated three-factor .80 model	$p < .001$	.80	.75	.11
Higher order three-factor model .90	$p < .001$	.94	.91	.07

Note. S-B = Satorra-Bentler. CFI = comparative fit index. NNFI = non-normed fit index. RMSEA = root mean square error of approximation. IFI = incremental fit index.

Table 3: Fit indices for interprofessional identity confirmatory factor analysis models (robust statistics)

Model IFI	S-B χ^2/df	CFI	NNFI	RMSEA
Recommended cut offs ≥.90 (Kline, 2005)	$p > .05$	≥.90	≥.90	≤.08
Correlated three-factor .86 model	$p < .001$	.86	.81	.10
Uncorrelated three-factor .81 model	$p < .001$	.81	.77	.11
Higher order three-factor model .89	$p < .001$	.89	.85	.09

Note. S-B = Satorra-Bentler. CFI = comparative fit index. NNFI = non-normed fit index. RMSEA = root mean square error of approximation. IFI = incremental fit index.

Three models – a three-factor correlated model as proposed by Cameron (2004), an uncorrelated three-factor model and a higher order model – were tested for both professional identity and interprofessional identity against the recommended cut-offs. The higher order model (Figures 1 and 2) was selected as the preferred model for both identities as it provides the best fit to the data. Although model fit is not optimal for the interprofessional measure, fit statistics for the higher order three-factor model are closest to the recommended cut-offs.

The first factor represents ingroup ties, the second factor represents centrality, and the third factor represents ingroup affect. To retain the integrity of the original theoretically driven model of identity, no changes were made to the professional or interprofessional models based on modification indices. The measures are internally reliable (Professional identity α = .81; Interprofessional identity α = .82).

Figure 1: Higher order three factor model for professional identity
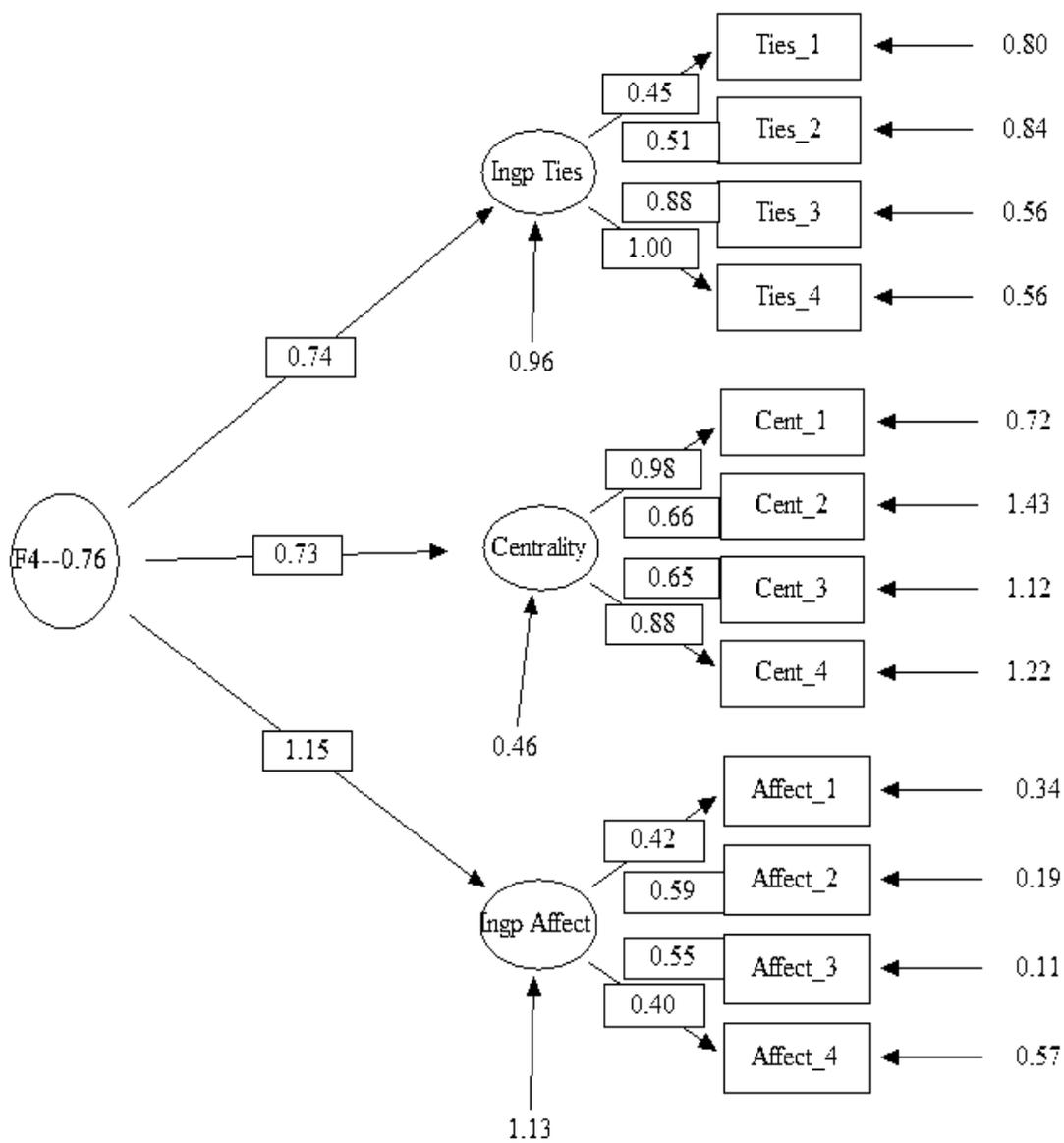
Figure 2: Higher order three factor model for interprofessional identity
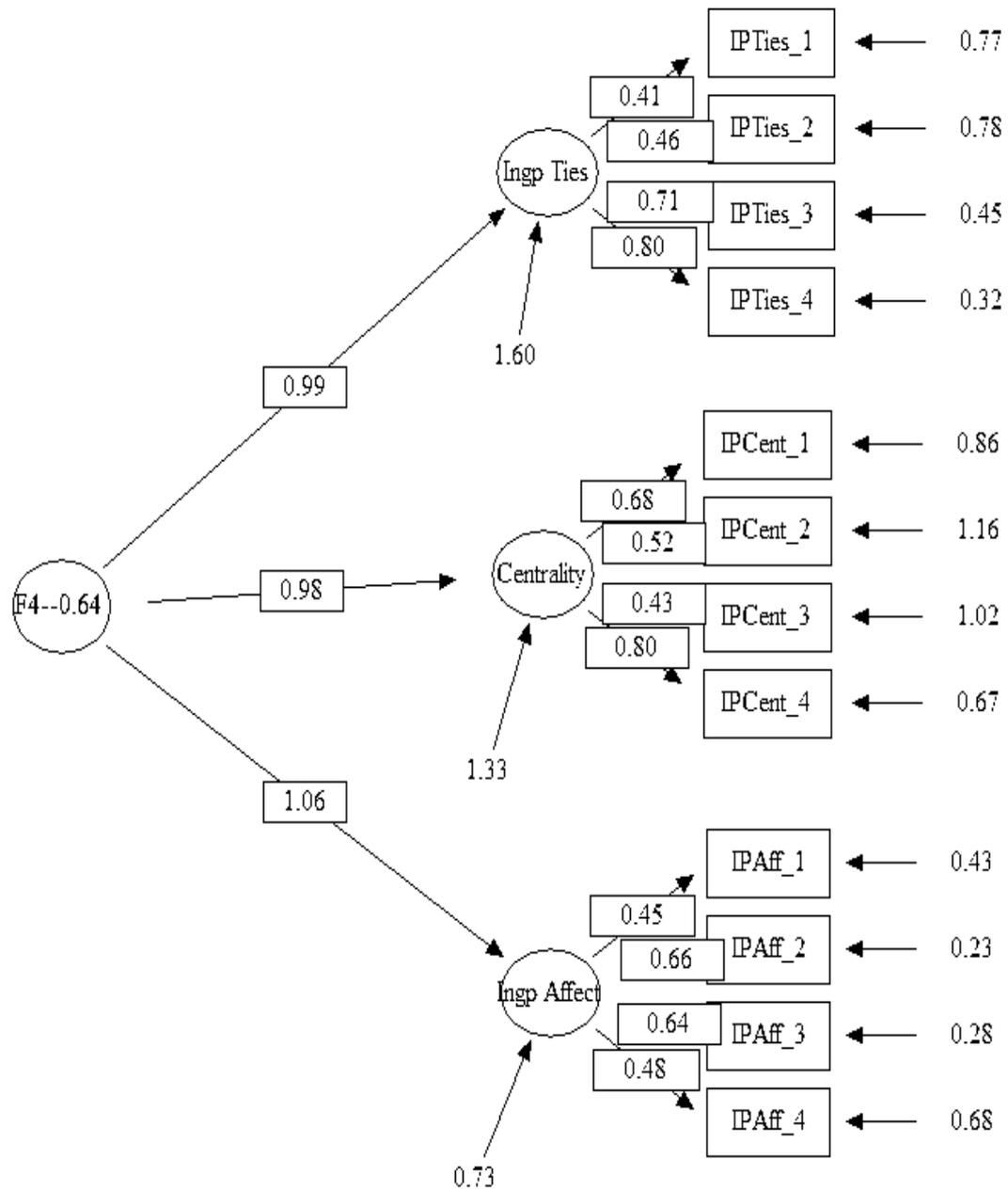
Confirmatory factor analyses indicated the unidimensional factor structure of stereotype (heterostereotype, autostereotype) and contact (quality) measures were adequate in this sample. Descriptive statistics for all measures are presented in Table 4.

Table 4: Scale scores of identity, stereotype and contact measures for all participants ($N = 253$)

	Scale range		Scale scores			
	Minimum	Maximum	Minimum	Maximum	Mean	SD
Identity						
Professional						
Ingroup Ties	1.00	6.00	1.00	6.00	4.27	0.94
Centrality	1.00	6.00	1.00	6.00	4.14	0.91
Ingroup Affect	1.00	6.00	2.00	6.00	5.28	0.77
Total	1.00	6.00	1.83	5.92	4.56	0.66
Interprofessional						
Ingroup Ties	1.00	6.00	1.00	6.00	4.12	0.98
Centrality	1.00	6.00	1.00	6.00	3.97	0.97
Ingroup Affect	1.00	6.00	2.25	6.00	5.25	0.75
Total	1.00	6.00	1.92	5.92	4.45	0.66
Stereotype						
Hetero	1.00	5.00	1.56	5.00	3.81	0.57
Autostereotype	1.00	5.00	2.33	5.00	3.94	0.57
Contact						
Quality	1.00	7.00	1.20	7.00	5.02	0.99

Note. Scale range represents the possible range of scores for each measure. Scale scores represent mean scores of all items within each subscale of the identity measures, and of all items on the stereotype and quality of contact measures respectively.

4.2. Independent variables that influenced professional and interprofessional identity strengths

Prior to conducting regression analyses, each of the independent variables was tested for their relationship with professional and interprofessional identity. Females ($M = 4.51$, $SD = .68$) had higher interprofessional identity scores than males ($M = 4.30$, $SD = .61$). This difference was statistically significant, $t(251) = -2.21$, $p = .028$, 95% CI [-0.38, -0.22] and a medium effect, $d = 0.66$. There were no gender differences in professional identity scores. No significant differences were found for the other demographic variables tested.

The correlation matrix (Table 5) indicates professional identity was significantly positively correlated with interprofessional identity, stereotype (auto and hetero) and quality of contact. Interprofessional identity was significantly positively correlated with stereotype (auto and hetero), quality of contact, and gender (female).

Table 5. Pearson correlation matrix for identity, stereotype, contact and demographic variables.

| | Identity | | Stereotype | | Contact | | | Demographic | | | | | |
| | | | | | Quantity | | | | | | Previous experience | | |
	Professsional	Interprofessional	Hetero	Auto	Within university	Outside university	Quality	Gender	Age	Study mode	Work or volunteer	Degrees completed
Identity												
Professional	1	.71**	.16*	.32**	-.04	-.04	.28**	.09	.11	.11	-.063	-.04
Interprofessional		1	.24**	.24**	.05	.04	.33**	.14*	.09	.03	-.08	-.05
Stereotype												
Hetero			1	.54**	-.03	.04	.45**	.06	-.16*	-.02	.10	.09
Auto				1	-.07	.04	.32**	.02	-.27**	-.01	.04	.11
Contact												
Quantity												
Within university					1	.20**	.08	-.18**	-.24**	-.28**	.09	.21**
Outside university						1	.05	-.11	-.17**	-.03	.06	.04
Quality							1	.01	-.19**	-.09	.06	.08
Demographic												
Gender								1	.06	.04	-.08	-.06
Age									1	.29**	-.21**	-.32**
Study mode										1	-.23**	-.25**
Previous work and volunteer experience											1	.26**
Previous degrees completed												1

Note. Heterostereotype refers to perceptions of students from one other profession with the Faculty of Health Sciences other than the participant's own profession. Autostereotype refers to perceptions of students from the participant's own profession. Contact quality refers to contact participants made with students from other professions within the Faculty of Health Sciences. Raw scores (years) were used for Age. Gender 1 = female, 0 = male; Study mode 0 = on campus, 1 = fully online; Previous work and volunteer experience 0 = yes, 1 = no; Previous degrees completed 0 = yes, 1 = no. * $p < 0.05$ (2-tailed). ** $p < 0.01$ (2-tailed).

4.3. Independent variables that influenced the amount of variance in professional and interprofessional identities

4.3.1. Professional identity

Seven multivariate outliers were detected using Mahalanobis distance. All had Cook's values of less than one (Tabachnick & Fidell, 2007), hence were deemed non-influential and retained for analysis.

In the first hierarchical multiple regression analysis, demographic variables, entered on the first step, accounted for a non-significant 2.60% variance in professional identity, R^2 = .03, F (5, 247) = 1.33, p = .25. Heterostereotype, autostereotype and quality of contact accounted for a further significant 18.20% variance in professional identity, ΔR^2 = .18, ΔF (3, 244) = 18.68, p < .001, with autostereotype and quality of contact accounting for significant unique variance in professional identity. The full model comprising demographic, heterostereotype, autostereotype and quality of contact variables accounted for a significant 20.80% variance in professional identity, R^2 = .21, adjusted R^2 = .18, F (8, 244) = 8.02, p < .001. This is a large (f^2 = 0.27) effect (Cohen, 1988).

4.3.2. Interprofessional identity

Seven multivariate outliers were detected using Mahalanobis distance. All had Cook's values of less than one (Tabachnick & Fidell, 2007), hence were deemed non-influential and retained for analysis.

In the second hierarchical multiple regression analysis, demographic variables accounted for a non-significant 2.80% of the variance in interprofessional identity, R^2 = 0.03, F (5, 247) = 1.43, p = .22. Heterostereotype, autostereotype and quality of contact accounted for a further significant 15.70% variance in interprofessional identity, ΔR^2 = .16, ΔF (3, 244) = 15.68, p < .001, with quality of contact the only significant unique variable that influenced

interprofessional identity strength. The full model comprising demographic, heterostereotype, autostereotype and quality of contact variables accounted for a significant 18.50% variance in interprofessional identity, $R^2 = .19$, adjusted $R^2 = .16$, $F (8, 244) = 6.93$, $p < .001$. This is a large ($f^2 = .28$) effect (Cohen, 1988) of interprofessional identity (Table 6).

Table 6: Hierarchical multiple regression predicting professional and interprofessional identities from demographic, stereotype and contact predictors (*N*=253)

Variable	Professional identity				Interprofessional identity			
	B	[95%CI]	β	sr^2	B	[95%CI]	β	sr^2
Model 1								
Age	.01	[-.01, .02]	.08	.01	.01	[-.01, .02]	.05	.00
Gender	.12	[-.06, .30]	.08	.01	.19	[.01, .37]	.13	.02
Study mode	.29	[-.17, .75]	.10	.01	-.05	[-.51, .41]	-.05	.00
Previous work and volunteer experience	-.04	[-.22, .14]	-.03	-.00	-.08	[-.26, .10]	-.06	-.00
Previous degrees completed	.06	[-.22, .33]	.03	.00	-.02	[-.29, .26]	-.01	-.00
Model 2								
Age	.02	[.01, .03]*	.21	.03	.02	[.00, .02]*	.10	.01
Gender	.11	[-.06, .27]	.08	.01	.17	[-.00, .33]	.11	.00
Study mode	.25	[-.17, .66]	.07	.00	-.07	[-.50, .36]	-.05	-.00
Previous work and volunteer experience	-.02	[-.19, .14]	-.02	-.00	-.08	[-.25, .08]	-.08	-.01
Previous degrees completed	.02	[-.22, .27]	.01	.00	-.05	[-.30, 20]	-.03	-.00
Heterostereotype	-.15	[-.31, .02]	-.13	-.01	.05	[-.12, .21]	.04	.00
Autostereotype	.41	[.25, .57]**	.36	.09	.21	[.04, .37]*	.18	.02
Quality of contact	.18	[.09, .26]**	.27	.06	.19	[.11, .28]**	.29	.07

Note. B = unstandardized regression coefficient; CI = confidence interval; β = standardised regression coefficient; sr^2 = squared semi-partial (part) correlations. * p < .05. ** p < .001.

4.4. Relative identity strengths

A repeated measures *t*-test was conducted to compare mean professional (*M* = 4.56, *SD* = .69) and interprofessional (*M* = 4.45, *SD* = .67) identity strengths. On average, professional identity was stronger, μ_d = .12, 95% CI [0.06, 0.18], than interprofessional identity. This difference was statistically significant, *t*(252) = 3.72, *p* < .001, and small, *d* = 0.18 (Cohen, 1988). Table 7 contains the professional and interprofessional identity scores by profession.

Table 7: Mean scores and standard deviations of professional and interprofessional identity measures by profession (*N*=253)

| | Identity | | | | | | | |
| | Professional | | | | Interprofessional | | | |
Profession (*N*)	Ingroup Ties *M*(*SD*)	Centrality *M*(*SD*)	Ingroup Affect *M*(*SD*)	Total *M*(*SD*)	Ingroup Ties *M*(*SD*)	Centrality *M*(*SD*)	Ingroup Affect *M*(*SD*)	Total *M*(*SD*)
Medicine (10)	4.50 (0.74)	4.59(0.99)	5.45(0.64)	4.85(0.96)	3.40(0.96)	4.13(1.13)	5.15(0.71)	4.23(0.68)
Speech Pathology (11)	3.98(1.10)	3.93(1.51)	4.69(1.10)	4.20(0.91)	3.98(0.95)	3.86(1.48)	4.93(0.71)	4.26(0.84)
Exercise Science (8)	3.78(0.51)	4.22(0.54)	5.47(0.34)	4.49(0.27)	3.50(0.73)	4.00(0.88)	5.28(0.51)	4.26(0.51)
Social Work (8)	3.78(0.51)	4.22(0.54)	5.47(0.34)	4.49(0.27)	3.50(0.73)	4.00(0.89)	5.28(0.51)	4.26(0.51)
Public Health (15)	3.75(1.37)	3.72(0.93)	4.78(1.09)	4.11(0.99)	3.72(1.31)	3.88(1.16)	5.22(0.81)	4.27(0.95)
Psychology (83)	4.19(0.90)	3.99(0.85)	5.24(0.74)	4.47(0.60)	4.12(1.04)	3.76(0.92)	5.15(0.76)	4.34(0.63)
Pharmacy (16)	4.66(0.77)	4.00(0.95)	5.41(0.51)	4.69(0.59)	4.31(0.61)	3.66(1.06)	5.33(0.66)	4.43(0.56)
Biomedical Sciences (28)	3.93(0.89)	4.25(0.88)	5.14(0.96)	4.44(0.69)	4.02(0.79)	4.20(0.97)	5.17(0.87)	4.46(0.71)
Nursing (28)	4.44(0.82)	4.27(0.82)	5.55(0.51)	4.76(0.44)	4.37(0.95)	4.17(0.69)	5.30(0.70)	4.64(0.53)
Physiotherapy (14)	4.63(0.62)	4.49(1.01)	5.13(0.92)	4.74(0.67)	4.39(0.91)	4.36(1.13)	5.21(1.07)	4.66(0.75)
Occupational Therapy (23)	4.46(0.87)	4.32(0.84)	5.46(0.50)	4.74(0.53)	4.30(1.08)	4.21(0.83)	5.51(0.45)	4.67(0.58)
Paramedicine (9)	5.25(1.05)	4.64(0.84)	5.97(0.08)	5.29(0.55)	4.39(0.78)	4.03(0.93)	5.81(0.30)	4.74(0.54)

5. Discussion

This study was undertaken to a) examine the influence of demographic, stereotype and contact variables on the strength of nursing and other healthcare students' professional and interprofessional identities at the start of a faculty-wide interprofessional first-year programme, and b) compare the relative strength of both identities. This is the first study that has investigated interprofessional identity using a social identity measure. The psychometric properties of the adapted measures were generally supported by the confirmatory factor analysis and reliability analyses results. However, less than optimal fit

statistics indicate that further development of the interprofessional identity measure is required.

Gender was the only significant demographic variable that influenced interprofessional identity strength; females had significantly higher interprofessional identity scores than males. However, gender was not a significant variable that influenced professional identity strength. This result differs from a finding by Adams et al. (2006). They found gender to be a significant predictor of first-year students' professional identity. Given a prevalence of papers reporting mixed results about gender and attitudes towards interprofessional education (Reeves et al., 2016), further longitudinal research exploring the relationship among gender, interprofessional education, and identity (professional and interprofessional) may shed light on these relationships

Across the professions, nursing students had the fourth strongest professional and interprofessional identities; with professional identity slightly stronger than interprofessional identity. This is consistent with the key finding of professional identity being significantly stronger than interprofessional identity across the professions surveyed. Unexpected was a significant, large positive correlation between both identities for all professions. Strong ratings for both identities early into the interprofessional programme (within the first six weeks) support the early introduction of interprofessional education in health professions curricula to maintain professional and interprofessional identity strengths. Our results also align with studies demonstrating individuals can belong to multiple social groups and concurrently display multiple identity salience (Crisp & Hewstone, 2001; Ellemers et al., 2002). Given the context for learning was a common first-year interprofessional programme, this finding may suggest participants, including nursing students, either a) identified with both their profession and as future healthcare practitioner or b) have not differentiated between the two identities at this early stage of their training.

Nursing students had stronger interprofessional identities than medical students, who scored the lowest on interprofessional identity among the 12 professions represented. Conversely, medical students had stronger professional identities compared to nursing students. These results may reflect the historical effects of the social positioning of medicine and nursing (Price et al., 2014), and the influence of profession-related stereotypes on career choice (MacMillan, 2012; Price et al., 2013). For example, the caring ethos is commonly associated with nursing (Price et al., 2013; Sandvik et al., 2015), while doctors are perceived as the main decision maker in client care (Price et al., 2014). Future research measuring nursing and medicine students' professional and interprofessional identity strengths at the end of the year-long interprofessional programme will further our understanding of how interprofessional education delivered, over 12 weeks each semester, impacts first-year students' professional and interprofessional identity strengths.

In addition to gender, quality of contact as a significant unique predictor of interprofessional identity is consistent with intergroup contact theory (Pettigrew, 1998). In other words, quality interprofessional contact experiences are important to promote interprofessional identity development in first-year students. Similarly, quality of contact and autostereotype as significant unique predictors of professional identity may suggest the presence of cross-categorisation (Hogg, 2016) where students identified with their profession-specific group and as first-year students.

This study has some limitations. Students were recruited from one institution. There was no control group as the interprofessional programme was mandatory for all students. Therefore, it remains unclear whether a level of interprofessional identity existed before students commenced university, or whether the level of interprofessional identity is due to students' early engagement in the interprofessional programme. Furthermore, only approximately ten percent of the first-year cohort participated as participation was voluntary

and the survey had to be completed outside tutorials. However, our sample of 253 students from 12 professions is large relative to average sample sizes and spread of professions in previous studies (Reeves et al., 2016), increasing confidence in the generalisability of our findings.

6. Conclusions and implications

The main finding of this study is that professional and interprofessional identities were present in first-year nursing, allied health and medical students within the first six weeks of an interprofessional first-year programme. This supports an early introduction of interprofessional education focused on providing quality contact experiences. Results also support the use of psychometrically-robust social identity measures to measure professional and interprofessional identity strengths.

Future studies should also explore the identity developmental trajectories of both identities. For example, the identified predictors of both identities and nursing students' relatively strong professional and interprofessional identities early in the interprofessional programme provide a starting point for tracking changes in identity strengths towards the end of the interprofessional programme. These findings may shed light on the defining characteristics of interprofessional identity, its relationship with professional identity, and inform future interprofessional initiatives within the nursing curricula.

Conflicts of interest

None.

Contributions

(1) the conception and design of the study, interpretation of data W, X, Y, Z

(2) drafting the article W

(3) final approval of the version to be submitted W, X Y Z

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TREND Statement Checklist

Paper Section/ Topic	Item No	Descriptor	Reported? √	Pg #
Title and Abstract				
Title and Abstract	1	• Information on how unit were allocated to interventions	√	1
		• Structured abstract recommended	√	1
		• Information on target population or study sample	√	1
Introduction				
Background	2	• Scientific background and explanation of rationale	√	2 - 5
		• Theories used in designing behavioral interventions	√	3 - 4
Methods				
Participants	3	• Eligibility criteria for participants, including criteria at different levels in recruitment/sampling plan (e.g., cities, clinics, subjects)	√	6 - 8
		Method of recruitment (e.g., referral, self-selection), including the sampling method if a systematic sampling plan was implemented	√	6 - 8
		• Recruitment setting	√	6 – 8
		• Settings and locations where the data were collected	√	6 - 8
Interventions	4	• Details of the interventions intended for each study condition and how and when they were actually administered, specifically including:		
		○ Content: what was given?	√	7
		○ Delivery method: how was the content given?	√	7
		○ Unit of delivery: how were the subjects grouped during delivery?	√	7
		○ Deliverer: who delivered the intervention?	√	7
		○ Setting: where was the intervention delivered?	√	7
		○ Exposure quantity and duration: how many sessions or episodes or events were intended to be delivered? How long were they intended to last?	√	7
		○ Time span: how long was it intended to take to deliver the intervention to each unit?	√	7
		○ Activities to increase compliance or adherence (e.g., incentives)	√	6 - 7
Objectives	5	• Specific objectives and hypotheses	√	5
Outcomes	6	• Clearly defined primary and secondary outcome measures	√	5
		• Methods used to collect data and any methods used to enhance the quality of measurements	√	10
		• Information on validated instruments such as psychometric and biometric properties	√	Figures 1&2 and Tables 2,3&4
Sample Size	7	How sample size was determined and, when applicable, explanation of any interim analyses and stopping rules	√	9
Assignment Method	8	Unit of assignment (the unit being assigned to study condition, e.g., individual, group, community)	√	6
		Method used to assign units to study conditions, including details of any restriction (e.g., blocking, stratification, minimization)	√	7
		Inclusion of aspects employed to help minimize potential bias induced due to non-randomization (e.g., matching)	√	7

TREND Statement Checklist

			N/A	
Blinding (masking)	9	• Whether or not participants, those administering the interventions, and those assessing the outcomes were blinded to study condition assignment; if so, statement regarding how the blinding was accomplished and how it was assessed.	N/A	
Unit of Analysis	10	• Description of the smallest unit that is being analyzed to assess intervention effects (e.g., individual, group, or community)	√	6
		• If the unit of analysis differs from the unit of assignment, the analytical method used to account for this (e.g., adjusting the standard error estimates by the design effect or using multilevel analysis)	N/A	N/A
Statistical Methods	11	• Statistical methods used to compare study groups for primary methods outcome(s), including complex methods of correlated data	√	10 – 12
		• Statistical methods used for additional analyses, such as a subgroup analyses and adjusted analysis	√	10 – 12
		• Methods for imputing missing data, if used	√	9
		• Statistical software or programs used	√	9
Results				
Participant flow	12	Flow of participants through each stage of the study: enrollment, assignment, allocation, and intervention exposure, follow-up, analysis (a diagram is strongly recommended)		
		○ Enrollment: the numbers of participants screened for eligibility, found to be eligible or not eligible, declined to be enrolled, and enrolled in the study	√	6
		○ Assignment: the numbers of participants assigned to a study condition	√	6
		○ Allocation and intervention exposure: the number of participants assigned to each study condition and the number of participants who received each intervention	√	6
		○ Follow-up: the number of participants who completed the follow-up or did not complete the follow-up (i.e., lost to follow-up), by study condition	√	6
		○ Analysis: the number of participants included in or excluded from the main analysis, by study condition	√	6 – 7
		• Description of protocol deviations from study as planned, along with reasons	N/A	N/A
Recruitment	13	• Dates defining the periods of recruitment and follow-up	√	6
Baseline Data	14	Baseline demographic and clinical characteristics of participants in each study condition		6 & Table 1
		Baseline characteristics for each study condition relevant to specific disease prevention research	N/A	N/A
		Baseline comparisons of those lost to follow-up and those retained, overall and by study condition	N/A	N/A
		• Comparison between study population at baseline and target population of interest	N/A	N/A
Baseline equivalence	15	• Data on study group equivalence at baseline and statistical methods used to control for baseline differences	N/A	N/A

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TREND Statement Checklist

			√	9
Numbers analyzed	16	• Number of participants (denominator) included in each analysis for each study condition, particularly when the denominators change for different outcomes; statement of the results in absolute numbers when feasible	√	9
		• Indication of whether the analysis strategy was "intention to treat" or, if not, description of how non-compliers were treated in the analyses	N/A	N/A
Outcomes and estimation	17	• For each primary and secondary outcome, a summary of results for each estimation study condition, and the estimated effect size and a confidence interval to indicate the precision	√	11 – 12 & Tables 5, 6&7
		• Inclusion of null and negative findings	√	11 – 12
		Inclusion of results from testing pre-specified causal pathways through which the intervention was intended to operate, if any	N/A	N/A
Ancillary analyses	18	• Summary of other analyses performed, including subgroup or restricted analyses, indicating which are pre-specified or exploratory	N/A	11 – 12
Adverse events	19	• Summary of all important adverse events or unintended effects in each study condition (including summary measures, effect size estimates, and confidence intervals)	√	11 – 12
DISCUSSION				
Interpretation	20	• Interpretation of the results, taking into account study hypotheses, sources of potential bias, imprecision of measures, multiplicative analyses, and other limitations or weaknesses of the study	√	13 – 16
		Discussion of results taking into account the mechanism by which the intervention was intended to work (causal pathways) or alternative mechanisms or explanations	√	13 - 16
		Discussion of the success of and barriers to implementing the intervention, • fidelity of implementation	√	13 - 16
		Discussion of research, programmatic, or policy implications	√	13 - 16
Generalizability	21	• Generalizability (external validity) of the trial findings, taking into account the study population, the characteristics of the intervention, length of follow-up, incentives, compliance rates, specific sites/settings involved in the study, and other contextual issues	√	15 – 16
Overall Evidence	22	• General interpretation of the results in the context of current evidence and current theory	√	15 - 16

Chapter Five

Chapter Five builds on the findings from the previous study by measuring changes in students' professional and interprofessional identity between the start and end of the faculty-wide interprofessional first-year programme. Factors influencing identity strengths at the end of the programme were also reported. This study has been published, details below:

Tong, R., Roberts, L. D., Brewer, M., & Flavell, H. (2020). Quality of contact counts: The development of interprofessional identity in first year students. *Nurse Education Today, 86*(March), 104328. https://doi.org/10.1016/j.nedt.2019.104328

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Quality of contact counts: The development of interprofessional identity in first year students[☆]

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ARTICLE INFO

ABSTRACT

Background: Little is known about how nursing and other healthcare students develop professional and interprofessional identities.
Objectives: This study a) measures changes in students' professional and interprofessional identities between the start and end of a faculty-wide interprofessional first year programme, and b) identifies factors influencing interprofessional identity strength at the end of the programme.
Participants: One hundred and eight first year nursing, medicine and allied health students.
Methods: A single-group pre-post-test design was used. Students completed an online survey at the start and end of the year-long programme. The survey comprised measures of professional and interprofessional identity, stereotypes, contact and demographics. The same survey was used twice.
Results: There was a small decline in professional identity and a large decline in interprofessional identity across the year. Nursing students, the only group involved in clinical practicums, were exempt from the large fall in interprofessional identity. Quality of contact with students from other professions and autostereotypes about own profession were predictors of interprofessional identity strength at the end of the programme, consistent with intergroup contact theory.
Conclusions: Introductory interprofessional education programmes should include opportunities for quality contact with students from other professions, and for students to develop a clear understanding of their own profession.

1. Introduction

Heightened demand for an interprofessional workforce has, in principle, made the process of becoming a healthcare professional increasingly complex (Trede, 2009; World Health Organization, 2010). Healthcare professionals are expected to work in collaborative teams whilst simultaneously maintaining their own professional identities (Hornby and Atkins, 2008). However, traditional profession-specific education and socialisation approaches may result in nursing and other healthcare students acquiring a professional identity and limited understanding of other professions (Khalili et al., 2014). This type of professional identity, termed 'uniprofessional', is a barrier to interprofessional collaboration (Carpenter and Dickinson, 2016).

Increasingly, professional accreditation bodies in Australia, the site of this study, mandate that healthcare students need to learn how to work collaboratively with other healthcare professions in addition to learning profession-specific knowledge, skills and behaviours (Australian Medical Council Limited, 2012; Australian Nursing and Midwifery Accreditation Council, 2012; Occupational Therapy Board of Australia, 2018; Physiotherapy Board of Australia and Physiotherapy Board of New Zealand, 2015; Speech Pathology Australia, 2011). The World Health Organization (2010) defines interprofessional education as occurring "when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes." (p. 7). This is particularly important for nursing because nurses and midwives constitute the largest proportion (63%) of the Australian health workforce (Australian Institute of Health and Welfare, 2012) and often work within multidisciplinary healthcare teams to deliver client care (Steven et al., 2017; Thistlethwaite, 2013).

Although the importance of interprofessional education for

interprofessional collaborative practice is widely recognised (Health Workforce Australia, 2013; Reeves et al., 2016; World Health Organization, 2010), there is limited understanding of how to effectively embed interprofessional education within profession-specific curricula to graduate healthcare professionals capable of interprofessional collaborative practice (Anderson et al., 2016; Reeves et al., 2013). To address this, some researchers have started exploring the effects of interprofessional education on professional and interprofessional identity development in nursing and other healthcare students (Imafuku et al., 2018; Khalili et al., 2013; Thistlethwaite, 2016) based on the belief that new graduates with both identities will become more willing and confident to engage in interprofessional collaborative practice in the health workplace (Khalili et al., 2013).

2. Background

Professional identity has been described as *a sense of self* that is derived from one's occupation (Skorikov and Vondracek, 2011). However, the term 'professional identity' is not clearly defined within the nursing or healthcare literature (Johnson et al., 2012). Similarly, there is a lack of shared understanding and definition of interprofessional identity within the interprofessional literature (authors, under review). One way in which interprofessional identity has been conceptualised is as part of a dual identity that emphasises the embodiment of interprofessional collaborative practice through concurrent identification with one's professional and the interprofessional community (Khalili et al., 2013). Although no universal agreement exists regarding the definitions and conceptualisations of both identities, previous research shows that healthcare students may enter university with idealised views of their future professional selves (Adams et al., 2006; Browne et al., 2018; Byrne, 2010; Langendyk et al., 2015). These views may contain incorrect autostereotypes (perception of one's profession) and hetereostereotypes (perception of other professions).

One way to rectify these misconceptions is to engage students in interprofessional education as part of their nursing training to develop professional and interprofessional identities. Khalili et al. (2013) proposed an interprofessional socialisation framework, underpinned by social identity (Tajfel and Turner, 1986) and intergroup contact theories (Pettigrew, 1998) to guide professional and interprofessional identity development. Social identity theory (Tajfel and Turner, 1986) emphasises the importance of group membership, whilst intergroup contact theory (Pettigrew, 1998) emphasises the importance of quality inter-group contact experiences to sustain positive contact effects beyond the initial encounter. Both theories have been used to understand professional and interprofessional identity development within nursing and interprofessional contexts (Khalili et al., 2013; Sollami et al., 2018; Willetts and Clarke, 2014).

Despite extensive research exploring the importance of profession-specific curricula in influencing students' development of professional identity (Boehm et al., 2015; Johnson et al., 2012; Wald, 2015), and of interprofessional education for preparing healthcare students to join an interprofessional collaborative workforce (Health Workforce Australia, 2013), little is known about how healthcare students' professional and interprofessional identities change following participation in interprofessional education. Studies, to date, have explored changes in nursing and other healthcare students' *attitudes* towards interprofessional learning and professional identity following interprofessional education (Coster et al., 2008; Sollami et al., 2018; Stull and Blue, 2016). Attitudes can be transient and there is a need to understand the longer-term effects of interprofessional education on collaborative behaviour (Reeves et al., 2016). As identity is more central to the self (Barrow, 2006) rather than attitudes, exploring professional and interprofessional identity development holds promise for understanding the longer-term effects of interprofessional education on interprofessional collaborative practice behaviours.

This study's aims were, therefore, to a) measure changes in students'

professional and interprofessional identities between the start and end of a faculty-wide interprofessional first year programme, and b) identify factors influencing interprofessional identity strength at the end of the programme. There were three hypotheses.

H1. Professional identification will be stronger than interprofessional identification at the start of the programme.

H2. The strength of association between professional and interprofessional identities will increase between the start and end of the programme.

H3. After controlling for interprofessional identity at the start of the year, hetero- and auto-stereotypes and quantity and quality of contact will be significant predictors of interprofessional identity at the end of the programme.

3. Methods

3.1. Research design

A single-group pre-post-test design was used.

3.2. Programme design

The faculty-wide interprofessional first year programme was informed by an Interprofessional Capability Framework (Brewer and Jones, 2013). The aim of this programme is to provide students from different courses (and professions) with an understanding of interprofessional collaboration. The programme was developed and taught by interprofessional teams comprising academic and professional staff from different professions. Over 12 teaching weeks each semester, students from different courses (and professions) spend at least 4 h together in tutorials associated with core units of the programme. Learning activities include observing staff model interprofessional working relationships, engaging in case-based learning to develop interprofessional capabilities, and developing cultural knowledge for effective interprofessional practice (Curtin University, 2019).

3.3. Participants and recruitment

Students were recruited for the first part of this study (T1) at the beginning of each interprofessional programme (March 2017 and 2018, and August 2017). The content of each programme was the same. Recruitment occurred through social media, tutorials, a psychology student research participant pool and the University's learning management system. Power analyses were conducted for each hypothesis (power = 0.80, α = 0.05; medium effect size) and minimum sample sizes between 64 and 85 were needed (Soper, 2004). A total of 658 students participated in the initial survey. The mean survey completion time was 13.2 min.

Of the 658 who completed the first survey, 277 consented to be recontacted for the follow-up study at the end of the programme (T2). These participants were recontacted at the end of the programme in October 2017, August and September 2018, and 108 participated (39% response rate). The mean survey completion time was 8.4 min.

The same survey and participation incentives were used at T1 and T2. Incentives comprised prize draws to win iTunes vouchers for non-psychology students and participation points for psychology students enrolled in a student research participation pool.

3.4. Measures

An online survey comprising three scale measures (Table 1) and single-item measures of demographic variables (age, gender, course enrolled, study mode, prior degrees completed and previous work or volunteer experience in health settings) was developed. All measures

Table 1
Scale measures used in the survey.

Construct	Measure	Authors	Number of items	Response options	Example item	Number of factors	Cronbach's alpha α	
							Original measure	This study
Professional identity	Three-Factor Model of Social Identity Scale[a]	Cameron (2004)	12	6-Point Likert-type scale from *strongly disagree* (1) to *strongly agree* (6)	In general, I'm glad to be part of this profession.	3	0.76–0.84	0.81
Interprofessional identity	Three-Factor Model of Social Identity Scale[a]	Cameron (2004)	12	6-Point Likert-type scale from *strongly disagree* (1) to *strongly agree* (6)	I have a lot in common with other health science professionals.	3		0.82
Heterostereotype	The Student Stereotype Rating Questionnaire[b]	Hean et al. (2006)	9	5-Point Likert-type response scale from *very low* (1) to *very high* (5)	How would you rate students from this profession on their academic ability?	1	NR[e]	0.90
Autostereotype	The Student Stereotype Rating Questionnaire[b]	Hean et al. (2006)	9	5-Point Likert-type response scale from *very low* (1) to *very high* (5)	How would you rate students from your own profession on their professional competence?	1		0.91
Quality of contact	Dimensions of Contact Scale[c]	Islam and Hewstone (1993)	5	7-Point Likert-type scale from *definitely not* (1) to *definitely yes* (7)	When you were in contact with students from other professions, was contact perceived as equal?	3	NR[e]	0.75
Quantity of contact[d]				*0* to *more than 50* in 1-h increments				

[a] Scale was adapted to measure professional identity by replacing references to ingroup member(s) with references to my profession. Interprofessional identity was measured by changing references to my profession changed to "health science professionals".

[b] Questionnaire was adapted to measure heterostereotype by prefacing questions within the questionnaire with "When you were in contact with students within the Faculty of Health Sciences, which *profession other than your own*, did you make frequent contact with? Please list *one* profession only. With this profession in mind, how would you rate students from this profession on the following?". Autostereotype was measured by prefacing items in the questionnaire for heterostereotypes with "How would you rate students from your *own profession* on the following?".

[c] Scale was adapted by prefacing the items with "When you are in contact with students from other professions, was contact".

[d] Quantity of contact was measured by creating two questions. These were – "How much time on average do you spend each week with students from other professions whilst at University?" and "How much time on average do you spend each week with students from other professions outside University?".

[e] NR = not reported.

3

were adapted and used with permission.

3.5. Data analysis

A total of 735 cases from T1 were downloaded and merged into one IBM SPSS (v.24) file. Of these, 658 were available for analysis. Cases were excluded if key measures for identity, stereotype and contact were not completed (N = 71), and where participants were not first year students (N = 6). This resulted in minimal missing data in the remaining data set for analysis (0.82%). Little's Missing Completely at Random (MCAR) test was significant, χ^2 (2212, n = 658) = 2619.43, p < .001, indicating the data was not Missing Completely at Random (MCAR). To identify whether the data was Missing Not at Random (MNAR) or Missing at Random (MAR), separate variance t-tests were conducted (Tabachnick and Fidell, 2007). Results indicated that missingness was not related to the dependent variables; missing data points were deemed Missing at Random (MAR) and replaced using Expectation-Maximization (Tabachnick and Fidell, 2007).

There were 114 cases received and merged into one data file from T2. Participants were matched by email addressed, then email addresses were replaced with identification numbers and deleted. Six cases without email addresses were deleted, leaving 108 cases for analysis. There were 39 missing data points (0.60%) across the dataset. Little's Missing Completely at Random (MCAR) test was not significant, χ^2 (666, n = 108) = 718.88, p = .076, indicating the data were missing completely at random, and replaced using Expectation-Maximization (Tabachnick and Fidell, 2007).

3.6. Ethics

Ethics approval (Approval number: HRE2016-0407) from the University's Human Ethics Research Committee was obtained before recruitment commenced.

4. Results

4.1. Sample representativeness

Tables 2 and 3 display participants by profession and demographic information respectively.

On average, professional identity of those who participated at T1 only (M = 4.56, SD = 0.65) was 0.19, 95% CI [−0.33, −0.05] lower than for those who participated twice (T1 and T2) (M = 4.75, SD = 0.68). This difference was significant t(656) = −2.72, p = .007, and small d = 0.287 (Cohen, 1988). Similarly, interprofessional identity of participants who participated in this study once (M = 4.46,

Table 2
Distribution of participants by profession at T1 (N = 658) and T2 (N = 108).

Profession	Number of participants	
	T1	T2
Biomedical sciences	83	11
Oral health therapy	4	2
Pharmacy	31	8
Nursing	83	18
Midwifery	2	0
Paramedicine	14	2
Occupational therapy	45	19
Social work	29	11
Speech pathology	28	4
Medicine	28	7
Physiotherapy	30	8
Exercise, sports and rehabilitation science	14	0
Psychology	225	13
Public health	42	5

Note. T1 = first part of the study. T2 = follow-up study.

Table 3
Participant demographics at T1 (N = 658) and T2 (N = 108).

	Descriptive statistic	T1	T2
Number of professions	N	14	12
Age	M (SD)	21.69 (6.89)	22.36 (6.52)
Gender			
Female	% (n)	75.8 (499)	82.4 (89)
Male	% (n)	23.9 (157)	17.6 (19)
Enrolment status			
Domestic	% (n)	93.5 (615)	92.6 (100)
Full-time	% (n)	94.2 (620)	90.7 (98)
On-campus	% (n)	93.8 (617)	100 (108)
Previous degrees	% (n)	9.3 (70)	9.3 (10)
Previous health-related work or volunteer experiences	% (n)	36.3 (239)	63.0 (68)

Note. T1 = first part of the study. T2 = follow-up study.

SD = 0.65) was 0.26, 95% CI [−0.40, −0.13] lower, than those who participated twice (M = 4.72, SD = 0.68). This difference was significant t(656) = −3.82, p < .001, two-tailed, and small d = 0.402 (Cohen, 1988). These results indicate that there were small differences in identity scores of students who participated once and twice, and those who participated twice were not representative of the wider first year healthcare students. All further analyses are for students who completed surveys at both time periods only.

4.2. Changes in identity strengths across the programme

A paired samples t-test was conducted to compare mean professional identity strengths at T1 (M = 4.75, SD = 0.68) and T2 (M = 4.47, SD = 0.73). On average, professional identity declined over time − 0.29, 95% CI [−0.43, −0.14]. This difference was statistically significant, t(107) = −3.92, p < .001, and small, d = 0.40 (Cohen, 1988).

Another paired samples t-test was conducted comparing mean interprofessional identity strengths at T1 (M = 4.71, SD = 0.71) and T2 (M = 2.85, SD = 0.53). On average, interprofessional identity declined over time − 1.86, 95% CI [−1.98, −1.74]. This difference was statistically significant, t(107) = −29.95, p < .001, and large, d = 2.98 (Cohen, 1988).

At T2, across the professions, nursing students had the strongest interprofessional identity (M = 5.26, SD = 0.99) and medical students, the weakest (M = 2.46, SD = 0.17). Nursing was the only group that was exempt from the large drop in interprofessional identity at the end of the programme (Table 4).

Professional identity was significantly positively correlated with interprofessional identity at T1, r(106) = 0.757, p < .001, and T2, r(106) = 0.495, p < .001. Correlation strength declined over time.

4.3. Predictors of interprofessional identity at T2

A hierarchical multiple regression analysis was conducted to determine the predictors of interprofessional identity at T2 (Table 5). At step one, interprofessional identity at T1 (IP ID at T1) accounted for a significant 24.40% variance in professional identity, R^2 = 0.24, F(1, 106) = 34.21, p < .001. On step two, stereotypes (heterostereotype, autostereotype), quality and quantity of contact (at and outside university) at T2 accounted for a further significant 19.70% variance in interprofessional identity, ΔR^2 = 0.197, ΔF(5, 101) = 7.13, p < .001. The full model comprising interprofessional identity at T1, stereotypes and contact at T2 accounted for a significant 44.10% of variance in interprofessional identity at T2, R^2 = 0.441, adjusted R^2 = 0.408, F(5, 101) = 7.13, p < .001. This represents a large effect (f^2 = 0.79) (Cohen, 1988).

Table 4

Mean scores and standard deviations on professional and interprofessional identity measures by profession at the start (T1) and end (T2) of the programme ($N = 108$).

Profession (N)	Identity			
	Professional		Interprofessional	
	T1	T2	T1	T2
	M(SD)	M(SD)	M(SD)	M(SD)
Medicine (7)	4.88(0.74)	4.38(0.57)	4.72(0.64)	2.46(0.17)
Speech pathology (4)	4.33(0.48)	4.67(0.62)	4.13(0.31)	2.88(0.61)
Social work (11)	4.69(0.41)	4.90(0.51)	4.56(0.44)	2.75(0.31)
Public health (5)	4.08(0.96)	4.09(0.99)	4.23(0.82)	2.72(0.99)
Psychology single degree[a] (11)	4.20(0.59)	4.00(0.64)	3.96(0.69)	2.51(0.48)
Psychology double degree[b] (2)	3.83(0.24)	4.58(1.30)	3.88(0.06)	2.96(0.53)
Pharmacy (8)	4.70(0.59)	4.28(0.69)	4.64(0.71)	2.95(0.71)
Biomedical Sciences (11)	4.77(0.62)	4.30(0.72)	4.93(0.72)	2.79(0.62)
Oral health therapy (2)	5.63(0.06)	4.83(1.06)	5.33(0.47)	2.67(0.24)
Nursing (18)	4.75(0.76)	4.36(0.80)	4.89(0.81)	5.26(0.99)
Physiotherapy (8)	5.14(0.45)	4.56(0.70)	4.99(0.43)	3.03(0.45)
Occupational therapy (19)	0.11(0.52)	4.67(0.70)	5.02(0.53)	3.03(0.48)
Paramedicine (2)	5.54(0.06)	5.50(0.12)	5.42(0.00)	3.62(0.06)

Note. [a,b]Students studying towards a psychology single degree or psychology double degree were considered as belonging to the psychology profession.

Table 5

Hierarchical multiple regression predicting interprofessional identity at T2 from interprofessional identity at T1, stereotype and contact predictors at T2 ($N = 108$).

Variable	B [95% CI]	β	sr^2
Model 1			
IP ID at T1	0.37 [0.25, 0.50]**	0.49	0.24
Model 2			
IP ID at T1	0.25 [0.13, 0.36]**	0.33	0.09
Stereotypes			
Hetero	−0.09 [−0.27, 0.08]	−0.11	0.01
Auto	0.23 [0.05, 0.42]*	0.25	0.03
Contact			
Quality	0.17 [0.09, 0.26]**	0.33	0.09
Quantity at university	0.02 [−0.01, 0.04]	0.12	0.01
Quantity outside university	0.01 [−0.00, 0.01]	0.12	0.01

Note. B = unstandardized regression coefficient; CI = confidence interval; β = standardised regression coefficient; sr^2 = squared semi-partial (part) correlations.

* $p < .05$.
** $p < .001$.

5. Discussion

This was the first study to empirically measure changes in first year nursing, allied health and medical students' professional and interprofessional identities between the start and end of a faculty-wide interprofessional first year programme, and the factors influencing interprofessional identity strength at the end of the programme. Across the professions, professional and interprofessional identities were significantly weaker and less strongly correlated by the end of the programme compared to at the start of the programme. After controlling for interprofessional identity at the beginning of the programme, autostereotypes and quality of contact were significant positive predictors of interprofessional identity at the end of the programme. These findings highlight the relevance of considering professional and interprofessional identity developments within introductory interprofessional education curricula.

Although both identities were significantly weaker by the end of the first year, the magnitude of decline was small for professional identity

but large for interprofessional identity. The small decline in professional identity may suggest students developed a more realistic understanding of their future professional identity by the end of their first year of study. Discrepancies between pre-existing professional identities of first year healthcare students beginning university and the established professional identities of healthcare professionals are recurrent themes in the professional identity development literature (Johnson et al., 2012; Sharpless et al., 2015). First year students' idealistic professional identity has also been identified within the interprofessional education literature as a factor contributing towards students' less positive attitudes towards interprofessional education (Coster et al., 2008; Stull and Blue, 2016).

High professional and interprofessional identity scores, and the large correlation between both identities for all professions at entry into the interprofessional education programme, suggest students might not have distinguished between these identities at this early stage of training. Students could have identified as 'first year Health Science students' and with their profession due to anticipatory socialisation (Khalili et al., 2013). In comparison, the large and significant difference in identity scores, and weaker correlation between both identities by the end of the programme suggest students were clearly distinguishing between professional and interprofessional identities.

The significant and large decline in interprofessional identity strength between the start and end of the programme mirrors trends in studies that found a decline in first year students' attitudes towards interprofessional learning following involvement in interprofessional education (Olson and Bialocerkowski, 2014; Visser et al., 2017). This finding supports the idea of professional identity development as a process of moving through conceptually-distinct development stages (Kegan, 1982, as cited in Bebeau and Monson, 2012). According to Bebeau and Monson (2012), professional identity formation involves transitioning through the independent operator, team-oriented idealist and the self-defining professional stages. Independent operators conceptualise professional identity as meeting concrete profession-specific role expectations. For example, first year nursing students may view nursing identity as only carrying out nursing-specific duties correctly. In comparison, team-oriented idealists understand how the roles and responsibilities of their own and other professions contribute towards client-centred care (Bebeau and Monson, 2012; Stull and Blue, 2016), which aligns with the purpose of interprofessional education (World Health Organization, 2010). Students' large decline in interprofessional identity and small decline in professional identity could indicate that, as first year students, they are in the independent operator stage and may not be developmentally ready to understand the "relevance" of interprofessional identity. A more nuanced exploration of the timing of interprofessional education is recommended given this issue remains contentious (Reeves et al., 2012). Exploring how involvement in interprofessional education at different points in students' training impacts interprofessional identity may clarify how educators constructively integrate an interprofessional curriculum into profession-specific curricula to graduate students with professional and interprofessional identities.

Other interprofessional education curriculum design factors could also have contributed to the results. Students in this study spend at least 4 h together each week in tutorials associated with core units of this programme for 12 weeks each semester. However, stronger interprofessional identity at the end of the programme was associated with the quality rather than quantity of contact experiences with students from other professions, consistent with intergroup contact theory (Pettigrew, 1998). In other words, quality contact experiences facilitate interprofessional identity development in first year nursing and other healthcare students. This is the only study within the interprofessional literature that demonstrates a relationship between quality of contact and changes in interprofessional identity strength. Previous studies explored quantity of contact and attitudes towards interprofessional learning (de Oliveira et al., 2018), and quality of contact as a *component*

of interprofessional socialisation for dual identity development (Khalili et al., 2013), but not identity directly. Understanding the relationship between quality of contact and changes in interprofessional identity strength may inform the design of interprofessional education curricula that emphasise quality interprofessional learning opportunities for students from different healthcare professions.

Similarly, our finding of positive autostereotypes as a predictor of interprofessional identity extends Visser et al.'s (2017) conclusion that students who have a high regard for their own profession are more likely to engage in interprofessional learning. Perhaps Cruess et al.'s (2014) recommendation of prioritising identity discussions within the (medical) curricula applies within the interprofessional education curriculum. Foregrounding interprofessional identity within interprofessional education programmes early in their training may increase students' awareness and understanding of the relevance of developing interprofessional and professional identities for collaborative working as future healthcare professionals.

Examination by professional grouping indicates that only nursing students were exempt from the large fall in interprofessional identity. Nursing students were the only group involved in clinical practicums in the first year of study. Clinical practicums provide students with opportunities to experience and compare professional reality with theory (Marañón and Pera, 2015). Students could have maintained their interprofessional identity through serendipitous interprofessional education opportunities whilst on practicum. For example, students could have gained an understanding of how healthcare professionals work together to provide client-centred care by observing team-based collaborative practice and informal interactions with other healthcare professionals. The impact of role modelling and informal interactions on students' interprofessional identity development warrants further research as, apart from one study (Michalec et al., 2017) that reported informal contact opportunities improved nursing and other healthcare students' perceptions of one another, most studies about the effects of informal interprofessional education relate to healthcare professionals (Reeves et al., 2016). Further research is also needed to understand how clinical practicums facilitate interprofessional and professional identity developments in undergraduate nursing and other healthcare students.

5.1. Limitations

This study was potentially the first to measure changes in first year students' professional and interprofessional identities between the start and end of a faculty-wide interprofessional education programme. However, results were not representative of the wider first year cohort due to small, but statistically significant differences in identity scores at the start of the programme between the group of students who participated only at the start, and those who also participated at the end of the programme. Although this limits the generalisability of findings, as discussed earlier, our findings parallel trends in perception-based studies exploring the effects of contact and stereotypes on professional identity and attitudes towards interprofessional education. Another limitation was the lack of control group as this was a mandatory programme for all first-year students enrolled in the Faculty of Health Sciences at this university. Further research exploring the effects of interprofessional education on professional and interprofessional identities, with a control group of students not involved in interprofessional education, may enable more definitive conclusions about the impact of interprofessional education on interprofessional identity to be made. Lastly, the low response rate was due to the voluntary nature of on-going participation and factors (attrition rates, interest in study) related to longitudinal study designs (Scott and Mazhindu, 2014).

6. Conclusions

Interprofessional identity development is facilitated when quality

contact experiences with students from other professions, and opportunities for students to develop a clear understanding of their own profession are included within introductory interprofessional education programmes. Across the professions, only nursing students maintained their interprofessional identity, and were the only group involved in clinical practicums at the time of the study. These findings may inform the design, implementation and alignment of interprofessional education curricula within the profession-specific curricula to graduate professionals with professional and interprofessional identities.

Author statement

We confirm that all authors meet the criteria for authorship and have approved the final manuscript. The first author was responsible for the conception and design of the study, data acquisition, analysis and interpretation, drafting and revising the manuscript. The second, third and fourth authors provided guidance with the conceptualisation, data interpretation and manuscript revision for important intellectual content. The second author also contributed towards data analysis.

Declaration of competing interest

The authors have no conflicts of interest to declare.

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TREND Statement Checklist

Paper Section/ Topic	Item No	Descriptor	Reported? ✓	Pg #
Title and Abstract				
Title and Abstract	1	• Information on how unit were allocated to interventions	√	1
		• Structured abstract recommended	√	1
		• Information on target population or study sample	√	1
Introduction				
Background	2	• Scientific background and explanation of rationale	√	2 - 3
		• Theories used in designing behavioral interventions	√	3
Methods				
Participants	3	• Eligibility criteria for participants, including criteria at different levels in recruitment/sampling plan (e.g., cities, clinics, subjects)	√	5
		Method of recruitment (e.g., referral, self-selection), including the sampling method if a systematic sampling plan was implemented	√	5
		• Recruitment setting	√	5
		• Settings and locations where the data were collected	√	5
Interventions	4	• Details of the interventions intended for each study condition and how and when they were actually administered, specifically including:		
		○ Content: what was given?	√	4
		○ Delivery method: how was the content given?	√	10 & 20
		○ Unit of delivery: how were the subjects grouped during delivery?	√	10
		○ Deliverer: who delivered the intervention?	√	20
		○ Setting: where was the intervention delivered?	√	4 – 5
		○ Exposure quantity and duration: how many sessions or episodes or events were intended to be delivered? How long were they intended to last?	√	10
		○ Time span: how long was it intended to take to deliver the intervention to each unit?	√	4
		○ Activities to increase compliance or adherence (e.g., incentives)	√	
Objectives	5	• Specific objectives and hypotheses	√	4
Outcomes	6	• Clearly defined primary and secondary outcome measures	√	4
		• Methods used to collect data and any methods used to enhance the quality of measurements	√	5
		• Information on validated instruments such as psychometric and biometric properties	√	Table 3
Sample Size	7	How sample size was determined and, when applicable, explanation of any interim analyses and stopping rules	√	5
Assignment Method	8	Unit of assignment (the unit being assigned to study condition, e.g., individual, group, community)	√	5
		Method used to assign units to study conditions, including details of any restriction (e.g., blocking, stratification, minimization)	√	5
		Inclusion of aspects employed to help minimize potential bias induced due to non-randomization (e.g., matching)	√	6

TREND Statement Checklist

Category	#	Item		
Blinding (masking)	9	• Whether or not participants, those administering the interventions, and those assessing the outcomes were blinded to study condition assignment; if so, statement regarding how the blinding was accomplished and how it was assessed.	N/A	
Unit of Analysis	10	• Description of the smallest unit that is being analyzed to assess intervention effects (e.g., individual, group, or community)	√	5
		• If the unit of analysis differs from the unit of assignment, the analytical method used to account for this (e.g., adjusting the standard error estimates by the design effect or using multilevel analysis)	N/A	N/A
Statistical Methods	11	• Statistical methods used to compare study groups for primary methods outcome(s), including complex methods of correlated data	√	6 – 8
		• Statistical methods used for additional analyses, such as a subgroup analyses and adjusted analysis	√	6 – 8
		• Methods for imputing missing data, if used	√	6
		• Statistical software or programs used	√	6
Results				
Participant flow	12	Flow of participants through each stage of the study: enrollment, assignment, allocation, and intervention exposure, follow-up, analysis (a diagram is strongly recommended)		
		o Enrollment: the numbers of participants screened for eligibility, found to be eligible or not eligible, declined to be enrolled, and enrolled in the study	√	5
		o Assignment: the numbers of participants assigned to a study condition	√	5
		o Allocation and intervention exposure: the number of participants assigned to each study condition and the number of participants who received each intervention	√	5
		o Follow-up: the number of participants who completed the follow-up or did not complete the follow-up (i.e., lost to follow-up), by study condition	√	5
		o Analysis: the number of participants included in or excluded from the main analysis, by study condition	√	5 - 6
		• Description of protocol deviations from study as planned, along with reasons	N/A	N/A
Recruitment	13	• Dates defining the periods of recruitment and follow-up	√	5
Baseline Data	14	Baseline demographic and clinical characteristics of participants in each study condition		5 & Table 2
		Baseline characteristics for each study condition relevant to specific disease prevention research	N/A	N/A
		Baseline comparisons of those lost to follow-up and those retained, overall and by study condition	√	6 – 7
		• Comparison between study population at baseline and target population of interest	√	6 – 7
Baseline equivalence	15	• Data on study group equivalence at baseline and statistical methods used to control for baseline differences	√	6 – 7

TREND Statement Checklist

Numbers analyzed	16	• Number of participants (denominator) included in each analysis for each study condition, particularly when the denominators change for different outcomes; statement of the results in absolute numbers when feasible	√	6	
		• Indication of whether the analysis strategy was "intention to treat" or, if not, description of how non-compliers were treated in the analyses	N/A	N/A	
Outcomes and estimation	17	• For each primary and secondary outcome, a summary of results for each estimation study condition, and the estimated effect size and a confidence interval to indicate the precision	√	6 – 8	
		• Inclusion of null and negative findings	√	6 – 8	
		Inclusion of results from testing pre-specified causal pathways through which the intervention was intended to operate, if any	N/A	N/A	
Ancillary analyses	18	• Summary of other analyses performed, including subgroup or restricted analyses, indicating which are pre-specified or exploratory	N/A	6 – 8	
Adverse events	19	• Summary of all important adverse events or unintended effects in each study condition (including summary measures, effect size estimates, and confidence intervals)	√	6 – 8 & 12	
DISCUSSION					
Interpretation	20	• Interpretation of the results, taking into account study hypotheses, sources of potential bias, imprecision of measures, multiplicative analyses, and other limitations or weaknesses of the study	√	8 – 13	
		Discussion of results taking into account the mechanism by which the intervention was intended to work (causal pathways) or alternative mechanisms or explanations	√	8 – 13	
		Discussion of the success of and barriers to implementing the intervention, fidelity of implementation	√	12	
		• Discussion of research, programmatic, or policy implications	√	8 - 13	
Generalizability	21	• Generalizability (external validity) of the trial findings, taking into account the study population, the characteristics of the intervention, length of follow-up, incentives, compliance rates, specific sites/settings involved in the study, and other contextual issues	√	12	
Overall Evidence	22	• General interpretation of the results in the context of current evidence and current theory	√	12	

Chapter Six

Identity developments in final year students involved in clinical placements

Moving from exploring professional and interprofessional identity development in first year students, this chapter presents a quantitative study of professional and interprofessional identity development in final year students involved in clinical placements during the year. Chapter Six corresponds to **Study Four**, the third empirical study of interprofessional identity in the thesis. Chapter Six is divided into five main sections: background, aims and hypotheses, methods, results, and discussion.

6.1   Background

Clinical education, the component of health professional education that occurs in contemporary health workplace settings, is vital for preparing work-ready healthcare professionals (Australian Health Practitioner Regulation Agency, [Ahpra] 2021; Burgess & Matar, 2020; Rodger et al., 2008). Clinical education provides students with opportunities to apply academic knowledge into 'real world' clinical practice settings through supervised experiential learning (Delany & Molloy, 2009; Rodger et al., 2008; Thistlethwaite, 2013) and opportunities to observe different health professionals engage in uniprofessional and interprofessional interactions with clients (Brewer & Flavell, 2020). Perhaps more importantly, clinical education is vital for students to become part of a community of practice and further develop their professional identity (Cruess et al., 2015; Monrouxe, 2016; Thistlethwaite, 2013).

To date, the majority of clinical placement experiences for students are profession-specific in nature (Bissett et al., 2021; Delany & Molloy, 2009; Thistlethwaite, 2013). Refer to page viii for a definition of profession-specific placements. An outcome of profession-specific placements is student development of a professional identity that reflects an

orientation towards one's chosen profession (Leedham-Green, 2020; Monrouxe, 2016; Trede et al, 2012).

Despite the importance and benefits of profession-specific clinical placements for preparing students to become qualified members of their chosen profession and the logistical challenges, there is a global trend in the interprofessional literature towards increasing interprofessional placement opportunities where students "learn about, with and from each other" (CAIPE, 2016, p.1), to provide interprofessional care and improve health outcomes (Frenk et al., 2010; Hammick et al., 2009; Khalili, Thistlethwaite, et al., 2019). The growing importance of providing interprofessional education in clinical settings was reiterated by CAIPE (2017), a prominent interprofessional community of practice based in the United Kingdom with international reach.

CAIPE (2017) recommends providing students with opportunities to participate in at least one dedicated interprofessional placement during their health professional education. As outlined previously, dedicated interprofessional placements are team-based interprofessional practice placements, which Brewer and Barr (2016) defined as "a dedicated and prearranged opportunity for a number of participants from health, social care and related professions to learn together for a period of time in the same setting as they perform typical activities of their profession as a team focused on a client-centred approach" (p. 747). Dedicated interprofessional placements can be found in many settings including primary schools, residential aged care, and primary care (Brewer & Barr, 2016), as well as in acute care settings in the form of student interprofessional training wards (Hylin et al., 2007; Jakobsen, 2016; Pelling et al., 2011).

The benefits of dedicated interprofessional placements for clients and students have been well described in the global interprofessional literature (Brewer & Flavell, 2020; Jakobsen, 2016; Oosterom et al., 2019). Frequently reported benefits for clients include self-

reported improvements in the quality of care provided by an interprofessional team (Brewer & Stewart-Wynne, 2013; Oosterom et al., 2019; Shiyanbola et al., 2014). Benefits for students include a clearer understanding of interprofessional practice (Mette et al., 2021; Mink et al., 2020; Seaman et al., 2018), an increased willingness to collaborate with other professions in subsequent health workplaces post placement (Brewer & Barr, 2016; Brewer & Flavell, 2020; Brewer et al., 2017), and further development of professional identity during the placement (Jakobsen, 2016, Jakobsen & Hansen, 2014).

Interestingly, whilst the benefits of both profession-specific and interprofessional placements for preparing students for future practice have been well described in the respective literatures (Delany & Molloy, 2009; Oosterom et al., 2019; Thistlethwaite, 2013), less is known about the collective influence of both types of placements on graduate preparation for the interprofessional healthcare workforce needed for the 21st century (Forman, 2020; Fraher & Brandt, 2019; Institute of Medicine, 2015). From the interprofessional clinical education literature reviewed (e.g., Brewer & Barr, 2016; Jakobsen, 2016; Oosterom et al., 2019), no quantitative study of (inter)professional identity was found that compared the effect of placement arrangement (only profession-specific placements or a combination of profession-specific placements and one dedicated interprofessional placement) on students' professional and interprofessional identity developments.

Most quantitative studies focused on evaluating the outcomes of individual dedicated interprofessional placements over the short-term, either at the start and end of the placement (Falk et al., 2015; Hansen et al., 2009), or at the end of the placement only (Anderson et al., 2014; Meek et al., 2013; Ponzer et al., 2004). Only one study by Hylin et al. (2007) explored the enduring effects of a two-week interprofessional student placement in a hospital training ward on graduates' professional practice. Two years after the interprofessional programme,

graduates completed a questionnaire that comprised of a series of close-ended and open-ended questions about their lasting impressions of the programme. Findings highlighted the benefits of including a dedicated interprofessional placement opportunity as part of students' health professional education, as these graduates remained open and willing to engage in interprofessional teamwork two years post placement (Hylin et al., 2007).

One limitation of current placement evaluations, as described above, is that these evaluation outcomes do not adequately explain how students who are involved in multiple clinical placements that may include a dedicated interprofessional placement during the year, develop their professional and interprofessional identities. Understanding the effect of placements on final year students' identity developments is important as many students spend the majority of their final year completing multiple clinical placements to develop the graduate competencies for their chosen profession (Ahpra, 2021; Burgess & Matar, 2020; Curtin University, 2021b). One way to address this limitation in identity research is to track the changes in identity strengths in final year students involved in different placement arrangements (only profession-specific or a combination of profession-specific placements and one dedicated interprofessional placement) across the year. The theories underpinning this study are discussed next.

6.1.2 Theories underpinning the study

Social identity theory (Tajfel & Turner, 1986) and intergroup contact theory (Pettigrew, 1998) provide the theoretical basis for this study, consistent with the theoretical approach taken to explore identity development in previous quantitative studies of identity (**Studies Two and Three**) in this thesis. Both theories and their relevance to interprofessional identity research were outlined on pages 9 to 11 of the introduction chapter. In summary, according to social identity theory (Tajfel & Turner, 1986) professional and interprofessional identity are social identities. Based on this theory, students with both

professional and interprofessional identities should possess a sense of belonging to their own profession and the interprofessional community (Khalili & Orchard, 2020; Khalili et al., 2013).

During a dedicated interprofessional placement, students are provided with ample opportunities to socialise interprofessionally with others (e.g., students, visiting clinical educators, interprofessional facilitator(s), and other healthcare professionals working on site) while they deliver supervised interprofessional care (Brewer & Barr, 2016; Brewer & Flavell, 2020). These interprofessional experiences should, according to Pettigrew's (1998) intergroup contact theory, enhance students' sense of belonging as a member of their own profession and the interprofessional community. Given professional and interprofessional identity development are underpinned by similar socialisation processes (Tong et al., 2020), and identity development is an outcome of clinical education (Cruess et al., 2015; Monrouxe, 2016; Thistlethwaite, 2013), I have argued that social identity theory (Tajfel & Turner, 1986) and intergroup contact theory (Pettigrew, 1998) are suitable theories to explore identity developments in this study. To set the scene for the study, a description of the context follows.

6.1.3   Context of the study

Final year students from nursing and a range of allied health professions including physiotherapy, occupational therapy, and speech pathology complete multiple clinical placements in different health workplaces throughout the year (Curtin University, 2021b). A detailed explanation of the type of placements available for final year students and the factors that influence placement allocation can be found on pages 26 to 28 of the methodology chapter. The length of each placement varies across the professions regardless of placement type. For example, students from physiotherapy and occupational therapy spend five days per week, for five and eight weeks respectively, at an assigned health workplace. In comparison,

students from speech pathology typically spend between four days per week over ten weeks at each workplace.

Although placement lengths vary by profession, all final year students are expected to manage an assigned caseload of clients with increasing autonomy and decreasing supervision from their clinical educator(s) as the placement progresses (Curtin University, 2021b). All students had prior interprofessional experiences in their first year (**Studies Two and Three**) and may have been exposed to other interprofessional learning opportunities in their second and/or third year of study.

6.2   Aim and hypotheses

The aim of this study was to explore the influence of different placement arrangements (only profession-specific or a combination of profession-specific placements and one dedicated interprofessional placement) on final year students' professional and interprofessional identity strengths between the start and end of the year. This study had two hypotheses:

Hypothesis 1. After controlling for professional and interprofessional identity strengths at the beginning of the year, by the end of the year professional identity will strengthen significantly while interprofessional identity will weaken significantly in students involved in only profession-specific placements.

Hypothesis 2. After controlling for professional and interprofessional identity strengths at the beginning of the year, by the end of the year both professional and interprofessional identity will strengthen significantly in students involved in a combination of profession-specific placements and one dedicated interprofessional placement.

6.3   Methods

6.3.1   Research Design

A quasi-experimental design was used. Students were assigned placements based on their clinical education needs and placement availability. The grouping variable is placement arrangement (only profession-specific or a combination of profession-specific placements and one dedicated interprofessional placement). The dependent variables are professional and interprofessional identity strengths.

6.3.2   Participants and procedures

Curtin University's Human Research Ethics Committee (Approval number HRE2016-0407) approved this study before participant recruitment commenced. Students were recruited for the pre-test at the beginning of each teaching year (March 2017 and 2018). Recruitment occurred through social media and the university's learning management system. Students participated on a voluntary basis. *A-priori* power analyses were conducted for each hypothesis (power = .80, α = .05; medium effect size) and a minimum sample size of 158 was needed to have sufficient power to detect medium effects (Soper, 2004).

A total of 141 students completed the pre-test survey at the start of the year. The mean survey completion time was 13.8 minutes. Of the 141 who completed the first survey, 48 consented to be contacted for the post-test at the end of the year. Of the 48, 30 students opted to participate in the follow up survey (62.5% response rate). The mean post-test survey completion time was 12.1 minutes. To encourage ongoing participation, incentives (prize draws to win iTunes vouchers) were provided for the pre-test and post-test components of this study. Tables 2 and 3 contain a breakdown of participants at both time points by profession and demographic information, respectively.

Table 2

Distribution of participants by profession at pre-test (N = 141) and post-test (N = 30)

	Number of participants	
Profession	Pre-test *n* (%)	Post-test *n* (%)
Oral Health Therapy	2 (1.4)	0 (0.0)
Pharmacy	5 (3.5)	4 (13.3)
Nursing	21 (14.9)	2 (6.7)
Occupational Therapy	11 (7.8)	1 (3.3)
Social Work	19 (13.5)	3 (10.0)
Speech Pathology	52 (36.9)	16 (53.3)
Physiotherapy	27 (19.1)	4 (13.3)
Psychology	4 (2.8)	0 (0.0)

Table 3

Participant demographics at pre-test (N = 141) and post-test (N = 30)

	Descriptive statistic	Pre-test	Post-test
Number of professions	*N*	8	6
Age	*M* (*SD*)	25.3 (7.2)	23.8 (4.6)
Gender			
Female	% (*n*)	92.9 (131)	93.3 (28)
Male	% (*n*)	7.1 (10)	6.7 (2)
Enrolment status			
Domestic	% (*n*)	93.6 (132)	90.0 (27)
Full-time	% (*n*)	95.7 (135)	100.0 (30)
On-campus	% (*n*)	96.5 (136)	96.7 (29)
Previous degrees	% (*n*)	20.6 (29)	6.0 (2)
Previous health-related work or volunteer experiences	% (*n*)	56.0 (79)	86.7 (26)

6.3.3   Measures

The online survey (See Appendix C, page 305) used in **Studies Two and Three** was modified for use in this study to capture information related to the placements completed during the final year of study. The study's survey was hosted online via Qualtrics (Qualtrics, 2017) and comprised a variety of scale measures and single-item measures. The scale measures referred to measures for identity (professional and interprofessional), stereotype (autostereotype and heterostereotype), and quality of contact. The single-item measures

captured demographic information (age, gender, course enrolled, study mode, prior degrees completed, and previous work or volunteer experience in health settings) and quantity of contact (between 0 to 50 plus hours). To measure quantity of contact, each student had to provide an approximate number of hours spent with students from other professions within university and outside university. In addition to completing scale and single-item measures, students were asked to list all of the placements they had completed during their course along with the duration of each.

6.3.4 Missing data analysis

A total of 155 pre-test cases were obtained from the March 2017 and 2018 recruitment. Of these, 141 were available for analysis after 14 cases were deleted as less than 20 percent of the survey items were completed. There were 83 missing data points (1.00%) across the dataset. Little's Missing Completely At Random (MCAR) test was not significant, χ^2 (119) = 107.05, p = .776. Therefore, missing data points were considered missing completely at random and replaced using expectation-maximization (Tabachnick & Fidell, 2007). According to Tabachnick and Fidell (2007), expectation-maximization is an algorithm for handling missing values in a dataset. The algorithm replaces each missing value with an estimated value that is obtained by analysing extant values in the dataset.

A total of 31 post-test cases were obtained from the October 2017 and September 2018 recruitments. Pre- and post-test participants were matched by their study identification numbers. One duplicate response was discarded, leaving 30 cases for analysis. There were 17 missing data points (0.48%) across the questionnaires. Little's Missing Completely At Random (MCAR) test was not significant, χ^2 (392) = .000, p = 1.00. Therefore, missing data points were considered missing completely at random and replaced using expectation-maximization (Tabachnick & Fidell, 2007).

6.4 Results

The results of this study are described in relation to sample representativeness, the relationship between identity and placement type, and change in identity strength across the year according to placement type.

6.4.1 Sample representativeness

On average, the professional identity of those who participated only at the start of the year (M = 4.87, SD = 0.59) was lower, 0.14, 95% CI [-0.38, 0.10], than those who participated at both the start and end of the year (M = 5.01, SD = 0.57). This difference was not significant $t(139)$ = -1.18, p = .240, with a medium effect size d = 0.582 (Cohen, 1988). Similarly, the interprofessional identity of students who participated only at the start of the year (M = 4.57, SD = 0.58) was lower, 0.16, 95% CI [-0.30, 0.20], than those who participated at both the start and end of the year (M = 4.63, SD = 0.74). This difference was also not significant $t(139)$ = -0.42, p = .676, with a medium effect size d = 0.617 (Cohen, 1988). These results indicate no statistically significant difference existed in the identity scores of students who participated once (pre-test survey) or twice (pre- and post-test surveys). All further analyses used the 30 participants who completed both pre- and post-test surveys.

6.4.2 Relationship between identity and placement arrangement

There were 17 students who completed only profession-specific placements and 13 students who completed a combination of profession-specific placements and one dedicated interprofessional placement. Two one-way analysis of covariances (ANCOVAs) were conducted to measure the effects of placement arrangement on professional and interprofessional identity strengths across the year. Results showed that, after accounting for differences in professional and interprofessional identity scores at the start of the year, professional identity strength at the end of the year was not significantly related to placement

arrangement (only professional-specific or a combination of professional-specific placements and one interprofessional placement), $F(1,27) = 0.01$, $p = .908$, partial $\eta^2 = .001$. Similarly, interprofessional identity strength at the end of the year was not significantly related to group, $F(1,27) = 0.47$, $p = .501$, partial $\eta^2 = .02$.

6.4.3 Change in identity strength across the year according to placement arrangement

Table 4 shows changes in professional and interprofessional identity strengths across the professions at both time points according to placement arrangement.

Table 4

Comparing mean scores and standard deviations of professional and interprofessional identity at the start and end of the year according to placement arrangement (N = 30)

	Time			
	Start of the year		End of the year	
	Only profession-specific	Combined placements	Only profession-specific	Combined placements
	($n = 17$)	($n = 13$)	($n = 17$)	($n = 13$)
	M(SD)	M(SD)	M(SD)	M(SD)
Professional identity	4.51 (0.34)	4.14 (0.32)	5.12 (0.42)	4.76 (0.68)
Interprofessional identity	4.65 (0.89)	4.60 (0.51)	4.47 (0.78)	4.31 (0.43)

6.4.3.1 Students involved in only profession-specific placements

A paired samples *t* test was conducted comparing mean professional identity strength at the start ($M = 4.51$, $SD = 0.34$) and end ($M = 5.12$, $SD = 0.42$) of the year. On average, professional identity strengthened over time 0.61, 95% CI [0.41, 0.81]. This difference was statistically significant, $t(16) = 6.45$, $p < .001$ and large, $d = 1.61$ (Cohen, 1988).

Another paired samples *t* test was conducted comparing mean interprofessional identity strength at the start ($M = 4.65$, $SD = 0.89$) and end ($M = 4.47$, $SD = 0.78$) of the

year. On average, interprofessional identity weakened over time -0.18, 95% CI [-0.50, 0.14]. This difference was not statistically significant, $t(16) = -1.19$, $p = .252$ and small, $d = 0.22$ (Cohen, 1988).

6.4.3.2   *Students involved in a combination of profession-specific placements and one dedicated interprofessional placement*

A paired samples *t* test was conducted comparing mean professional identity strength at the start ($M = 4.14$, $SD = 0.32$) and end ($M = 4.76$, $SD = 0.68$) of the year. On average, professional identity strengthened over time 0.62, 95% CI [0.30, 0.94]. This difference was statistically significant, $t(12) = 4.20$, $p = .001$ and large, $d = 1.24$ (Cohen, 1988).

Similarly, a paired samples *t* test comparing mean interprofessional identity strengths at the start ($M = 4.60$, $SD = 0.51$) and end ($M = 4.31$, $SD = 0.43$) of the year was conducted. On average, interprofessional identity weakened over time -0.29, 95% CI [-0.62, 0.05]. This difference was not statistically significant, $t(12) = -1.87$, $p = .086$ and medium, $d = 0.62$ (Cohen, 1988).

6.5   Discussion

This study explored the influence of different placement arrangements (only profession-specific or a combination of profession-specific placements and one dedicated interprofessional placement) on final year students' professional and interprofessional identity strengths between the start and end of the year. Findings from this study should be interpreted with caution because they were based on an underpowered sample of 30 students. Of the 30 students, 17 were involved in only profession-specific placements while 13 completed a combination of profession-specific placements and one dedicated interprofessional placement. There were two main findings. First, after controlling for identity strengths at the start of the year, placement arrangement had no statistically significant effect on professional or interprofessional identity strengths. This means that both

hypotheses were not supported. Changes to students' identity strengths across the year were due to factors not measured in this study.

Following a comprehensive review of the interprofessional education, identity development, and socialisation literatures, some factors that could have contributed to the changes in students' identity strengths in this study were access to mentors and role models (Seymour et al., 2018; Wilson et al., 2013), previous experience with the profession (Adams et al., 2006; Gray et al., 2020), profession-specific and interprofessional fieldwork/clinical placement experiences (Brown et al., 2020; Gray et al., 2020; O'Leary et al., 2019), and societal expectations regarding the norms, values, beliefs, and behaviours associated with the profession (Monrouxe, 2016; Mounrouxe & Rees, 2015). Given identity is influenced by a myriad of contextual factors, it can be argued that future research should also identify the factors associated with placement arrangements that may influence identity development, in addition to measuring identity strengths over a given period.

The second main finding from this study was students from both groups (only profession-specific or a combination of profession-specific placements and one dedicated interprofessional placement) experienced a significant and large increase in their professional identity across the final year of their course. While there was a slight decrease in interprofessional identity regardless of placement arrangement, this change was not significant. This finding indicates that future research with an adequately powered sample is required to detect statistically significant effects of the relationship between placement arrangement and interprofessional identity strength (Schäfer & Schwarz, 2019).

Of note, the finding that students involved in both types of placements experienced no significant change in their interprofessional identity was contrary to expectations, because the dedicated interprofessional placements fulfilled the contact conditions (equal status, common goals, intergroup cooperation, authority support, friendship potential) outlined in

Pettigrew's (1998) intergroup contact theory. This finding suggests conceptualising interprofessional identity development as an outcome of group membership changes according to social identity theories (Pettigrew, 1998; Tajfel & Turner, 1986) may not adequately explain how interprofessional identity develops. Perhaps another theoretical perspective (and theory) is needed to understand how if and how interprofessional interactions influence students' understanding of interprofessional identity.

A possible alternative theoretical perspective is to view interprofessional identity development through a constructivism lens (Burr, 2015; Talja et al., 2005). As mentioned in the introduction and methodology chapters, constructivism views identity development as an internal process of understanding and creating meaning from events (Burr, 2015; Rees et al., 2020 Talia et al., 2005). It, therefore, can be argued that by re-conceptualising interprofessional identity development as a process of construing and constructing meaning from events (e.g., clinical placements), one may gain insight into why no significant changes to students' interprofessional identity was found in this study.

Building on the previous recommendation, a qualitative exploration of interprofessional identity during dedicated interprofessional placements is recommended. Kegan's (1982) constructive developmental theory of self can be used to inform this study and this theory is rooted in constructivism, as explained in Chapter One. Kegan's (1982) theory has been used in the interprofessional field to understand professional identity development, attitudes towards interprofessional collaboration (Stull & Blue, 2016), and interprofessional identity development in first-year nursing, allied health and medical students (Tong, Roberts, et al., 2020).

According to Kegan (1982), individuals develop their identity by progressing through four meaning-making lenses over time. Lewin et al., (2019) describes meaning-making lenses as tools that "determine the way people take in and integrate complex

influences into forming their adult identities." (p. 1299) These lenses are instrumental, socialised, self-authoring, and self-transforming (Kegan, 1982). A lens change, also known as a transformation (Kegan, 1982; Lewin et al., 2019), occurs when individuals change the way they know and understand the world (Kegan, 1982; Lewin et al., 2019). In other words, a lens transformation occurs when an individual becomes aware of the limitations associated with how one has previously understood and managed a given situation (Kegan, 1982; Lewin et al., 2019). Following awareness, the individual addresses the limitations by developing greater insight and ways of managing the same situation more effectively (Kegan, 1982; Lewin et al., 2019). Individuals who experience multiple lens transformations are more likely to have a more independent sense of self that is rooted in a personally defined value system (Kegan, 1982; Lewin et al., 2019). Kegan's (1982) theory is used in the next chapter which details a qualitative exploration of final year students' development of interprofessional identity during a dedicated interprofessional placement.

6.5.1 Strengths and limitations

This was the first quantitative study that explored the effects of placement arrangement (only profession-specific or a combination of profession-specific placements and one dedicated interprofessional placement) on final year healthcare students' professional and interprofessional identity strengths across a one-year period. The use of a comparison group of students not involved in interprofessional clinical placements was a strength of this study. Two limitations need to be acknowledged. First, the findings were based on a small and underpowered sample, hence they should be interpreted with caution and within the context of this study only. Further compounding this underpowered sample issue was the high participant attrition between the start (T1) and end (T2) of the year. Of the 141 students who participated at T1, only 30 participated again at T2. Reasons included the voluntary nature of ongoing participation, and the end of the year being a busy time for

most final year students. The end of the calendar year coincides with the end of the academic year in Australia. During this time, most students are, typically, focused on completing their final clinical placement and coursework assignments concurrently to be eligible to graduate by the end of the year (Curtin University, 2021b). Despite the small sample, the absence of statistically significant differences in the identity scores at the start of the year between students who participated at T1 only and those who completed surveys at both time points increased my confidence in the findings.

The quasi-experimental design was the second limitation of this study. Curtin University is the largest provider of health professional education in Western Australia (Curtin University, 2021b). To address the logistical complexity of organising clinical placements (profession-specific, dedicated interprofessional) for large student cohorts at Curtin University, placements are allocated based on students' clinical learning needs. Consequently, I could not randomly assign students to the experimental (combination of profession-specific placements and one dedicated interprofessional placement) and control (profession-specific placements only) groups at the start of the year. The limitations described highlight that it is unrealistic for researchers to methodologically or statistically control for a diverse range of factors that may influence identity development. A more realistic alternative is to conduct mixed methods interprofessional identity research and form recommendations based on the integrated insight obtained from the quantitative and qualitative findings (Creswell & Plano Clark, 2017).

6.5.2   Concluding comments

This study aimed to explore the effects of placement arrangement (only profession-specific or a combination of profession-specific placements and one dedicated interprofessional placement) on final year students' professional and interprofessional identity developments between the start and end of the year. The first main finding was that

placement arrangement had no statistically significant effect on the strength of professional and interprofessional identity at the end of the year, after controlling for identity strengths at the start of the year. The second main finding was that students from both groups (only profession-specific or a combination of profession-specific placements and one dedicated interprofessional placement) experienced a significant and large increase in their professional identity across the year. While there was a slight decrease in interprofessional identity regardless of placement arrangement, this change was not significant. Further research with adequately powered samples is needed. A qualitative study of interprofessional identity development during a dedicated interprofessional placement is also recommended.

Chapter Seven

Tong, R., Brewer, M., Flavell, H., & Roberts, L. D. (2021). Facilitating interprofessional identity development in healthcare students through dedicated interprofessional placements. *Journal of Interprofessional Care*, 1-9. https://doi.org/10.1080/13561820.2021.1883564

Abstract

There is a growing body of research evidencing the benefits of dedicated interprofessional placements in preparing healthcare students for interprofessional practice. However, little is known about if and how students develop their interprofessional identity during interprofessional placements. This study addresses this knowledge gap by exploring final year students' interprofessional identity development during dedicated interprofessional placement(s). Thirty-eight students from five health professions were interviewed and data analysed inductively to identify themes. Participants also drew images representing their perceptions of interprofessional identity and its relationship to professional identity as part of the data collection. The themes showed participants progressed from conceptualising interprofessional identity as a requirement of the placement at the start of the placement, toward internalising an interprofessional identity by the end of their placement. Context influences interprofessional identity salience. A commitment from healthcare professionals to model interprofessional practice, combined with explicitly facilitating interprofessional identity development, is recommended to facilitate continued interprofessional identity development in different contexts post placement.

Keywords: interprofessional identity, interprofessional placements, healthcare, students

Introduction

There is a growing body of research describing the benefits of dedicated interprofessional placements for interprofessional practice and client outcomes (Boshoff et al., 2020; Brewer & Flavell, 2020; Oosterom et al., 2019). Dedicated interprofessional placements are team-based interprofessional practice placements, which Brewer and Barr (2016) defined as "a dedicated and prearranged opportunity for a number of participants from health, social care and related professions to learn together for a period of time in the same setting as they perform typical activities of their profession as a team focused on a client-centred approach." (p. 747) Dedicated interprofessional placements differ from traditional clinical placements (Rodger et al., 2008); the latter are typically uniprofessional with only some occurring within multiprofessional workplaces (Thistlethwaite, 2013). In contrast to interprofessional work, the term "multiprofessional" in a health service delivery context refers to activities performed by members from different professions who work independently, in parallel, or sequentially with one other to deliver a health service (Khalili, Gilbert, et al., 2019; Thistlethwaite & Moran, 2010), rather than "with, from and about each other to improve collaboration and the quality of care and services." (Centre for the Advancement of Interprofessional Education [CAIPE], 2016, p.1)

Dedicated interprofessional placements can be found in many settings including primary schools, residential aged care, and primary care (Brewer & Barr, 2016). One benefit of these placements is learners' (students, graduates) self-reported enhanced ability and willingness to collaborate with other professions in subsequent clinical workplaces (Brewer & Flavell, 2020). Increased short-term client satisfaction with the quality of care received in interprofessional training wards compared to care provided by multiprofessional healthcare teams in regular wards (Oosterom et al., 2019) is another benefit of dedicated

interprofessional placements. Despite these benefits for learners and clients, little is known about if and how learners develop an interprofessional identity during placements.

Background

Interprofessional identity is an under-researched area compared to professional identity in interprofessional contexts (Tong, Brewer, et al., 2020). For example, findings from a scoping review of interprofessional identity by Tong, Brewer, et al., (2020) showed no universal definition of interprofessional identity exists, and the relationship between interprofessional and professional identities lacks clarity. The authors of the scoping review addressed this gap by proposing a definition of interprofessional identity: "the development of a robust cognitive, psychological and emotional sense of belonging to an interprofessional community(s), necessary to achieve shared context-dependent goals." (Tong, Brewer, et al., 2020, p.6) This definition acknowledges the influence of context on identity development and aligns with the dimensions of interprofessional work (Xyrichis et al., 2018) and the proposed lexicon for the field (Khalili, Gilbert, et al., 2019). Interprofessional identity in this study was conceptualised according to Tong, Brewer, et al.'s (2020) definition.

This study was grounded in Kegan's (1982) constructive developmental theory of self. This theory has been adapted to understand professional identity development, attitudes towards interprofessional collaboration (Stull & Blue, 2016), and interprofessional identity development in first-year nursing, allied health and medical students (Tong, Roberts, et al., 2020). According to Kegan (1982), individuals develop their identity by transitioning through four meaning-making lenses over time. These lenses are instrumental, socialised, self-authoring, and self-transforming (Kegan, 1982). Lens transitions occur as individuals develop an independent sense of self and gain social maturity (Kegan, 1982; Lewin et al., 2019).

In the same way that professional identity develops during uniprofessional clinical placements (Thistlethwaite, 2013), it could be argued that interprofessional identity develops during dedicated interprofessional placements. Understanding how interprofessional identity develops during interprofessional placements may inform the re-design of interprofessional placement curricula and interprofessional education more broadly, to facilitate interprofessional identity development. The aim of this study was to explore if and how final year healthcare students develop interprofessional identity during a dedicated interprofessional placement.

Study context

The study was conducted in a large metropolitan university in Australia where health science students may participate in dedicated interprofessional placements as part of their professional training (Brewer & Barr, 2016). Placements are hosted within a primary school, a residential aged care organisation, and a community health centre (Brewer & Barr, 2016; Brewer et al., 2017).

Students are expected to demonstrate communication, role clarification, team function, conflict resolution, and reflection; all interprofessional capabilities described in Brewer's interprofessional capability framework (Brewer & Jones, 2013). They do so by engaging in interprofessional teamwork (Xyrichis et al., 2018) with other students and staff (e.g., dedicated interprofessional practice facilitators, visiting profession-specific supervisors, and other healthcare professionals working onsite) to deliver interprofessional services to clients (Brewer & Barr, 2016; Curtin University, 2020). Examples of interprofessional activities that students undertake include delivering joint therapy sessions and participating in regular interprofessional team meetings, client case conferences, and industry-generated projects (Brewer & Flavell, 2020). All activities are supervised by a

dedicated interprofessional practice facilitator and visiting profession-specific supervisors (Brewer & Barr, 2016; Brewer & Flavell, 2020).

Method

A qualitative design using an inductive thematic analysis approach (Braun & Clarke, 2006) was adopted. This research was conducted from a social constructionist epistemological position (Bryman, 2016), acknowledging that participants' understanding of interprofessional identity can be influenced by the broader social context in which their identity develops. This positioning aligned with inductive thematic analysis (Braun & Clarke, 2006) and the use of semi-structured interviews to explore participants' understanding of interprofessional identity. Ethics approval (HRE 2016-0407) was obtained from Curtin University human research ethics committee before recruitment commenced.

Research team

The research team comprised four members experienced in undertaking qualitative research (RT, MB, HF, LR), teaching qualitative research (HF, LR) and supervising students conducting qualitative research dissertations (HF, MB, LR).

Data collection

Final year students were contacted towards the end of their final year of professional training, which coincided with their final two to three weeks of placement. RT recruited participants for this qualitative study by sending emails to 13 final year students who participated in an earlier quantitative study about interprofessional identity and expressed interest in participating in further qualitative interprofessional identity research.

RT also promoted this qualitative study at three university-run interprofessional placement sites (a primary school, an aged care facility, and a community health centre), by visiting each site between four to eight times during students' team meetings. There were approximately 10 students from occupational therapy, physiotherapy, speech pathology,

nursing, pharmacy, social work, counselling psychology, and dietetics at each meeting. Overall, approximately 193 students from eight professions were invited to participate in this study.

Interested students contacted the researcher to organise individual, face-to-face interviews at mutually convenient locations (e.g., on campus, cafes). All interviews were conducted in-person and within four weeks of placement completion. Consent forms were signed prior to the interviews. Each participant was interviewed only once, and during the interview, reflected on their entire placement. RT conducted the interviews using a semi-structured interview guide (Appendix A). The interview guide comprised broad questions that were developed to explore participants' perceptions of interprofessional identity development during interprofessional placement and its relationship with professional identity.

Following interviews that lasted 10 to 22 minutes, participants spent time drawing, annotating, reflecting, and discussing their drawings of interprofessional identity with the interviewer, and if and how this related to professional identity. Drawings were collected as data as they enabled participants to represent their perspectives about identity and placements in ways that interviews alone cannot (Guillemin, 2004). A total of 29 drawings were obtained. RT kept field notes during and immediately after each interview. Each participant was given a $10 gift voucher in recognition of their time. All interviews were audio recorded with permission, transcribed, and anonymised. Data collection ceased after 38 interviews when information power (Malterud et al., 2016) was considered adequate on the basis of the narrow study aim, specificity of the sample and quality of the dialogue.

Participants

A total of 38 participants from five professions were interviewed: occupational therapy (n=15), speech pathology (n=9), physiotherapy (n=7), counselling psychology

(*n*=5), and pharmacy (*n*=2). Placement duration varied by profession: occupational therapy (35 days), speech pathology (40 days), physiotherapy (25 days), counselling psychology (42 days), and pharmacy (25 days).

Data analysis

Interviews were transcribed by RT and uploaded into Nvivo (v. 12) software . Transcripts were analysed reflexively using the inductive thematic analysis procedures outlined by Braun and Clarke (2006). All researchers read the transcripts to familiarise themselves with the data. RT coded each transcript line by line. MB, LR, and HF each cross-coded seven transcripts independently (Levitt et al., 2018).

All researchers met regularly and engaged in ongoing reflexive discussions about the content (i.e., what participants said) and analysis of the dataset. The aim of these discussions was to manage the influence of individual subjectivity regarding data interpretation, codes, and themes, along with the maintenance of a reflective journal. An audit trail of key decisions in the analysis process was also kept. These processes increased the rigour of the analysis. Initial themes were identified inductively at the semantic level (Boyatzis, 1998). Final themes and their descriptions were developed at the latent level (Boyatzis, 1998) through an iterative process of discussing findings within the research team and refining the themes over time (Braun & Clarke, 2006).

Results

Three themes related to how participants developed their interprofessional identity during dedicated interprofessional placements were developed. These were: "gain role clarity," "commitment to client-centred care," and "identifying the self as both a professional and an interprofessional practitioner." Collectively, these themes indicated participants developed clearer understanding of interprofessional identity and its relationship with interprofessional practice during dedicated interprofessional placement(s). Themes are

detailed below using representative quotations and visual representations (Figures 1-4) from the participants. Minor grammar modifications have been made to the quotations to aid understanding.

Gain role clarity

At the beginning of the interviews, most participants explained that they had not previously thought about interprofessional identity. However, on further consideration, they linked interprofessional identity with gaining a clear understanding of one's role within the interprofessional team. For example,

> *I'm not really sure, but I am thinking [interprofessional identity is about] how we work together with other professionals and also how we define what we can contribute to others (P30).*

And

> *Interprofessional identity, I guess that would mean your role in an interprofessional team. I think that's what it means. I don't know. I've not really thought about it before (P2).*

Participants described role clarity as making a profession-specific contribution within the interprofessional team, working within role boundaries. Typical examples of the relationship between role boundaries and identity (professional and interprofessional) included:

> *interprofessional identity is* [about] *doing your part within a team, knowing your professional boundaries. If I am constantly upskilling, developing,* [engaging in] *continuing professional development* [and] *things like that, then I will become more valuable in a team environment. I* [will] *become better aware of my scope, my boundaries and become* [a] *more valuable member of the team I suppose (P21).*

And

Interprofessional identity is quite similar I think [to professional identity] *in terms of looking at boundaries. But at the same time, we also have to collaborate with each other* [to] *provide the best care for the clients. Collaborating* [involves] *discussing what they've* [clients] *been doing with physios* [physiotherapists] *and what they've been doing with speechies* [speech pathologists] *and what we can do in terms of* [providing an] *OT* [occupational therapy] *service* (P25).

The relationship between role clarity and both identities was also captured in the drawings. For example, participant P25 went on to illustrate this relationship at the end of the interview (See Figure 1).

Figure 1

Relationship between role clarity and professional and interprofessional identities (P25)
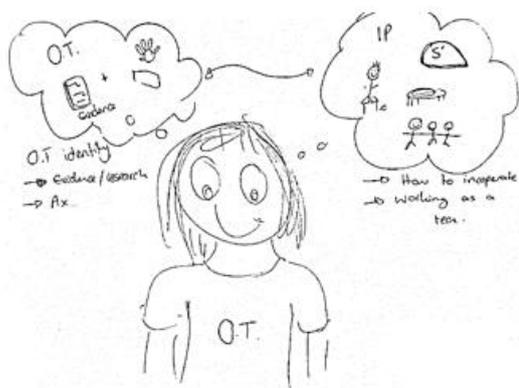
Note. OT = occupational therapist; IP = interprofessional identity; S = refers to P25.

Interestingly, early in the placement, several participants associated interprofessional identity with practising interprofessionally as a requirement of the placement. For example:

"I think interprofessional identity also means collaboration. There's a huge emphasis on collaboration in this interprofessional placement. Obviously, we are assessed on how we work with other professions as well. Collaboration to me means working together with another therapist. Working together doesn't necessarily mean

having two people in the same room when a kid's doing something. It [means] *working out how both therapists can contribute during the session as well. That understanding was not obvious in the first few weeks* [of the interprofessional placement]" (P2).

In summary, although the notion of an interprofessional identity was novel to many participants, all emphasised that a clear understanding of professional identity provides the foundation for interprofessional identity development.

Commitment to client-centred care

This theme refers to the cognitive shift in participants' understanding that interprofessional identity develops as the placement progressed. This shift was grounded in the realisation that interprofessional practice is important to meet the needs of the client, not the needs of the profession or to fulfil placement requirements. For example, one participant described this cognitive shift as:

Initially [interprofessional identity] *was* [understood as] *I know what you do, you know what I do. If you have a case in common together* [with me], [intervention involves] *you doing your* [part and] *I doing my part. I know what you are doing so it's* [interprofessional identity] *just more about keeping each other updated… but I think through this placement, it's* [interprofessional identity] *really about coming together with a common goal and* [understanding] *how you can weave together all these two goals together in a session to achieve the client's overall goal* (P38).

At the start of the placement, this participant associated being client-centred with working alongside other professions. By the end of the placement, however, this participant placed greater emphasis on working interactively and interdependently with different professions to deliver client-centred care.

Further to this, interprofessional thinking, developed during placement, was frequently mentioned as an attribute underpinning participants' commitment toward delivering client-centred care. Examples include:

I think [interprofessional placements] *definitely facilitated interprofessional thinking because* [interprofessional thinking] *has been taught in our course and injected in our placements to have that teamwork and have that interdisciplinary mindset. So I think it* [interprofessional thinking] *just encourages me to go speak with other participants, other Ots or whoever is on the ward, and that just helps me* [to] *make more connections* [with other professions] *because it's* [interprofessional thinking] *also about others* (P7).

And

I can say that this interprofessional clinical placement is really interprofessional for me because it has really challenged you [to think] *not just within your profession. Like in* [hospital in Singapore] *where I was, you knew what you did,* [and] *you knew there were other team members involved* [in] *treating this patient together. But we saw* [patients in common] *in terms of their case history. We wanted to see the diagnosis; what was* [the] *input from other profession in terms of their analysis and that was it. There was nothing interprofessional* [about that way of working] (P38).

Notably, interprofessional thinking was operationalised as the capabilities that participants perceived were important for client-centred practice. These capabilities were teamwork, reflection, conflict resolution, communication, and role clarification. A representative quotation for each capability is presented below.

Teamwork

You have to know what your skills are, what your strengths are [and] *bring that to the team. At the same time when you're talking about interprofessional identity, you have to be willing to listen to other people's professions and what the primary concerns are, because physio might not be the main concern; so being able to realise when physio needs to step back for the benefit of the team and the patient* (P8).

Reflection

The Ots really helped me to see all aspects. I'm looking at the speech, language swallowing, and the Ots really helped me by mentioning other things. You know, this person needs help with their mobility and this person needs help with their mental health, and they need help with their drug addiction. Having them feedback to me reminds me that these are some other things going on for [clients]*, and* [their feedback] *helps me remember* [that although] *my goals are this, there* [are] *other things happening in their lives that might impact how committed they are to therapy. Maybe I should think a bit more about how I'm goal-setting and how I can bring those other aspects up* (P31).

Conflict resolution

It's really important [to be] *in clients' best interest and sometimes it's not always pleasant. Like when you have to advocate for the client* [and] *I disagree with someone, I will have to be assertive to advocate for my client.* (P32)

Communication

An interprofessional identity is just [about] *being part of a cohesive interprofessional team where we're all communicating with each other and working in a team to really help the client* [who is] *at the centre of it all.* (P35)

Role clarification

> [Interprofessional identity] *is knowing what you* [can] *do yourself, and I think [it is]* *also* [about] *understanding what someone else does*. (P10)

These examples highlight the 'next step' in interprofessional identity development involves a commitment to client-centred care by learning to apply interprofessional capabilities flexibly to meet clients' needs. Participants did not describe these capabilities in any particular order, consistent with the notion that interprofessional capabilities are inter-related and may not develop in a linear manner (Brewer & Jones, 2013; Sy et al., 2019).

Identifying the self as both a professional and an interprofessional practitioner

As they began to identify as future interprofessional practitioners by the end of the placement, participants used their knowledge of interprofessional practice and interprofessional thinking to understand the relationship between professional and interprofessional identities. It was clear from their interview transcripts and drawings that daily opportunities to work interactively with students and staff (clinical educators, other health professionals at the placement site) throughout the placement were important for participants to internalise their interprofessional identity. For example, one participant described the relationship between both identities as interrelated, professional identity as a part of interprofessional identity:

> *I think interprofessional* [identity] *for me is like fine tuning my professional identity.* *I have a general identity as a professional, but interprofessional* [identity] *brings it* *a bit higher. If an analogy works, it's like you know how to play a musical instrument,* *but to be able to play it to an audience, that's another level … Because I think it's not* *just* [about] *your profession, but it's also* [about] *respecting others. I think* *interprofessional identity* [involves being] *more aware and more respectful* [of other professions] *as opposed to my identity as just a speech pathologist* (P38).

Another participant (P14) illustrated both identities as intertwined and identified both professionally and interprofessionally (See Figure 2).

Figure 2

Professional and interprofessional identities intertwined (P14)
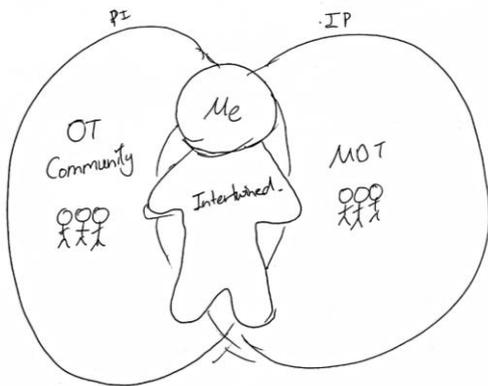
Note. PI = professional identity; IP = interprofessional identity; OT = occupational therapy; MDT = multidisciplinary team.

Participants also illustrated the importance of both identities for meeting the client's needs. As an example, one participant (P32) drew a bridge with professional and interprofessional identities at each end and the client in the middle (Figure 3).

Figure 3

The bridge analogy (P32)
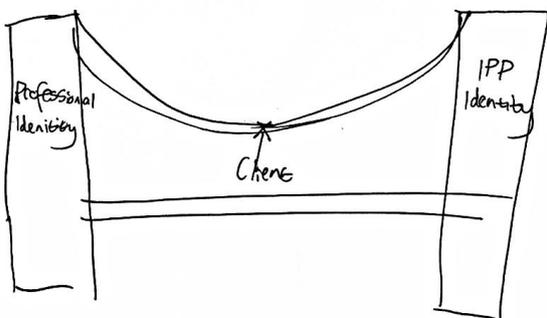
Note. IPP = interprofessional.

Most participants acknowledged interprofessional identity may not be salient in all contexts. For example, one participant (P3) illustrated the relationship between identity salience and context as context dependent (Figure 4):

Figure 4

Context determines identity salience (P3)
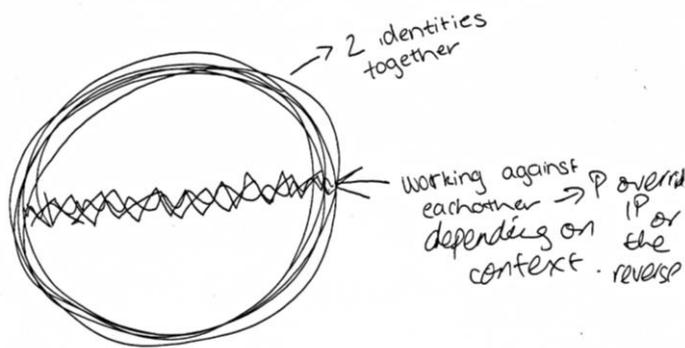
Note: P = professional; IP = interprofessional.

Participants highlighted three contextual factors that influenced interprofessional identity salience. These were: access to shared workspaces, attitudes of individual health professionals toward students in the workplace, and team dynamics.

Access to shared workspaces

> [hospital in Western Australia] *was great because* [although] *we were in the in-patient ward; we had an allied health room. There was speechies, Ots, and the physios, and we were all in the same room. That was really good.* [We could] *discuss same patients and their role in the* [care of the] *patient and our role in the* [care of the] *patient.* [It] *was really good understanding of what, different people do… plus at* [dedicated interprofessional placement site], *we were in one meeting room with the Ots and the speechies and the other participants. In the mornings we had an IPP* [interprofessional practice] *meeting and planned out which units we were going to*

see [and] *which joint sessions we were going to do. It was all extremely IPP-based* (P4).

Attitudes of individual health professionals toward students in the workplace

I guess they [health professionals] *give more thought to what you say in different areas as well, and* [it] *depends on who you work with. So like when I was in the hospital, I called one of the doctors and said I didn't think this person was ready to go home yet. The doctor pretty much completely ignored me and tried to send him home. Then I went to another doctor and said the same thing about a different patient, and she* [said] *'that's right, tell me why'. I think there's a difference in who you're working with as well, how much they take on board what you say* (P2).

Team dynamics

I've been on two interprofessional placements but I'm still trying to find that interprofessional identity, because I've only worked within a student team, and we were all learning, so it was fine. But if I were to go outside and join an interprofessional team, I think the dynamics will be completely different. I'll have to find that interprofessional identity in that team again if that makes sense (P38).

Collectively, findings of this theme suggest individuals internalise an interprofessional identity by the end of the placement. They do so by identifying both professionally and interprofessionally. Of note, context influences interprofessional identity salience.

Discussion

The aim of this study was to explore if and how final year students develop interprofessional identity during a dedicated interprofessional placement. Overall, results showed participants progressed from conceptualising interprofessional identity as a

requirement at the start of the placement, towards internalising an interprofessional identity by the end of the placement. Context influences interprofessional identity salience.

Findings indicate interprofessional identity development begins when students gain role clarity within interprofessional context(s) and learn to work together with students from other professions in the interprofessional team. Analysis of the interview transcripts showed most participants did not realise they were developing an interprofessional identity as they engaged in interprofessional practice throughout the placement.

Kegan's (1982) constructive developmental theory of self, provided the theoretical basis for understanding findings of this study. Participants' descriptions of interprofessional identity as interprofessional practice and being rewarded for doing so early in the placement (i.e., being instructed they will pass the placement if they engage in interprofessional practice), indicated they viewed identity through the instrumental lens (Kegan, 1982). This lens represents a narrow understanding of identity that is based on an external validation of self (Kalet et al., 2017; Kegan, 1982). In other words, interprofessional identity development begins as students develop cognitive ties towards interprofessional identity (i.e., thinking this is what I need to be), and receiving social validation for doing so (i.e., being instructed they will pass the placement if they engage in interprofessional practice).

As the placement progressed, participants also developed affective ties (i.e., it feels good to engage in interprofessional practice) and psychological ties (i.e., I am committed to interprofessional practice as a future interprofessional health professional) to an interprofessional identity. For example, further analysis of their interview transcripts and drawings showed that all participants expressed a commitment to ground their practice in client-centred care, as they gained a deeper understanding of the importance of interprofessional practice during the placement.

Consistent with Kegan's (1982) constructive developmental theory of self, participants developed a deeper understanding of interprofessional identity by transitioning from viewing identity from the instrumental to the socialised lens. Individuals with a socialised interprofessional identity are able to internalise and emulate perceived norms and expectations of important others (e.g., interprofessional practice facilitators, other healthcare professionals) without question (Kalet et al., 2017; Lewin et al., 2019)

Given students' interprofessional learning was facilitated throughout the placement by dedicated interprofessional practice facilitator(s) and visiting profession-specific clinical educators from the students' university, this finding suggests the importance of interprofessional role models for facilitating students' ongoing interprofessional identity development. This recommendation mirrors recommendations in the wider practice-based learning literature regarding the importance of role models for professional identity construction (Jack et al., 2017; Thistlethwaite, 2013).

Towards the end of the placement, participants started identifying as future interprofessional practitioners and as members of their own profession who are capable of, and committed, to interprofessional practice. However, the finding that interprofessional identity salience is influenced by three contextual factors (access to shared workspaces, attitudes of individuals in the workplace, and team dynamics) may indicate participants' perceptions of the relevance of an interprofessional identity for clinical practice changes, as they experienced the realities of practice. The notion of a perceptual dip (Sy et al., 2019) can be used to explain this idea further.

Sy et al. (2019) defined a perceptual dip as a "critical season in professional growth" (p.64), This growth occurs as individuals (students, professionals) work through perceived challenges (e.g., attitudes of individuals in the workplace, team dynamics) associated with interprofessional practice in the workplace. This perceptual dip occurs over a brief period of

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time and is necessary for individuals to develop deeper and more meaningful understandings of interprofessional teamwork in the workplace (Sy et al., 2019). Further research exploring if and how this concept may deepen current understanding of interprofessional identity development as students become professionals is recommended.

The participants associated interprofessional identity salience with access to shared physical workspaces. This finding mirrors findings in other studies that explored the relationships among space, interprofessional education, and practice (Brewer et al., 2017; Hawick et al., 2020; Nordquist et al., 2011). A common finding from these studies was that students gained a broader understanding of professional and interprofessional practice, through frequent opportunistic interprofessional interactions with other students, clinical educators, and other health professionals in these shared physical spaces. Further research exploring interprofessional identity development in settings that may not include shared physical workspaces is recommended, given effective interprofessional practice can also occur in these settings (DiazGranados et al., 2018; Franz et al., 2020; Sy et al., 2019).

Apart from shared physical workspaces, further researchers should also consider the influence of shared virtual workspaces on interprofessional identity development. Recently, the COVID-19 pandemic and technological advancements have contributed towards greater interest in the potential of virtual interprofessional teams and virtual interprofessional education initiatives for delivering client-centred care and health professions education (Khalili, 2020; Langlois et al., 2020). For example, future researchers could explore interprofessional identity development during online interprofessional education, hybrid online, and in-person interprofessional education programmes. These findings may inform the design of interprofessional education programmes that prepare students to become interprofessional practitioners capable of working in physical and virtual interprofessional teams.

Attitudes of individual health professionals in the workplace and team dynamics were two other contextual factors that influenced interprofessional identity salience in this study. Effective interprofessional teamwork, collaboration, and partnership between clients and professionals is required to address healthcare needs in the 21st century (Fraher & Brandt, 2019; Khalili, Thistlethwaite, et al., 2019; Thistlethwaite et al., 2019). In line with this focus, it can be argued that healthcare professionals have a responsibility to engage in interprofessional practice to ensure students' interprofessional identity development during clinical placements is not hindered by dissonance between what was taught about interprofessional practice at university and what they experience in the workplace.

In the same way that professional identity develops serendipitously through various professional socialisation experiences (Rees & Monrouxe, 2018), continued interprofessional identity development following dedicated placements is likely to be influenced by students' experiences interacting with healthcare professionals in the workplace during subsequent placements. Because commitment influences behaviours in the absence of external reinforcers (Reinders et al., 2018), commitment from key stakeholders (e.g., senior management) in the workplace to provide continuing interprofessional education is needed. The goal of continuing interprofessional education should be to equip healthcare professionals with the interprofessional capabilities and commitment to work interprofessionally in different workplace contexts (Fraher & Brandt, 2019; Thistlethwaite et al., 2019).

Facilitating students' interprofessional identity development is a joint responsibility of university educators and employers in the workplace. Therefore, interprofessional identity development should be a goal of dedicated interprofessional placements, consistent with recommendations by Rees et al. (2019). For example, educators should let students know that they are developing their interprofessional identity as they learn about, and engage in,

interprofessional practice during the placement. Next, students need opportunities to develop a clear understanding of their professional identity in an interprofessional context early in the placement, as professional identity development precedes interprofessional identity development (Reinders et al., 2018). To achieve this goal, students need to learn to apply interprofessional capabilities (e.g., teamwork, communication) flexibly (e.g., make referrals, initiate joint intervention sessions with other professions) in practice.

Following a clear understanding of professional identity, students should focus on developing a commitment towards client-centred care by engaging in interprofessional teamwork (Xyrichis et al., 2018) consistently throughout the placement. Finally, explicit discussion about the influence of context on interprofessional identity salience is needed to equip students with the capabilities and commitment to practise interprofessionally in different contexts to deliver client-centred care.

These discussions should be grounded in a shared understanding of identity salience and context. For example, educators and researchers in interprofessional education can frame discussions about interprofessional identity salience and context based on work by Stryker and colleagues (Stryker, 1968; Stryker & Serpe, 1982; Stryker & Vryan, 2003) on identity salience, and Bates and Ellaway's (2016) definition of context: "a dynamic and ever-changing system that emerges from underlying patterns of patients, locations, practice, education and society, and from the unpredictable interactions between these patterns." (p. 814) To conclude, further research exploring how current interprofessional curricula can be re-designed to incorporate the recommendations from this study is required.

Strengths and limitations

This study explicitly explored final year students' interprofessional identity development during a dedicated interprofessional placement. This study had some limitations. First, the transferability of findings may be limited as all participants self-

selected and were from one university. Second, findings represent interprofessional identity development at one point in time. However, these findings provide a starting point to inform future longitudinal interprofessional identity research across a range of universities and professions.

Conclusion

Interprofessional identity develops during dedicated interprofessional placements. Participants progressed from conceptualising interprofessional identity as a requirement of the placement at the start of the placement, toward internalising an interprofessional identity by the end of their placement. The finding that context influences interprofessional identity salience suggests as students experience the realities of clinical practice, they may experience a perceptual dip (Sy et al., 2019) regarding the relevance of an interprofessional identity for practice. This phenomenon occurs over a brief period of time and is necessary for students to develop deeper and more meaningful understandings of interprofessional teamwork in the workplace (Sy et al., 2019). Further research exploring if and how this concept may inform continued interprofessional identity development as students become professionals is recommended.

Lastly, a commitment from healthcare professionals to model interprofessional practice, combined with explicitly facilitating interprofessional identity development at university is recommended. Further research exploring interprofessional identity development and salience in different contexts is also recommended. Such findings may inform the re-design of interprofessional education curricula to facilitate continued interprofessional identity development in different contexts post placement.

Declaration of interest

The authors report no conflicts of interest.

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Interview questions

1) What does professional identity mean to you?

2) How has your professional identity developed over the course of your studies?

3) How have your placements influenced your development as a professional?

4) What does interprofessional identity mean to you?

5) How has your interprofessional identity developed over the course of your studies?

6) How have your placements influenced your development as an interprofessional practitioner?

Prompts:

What was particularly memorable about your placements?

What was particularly challenging?

7) Please describe the relationship between your professional and interprofessional identities.

8) In what situations is one identity more important than the other?

9) What image or images comes to mind when you think about the interaction between both identities? Provide participant with paper and textas to draw an impression of both identities.

10) Is there anything else you would like to share?

Rationale for including drawings as a data collection tool

Participant-produced drawings were used to facilitate in-depth discussions about identity during interviews and to illustrate key findings from the participants' narratives about interprofessional identity and its relationship with professional identity. A total of 30 drawings were obtained. In all the drawings, both identities appear to coexist and are necessary to guide interprofessional practice. This observation is consistent with the participants' narratives about how the interplay between their professional and interprofessional identities, as well as their collective influence on practice.

An interesting difference across the four drawings included in this paper was the way that the relationship between both identities was visually represented varied (Refer to Figures 1 to 4 in the paper). During the conception of this study, my supervisors and I decided that it was beyond the scope of this thesis to analyse the drawings. However, given the quantity of drawings obtained in this study (n=30), an in-depth analysis of these drawings is recommended for future studies of interprofessional and professional identities to gain a critical understanding into how interprofessional interactions influence students' perceptions of both identities and their influence on practice.

Summary of participants by gender and profession

Table 1
A summary of participants by gender and profession (n=38)

	Profession				
Gender	Occupational therapy	Speech pathology	Physiotherapy	Counselling psychology	Pharmacy
Female	12		5	1	1
Male	3	9	2	4	1

Data management

Table 2

Data management according to Braun and Clarke's (2006) six phases of thematic analysis

Phase	Description
One	Familiarisation of data through transcription, multiple readings and note taking.
Two	Inductively generating initial codes based on the participants' perceptions of identities and practice.
Three	Searching for themes by grouping initial codes that were similar and developing candidate themes.
Four	Reviewing and refining candidate themes to determine whether they are really themes or subthemes. My supervisors and I discussed the candidate themes on multiple occasions to ensure that the final themes identified accurately represented key ideas from the dataset. Individual subjectivity and discrepancies regarding data interpretation were discussed until consensus was reached regarding what constituted themes.
Five	Defining and naming themes. Three themes were developed: "gain role clarity," "commitment to client-centred care," and "identifying the self as both a professional and an interprofesisonal practitioner." - The theme "gain role clarity" captured the participants reflections regarding how interprofessional interactions shaped their understanding of an interprofessional identity. - The theme "commitment to client-centred care" described the cognitive shifts that occurred that led to participants developing insight into interprofessional identity and its importance for practice. - The theme "identifying the self as both a professional and an interprofessional practitioner" captured the participants' perceptions of the interplay between their interprofessional and professional identities.
Six	Reporting each theme. Please refer to the results section (page 131) of the paper for details.

Clarifying semantic and latent levels of thematic analysis

Semantic level of thematic analysis refers to the surface-level meaning of the data. In comparison to the semantic level of thematic analysis, at the latent level, emphasis is placed on interpreting surface-level data to understand what it actually means (Boyatzis, 1998). Interpretation involves interrogating the assumptions and ideas that underpin the spoken narrative (Boyatzis, 1998). Table 1 contains two examples of thematic analysis at the latent and semantic levels. These examples were based on data from **Study Five**.

Table 3
Thematic analysis at the latent and semantic levels

Latent level	Semantic level
Gain role clarity	1. Working as a team while working within role boundaries. 2. Learning to collaborate with other professions while retaining own professional identity.
Identifying the self as both a professional and an interprofessional practitioner.	1. Interprofessional identity involves fine tuning professional identity. 2. Professional and interprofessional identities are intertwined as a member of the multidisciplinary team.

Further discussion regarding context and identity salience

Monrouxe and Rees (2015) noted that *identity* can be critically explored from a range of theoretical perspectives. In this study, interprofessional identity was explored from a constructivist perspective (Mann & MacLeod, 2015; Talja et al., 2005). A rationale for the switch in theoretical perspective from constructionist to constructivist was provided in the previous study (**Study Four**). Constructivists believe that the world has multiple realities; each reality represents how one construes and constructs meaning in light of their context, past experiences, attitudes, beliefs, and knowledge (Mann & MacLeod, 2015).

Context matters because individuals understand and develop their interprofessional identity through a process of engaging in interprofessional interactions during the interprofessional placement, reflecting on their interprofessional experiences gained during placement against existing understanding of interprofessional practice and identity, and potentially, develop further insight about interprofessional identity and practice (i.e., further interprofessional identity development) (Mann & MacLeod, 2015). Meaning-making occurs through dynamic interactions between the individual, events, and other individuals in the environment that one is in (Mann & MacLeod, 2015; Talja et al., 2005).

As reported in the paper, participants commented that interprofessional identity salience was context-dependent. I went on to explain that this finding may indicate that the participants' perceptions of the relevance of interprofessional identity for clinical practice changes, as they experienced the realities of practice (page 142). Interpreted according to Kegan's (1982) theory, this finding suggests the participants' understanding of interprofessional identity was shaped by Kegan's (1982) socialised lens. A socialised view of interprofessional identity meant that participants understood interprofessional identity as adopting perceived norms and expectations of important others (e.g., interprofessional practice facilitators, other healthcare professionals) without question (Kalet et al., 2017; Lewin et al., 2019). It, therefore, can be argued that if the context is not conducive for interprofessional practice, individuals with a socialised view of identity are less likely to engage in interprofessional practice in the workplace.

Chapter Eight

Chapter eight builds on the findings from chapter seven by exploring if and how new graduates, with prior interprofessional experiences, continue to develop their interprofessional identity. The impact of any further interprofessional identity development on new graduates' practice orientation in a range of health service delivery settings is also discussed. The work in this chapter is being developed for a publication titled "Exploring interprofessional identity development in healthcare graduates and its impact on practice" with co-authors Brewer, M., Flavell, H., & Roberts, L. D. This work is in the later stages of a peer review process with a journal. This manuscript was revised and resubmitted on 20th August 2021. Vancouver referencing style was used in this paper as a requirement of the journal.

Abstract

Interprofessional identity development is an emerging area of research. Whilst there is a growing body of studies exploring interprofessional identity development and interprofessional education, little is known about interprofessional identity development in healthcare professionals and the impact of interprofessional identity on practice. This study explored interprofessional identity development in graduates during their first year of work as health professionals and the influence of this on practice. All graduates had prior interprofessional education as students. Fourteen interviews with eight graduates were conducted. Data was analysed cross-sectionally using inductive thematic analysis. Three inter-related themes were developed: 'growing confidence,' 'commitment to client-centred care,' and 'maintaining dual identification in different contexts.' These themes demonstrated that, first, interprofessional identity development occurred along a continuum influenced by the practice context and the individual's commitment to client-centred care. Second, confidence identifying and practising as a healthcare professional facilitates further interprofessional identity development. Third, maintaining identification as an interprofessional practitioner involves developing an increasingly sophisticated understanding of interprofessional practice by viewing interprofessional identity through increasingly complex meaning-making lenses consistent with the constructive developmental theory of self. Findings support the inclusion of pre-licensure interprofessional education and inform further interprofessional identity research in professionals beyond their first year of practice.

Introduction

The 21st century health workforce requires effective interprofessional teamwork, collaboration, and partnership between clients and professionals. (1-3) Universities have responded by including interprofessional education within health professional training programmes. (4) Whilst the long-term impact of interprofessional education initiatives on subsequent professional practice, as perceived by students and graduates, are generally positive, (5, 6) some researchers (7, 8) highlight that new graduates may not be adequately prepared for the interprofessional workforce. This finding may be due to the complexities involved as students transition to practice. (9)

The transition from being a student to a professional represents an identity shift. (10) New graduates need to modify the professional identity that they entered the workplace with to one that fits the workplace context. (9, 11, 12) This identity transition occurs as new graduates develop confidence to practice with increasing autonomy (13) and learn the expectations (norms, values, behaviours) of the workplace (9, 11) concurrently. Further to this, graduates also need to learn to work interprofessionally whilst establishing their identity in their chosen profession as members of the interprofessional workforce. (2, 7, 14).

Despite the growing need for health professionals capable of working interprofessionally, (1, 14) limited empirical understanding exists of how new graduates with prior interprofessional experiences as students, remain committed to working interprofessionally over the long term. (15) Researching interprofessional identity development in new graduates over a sustained period is one way to address this knowledge gap. Interprofessional identity refers to "the development of a robust cognitive, psychological, and emotional sense of belonging to an interprofessional community(s), necessary to achieve shared context-dependent goals".[16(p6)]

To date, most interprofessional identity studies conceptualised identity in terms of group memberships according to social identity theory, (16) and as an outcome of interprofessional socialisation. (17, 18) We argue that the social identity lens may not adequately inform how graduates with an interprofessional identity, develop further insight into their interprofessional identity, and how it influences their practice in different health service delivery contexts as professionals. Another theoretical perspective is needed to understand how graduates may continue to develop their interprofessional identity. Specifically, we propose conceptualising further interprofessional identity development in graduates as a process of becoming an interprofessional practitioner who is committed and capable of delivering interprofessional care in different health service delivery contexts. In line with the proposed conceptual shift in understanding identity development as a process rather than an outcome of group memberships, this study will draw on Kegan's (19) constructive developmental theory.

According to Kegan, (19) identity development in adults involves a unilateral transition through four meaning-making lenses: instrumental, socialised, self-authoring and self-transforming. Each lens represents a level of meaning-making ability that individuals employ to understand experiences, relationships, and the self. (20) Identity viewed through the 'instrumental' lens is focused on rules and rewards; the 'socialised' lens emphasises following social norms and expectations; the 'self-authoring' lens focuses on building an internal value system; and the 'self-transforming' lens is the awareness of the limitations of one's own value system and being open to the value system of others. (19) A lens transition is triggered when individuals are faced with a situation or challenge that cannot be resolved by viewing this through an existing lens. (19, 21) The outcome of a lens transition is that thinking becomes less rigid and simplistic, as individuals develop the ability to think in more flexible, open and complex ways. (22)

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Kegan's (19) theory has been used to explain healthcare students' professional (23-25) and interprofessional (26, 27) identity developments. A common finding from these studies was, to identify as future professionals with an interprofessional sense of self, students need to progress through different stages of identity development to develop a sophisticated understanding of how interprofessional practice manifests in different contexts to ensure care remains client-centred. Exploring graduates' interprofessional identity development using Kegan's (19) theory is the logical next step. Therefore, the aim of this study was to explore interprofessional identity development in graduates during their first year of work, and its influence on their practice. All graduates in this study had prior interprofessional education coursework (29) and practice (26) experiences as students.

Method

The study was underpinned by social constructivism (28), acknowledging that the participants construct their identity by understanding and creating meaning from events (28). This position aligned with the research aim and informed the decision to conduct multiple individual semi-structured interviews with participants during their first year of work.

Ethical considerations

Ethics approval (HRE 2016-0407) was obtained from the university's human research ethics committee before recruitment commenced.

Data collection

Data collection occurred over two years between March 2018 and February 2020 and involved two cohorts of graduates during their first year of practice. Each cohort was tracked for one year. The first cohort graduated at the end of 2017, the second, at the end of 2018. Graduates were recruited using purposive sampling. (30) This sampling strategy aligned with the study aim and underpinning epistemological position, thus ensuring methodological rigour and trustworthiness of the data obtained. (30)

Researcher RT recruited all participants for this study by sending emails to 17 new graduates from both student cohorts who participated in an earlier study about interprofessional identity as final year students and expressed interest in this study. Eight of the 17 graduates contacted participated in this study. To minimise participant attrition as the study progressed, RT sent each participant who consented further contact, an email and/or text message approximately three months after each interview. A follow-up email and/or text message was sent one month before the interview to remind participants of the study and importance of ongoing participation for advancing the interprofessional identity scholarship. All participants had the option of a face to face, virtual, or phone interview at each interview, to reduce potential barriers (time, travel) to ongoing participation. These participant engagement strategies are consistent with recommendations in the qualitative longitudinal research literature for recruiting and retaining participants. (31-33)

Semi-structured interviews were conducted at three time points during graduates' first year of practice. The first time point, T1, occurred four to six weeks after workforce entry, the second, T2, six to eight months, and the third, T3, after 11 to 13 months post-entry. An interview guide (S1 File) was used for all interviews. Questions were developed by all members of the research team following an extensive review of the identity (professional, interprofessional), socialisation, and interprofessional literature to ensure questions were

dependable and credible (34, 35). The team comprised four members experienced in undertaking qualitative research (RT, MB, HF, LR), teaching qualitative research (HF, LR) and supervising students conducting qualitative research dissertations (HF MB, LR).

Participants

Eight new graduates from four professions participated. Participants were from physiotherapy (n=3), occupational therapy (n=2), speech pathology (n=2) and pharmacy (n=1). Table 1 contains a summary of the participants' profession, practice settings, and type of interview completed at each time point.

Table 1. Participant demographic information

Participant	Profession	Practice setting	Description of the practice setting according to the participant	Type of interview at each time point		
				T1[a]	T2[b]	T3[c]
P1	SP[d]	Hospital	Acute hospital with a multiprofessional approach[h] to service delivery.		Skype	Phone
P2	OT[e]	Community health	A therapy centre with multiple professions. Services are delivered interprofessionally[i]. Therapist(s) deliver services in the client's home, school, community, or in the therapy office.	Face to face	Face to face	
P3	SP	Rural health	A rural health service where therapists may deliver services interprofessionally or multiprofessionally in an acute hospital and in the community.	Skype	Skype	Skype
P4	OT	Community health	A rehabilitation centre where services are delivered multiprofessionally.	Phone	Face to face	
P5	Pharm[f]	Private practice	A private practice with one profession. Services are delivered uniprofessionally[j].	Phone		
P6	PT[g]	Defence	A defence based located in rural Australia with a multiprofessional approach to service delivery.	Phone		
P7	PT	Private practice	A private practice with multiple professions. Services are delivered multiprofessionally.	Face to face	Phone	
P8	PT	Private practice	A private practice with multiple professions. Services are delivered multiprofessionally.		Face to face	

[a]T1 between four to six weeks, [b]T2, between six to eight months, and [c]T3, between 11 to 13 months post entry. [d]SP = speech pathology, [e]OT = occupational therapy, [f]Pharm = pharmacy, and [g]PT = physiotherapy. [h]Multiprofessional refers to activities performed by members from different professions independently, in parallel or sequentially with one another. (36) [i]Interprofessional refers to activities performed by members from different professions by integrating work practices and working interdependently to achieve shared care outcomes. (36, 37) [j]Uniprofessional refers to activities undertaken by one profession alone. (36)

Due to graduates' availability and the voluntary nature of participation, three participants participated at one time point (T1 or T2), four participated at two time points (T1 and T2 *or* T2 and T3), and one participated at all three time points. Across all time points, a total of 14 interviews were conducted with the eight participants. The average interview length was 26 minutes. The shortest interview was 16 minutes; the longest, 60 minutes. A combination of face-to-face, virtual and phone interviews were conducted to accommodate participants' preferences. All interviews were audio recorded with permission, transcribed, and deidentified. Prior to analysing the dataset, all researchers compared the frequency of participation by profession, mode of interview (face-to-face versus online or over the phone) and practice settings (private practice, hospital, community health). Only practice settings influenced the frequency of participation (see Table 1). Graduates who worked in health workplaces with either a multiprofessional or interprofessional approach to service delivery, participated in one or more follow-up interview(s). To enhance the credibility of data analysis, RT made notes during interviews, engaged in reflexive journaling, and maintained an audit trail of key decisions made as a team. (32, 34)

Data analysis

Data was analysed for each cohort of graduates at each time point using Braun and Clarke's (38) inductive thematic analysis procedures. A recurrent cross-sectional approach (31) of analysing data obtained at all time points was chosen for three reasons. First, this approach focuses on exploring changes in interprofessional identity over time at the level of the whole sample, (31) consistent with the study's aim. Second, participant numbers varied at each time point due to logistical challenges and the voluntary nature of participation. Third, by analysing data cross-sectionally, interesting findings from the data at one point in

time can be explored further in subsequent interviews, (31, 32, 39) which enables a more in-depth understanding of interprofessional identity to be obtained.

All researchers read transcripts from T1 independently to familiarise themselves with the data and met regularly to discuss the data (32, 39). Initial themes were developed based on the T1 data. Transcripts from T2 and T3 were coded based on the initial themes developed from T1, to identify changes at subsequent time points. New codes and themes from T2 and T3 were also added as part of the inductive analysis. RT coded all transcripts across all time points. MB, HF, and LR cross-coded a portion of the transcripts ($n = 4$ each), including multiple transcripts from the same participant, to track change over time. Codes and themes developed from both cohorts at all time points were compared. No notable differences in graduates' perceptions of interprofessional identity were found between cohorts, which suggested adequate information power (40) was obtained based on the narrow study aim, specificity of the sample, and quality of narratives.

To enhance the credibility, rigour, and trustworthiness of the findings, (34, 35) all researchers developed the themes and their descriptions through an iterative process of discussing findings, addressing personal bias on data analysis, engaging in peer debriefing, and refining themes over time. (38) During this process, the researchers also found that the participants' views of interprofessional identity and practice did not differ by profession, mode of interview (face-to-face versus online or over the phone), or practice settings (private practice, hospital, community health). Initial themes were identified inductively at the semantic level while final themes were developed at the latent level. (41)

Results

Three interrelated themes related to the participants' perceptions of interprofessional identity and its influence on professional practice during their first year of work were developed. These were: 'growing confidence,' 'commitment to client-centred care,' and

'maintaining dual identification in different contexts.' The progression of each theme is described below.

Growing confidence

Participants regarded their confidence in identifying as professionals instead of as students on clinical placement in the workplace as important during interviews conducted at T1. For example:

> *As a student, everything you do gets analysed and prodded by your clinical supervisors. They want to know your clinical reasoning behind what you do. There's a lot less frequent prodding* [and] *questioning by your clinical supervisor as a professional and that's ok. I think you need to feel confident in your ability to support your clients achieve their goals without the need to check with a senior* [clinician] *or clinical supervisor all the time as a professional.* (P2, six weeks)

This participant's description of confidence suggested an identity shift from student to professional occurred in the first few weeks after workforce entry as confidence working with clients independently increased. Likewise, another participant, P4, reflected on the impact of growing confidence practising as a professional on her identity shift as:

> *With every piece of documentation that I would write on my placements, it would still need to be co-signed by my supervisor. Whereas* [in] *the role now, in the initial stages of me starting this role, things were still looked over by a supervisor. But that has tapered off now… It can be a little bit scary. Sometimes I feel like my confidence wasn't* [there]*… After almost two months, my confidence as a professional has improved a little bit… My supervisor has said she doesn't think that anybody doing this role is going to be confident until at least six months in because of the diversity of the caseload.* (P4, six weeks)

Both examples indicated that graduates entered the workforce identifying as students on clinical placements. Growing confidence meeting the needs of the client with reducing guidance from colleagues with more experience (e.g., clinical supervisor), facilitated movement from identifying as students to identifying as professionals in the first few weeks following workforce entry.

The ability to take on more responsibility in the health workplace was also linked to confidence identifying as professionals instead of students on clinical placement in the workplace. For example:

> *I hold a lot more responsibility as they* [employer] *put me in charge of the Western administration base, which is a massive boost to my confidence as a new grad. They do give me that responsibility* [to] *make changes on my own, with discretion compared to a* [pharmacy] *assistant* [where] *you would consult the pharmacist every time… During placements, I was still an assistant not an intern* [pharmacist]. *We had different responsibilities. We didn't have the autonomy then to make our own decisions.* (P5, four weeks)

It was clear from follow-up interviews at T2 that participants' confidence practising as professionals continued to grow through skill repetition. As one participant explained, "when I first started, [I felt that] because I did not have enough experience I panicked. But now everything seems fine. I have more confidence treating patients [by] seeing the same conditions over time." (P8, six months).

Participants' perceptions of confidence as professionals also increased as they gained a clearer understanding of their work role and experienced greater autonomy in their role over the first four to eight months of employment. A representative quotation for each attribute is presented.

Role clarity

I feel a little bit more sure of what my role is when talking to different stakeholders. My identity [is] *a little bit more set. I guess I'm a lot more familiar with what the parameters of my role are and what I'm there to do.* (P4, eight months)

Role autonomy

I think it's that transformation of independence from a student. Even [in] *February when I entered* [the hospital]*, it didn't strike me that I am an independent speech therapist. I still think* [that] *I'm a student and I'm there to learn. Even one month into it, halfway through the induction it still felt like I'm still a student you know, I still have to ask questions, I still have to check whether I'm on the right track. But now six months on, I think it's more of* [the] *more complex cases like the intubated cases that I would check back. Normal caseloads like all the internal medicine ones, I just do it. I don't really talk to my supervisors.* (P1, six months)

Confidence remained a key theme in the interviews conducted at T3. These narratives highlighted a link between confidence and interprofessional practice to meet the needs of the clients. Typical examples included:

I think I've grown more confident in diagnosing and advocating for patients [that] *come in with oral refusal. There are team doctors that are always saying let's insert* [a] *NGT* [nasogastric tube] *and send them back. I* [respond with] *'no, just because they are oral refusing doesn't mean they need* [a] *NGT... sometimes it's* [more about] *discussing with* [the] *family* [regarding] *whether it's* [nasogastric tube] *something they want. Whether it's* [the nasogastric tube is] *something that the patients even want. Because there are times where you discharge like that* [with a nasogastic tube]*. They pull out the tube and you are back to the same problem* [oral refusal]. (P1, twelve months)

Likewise, another reflected on confidence and interprofessional practice as:

I think interprofessional [practice] *also ties in with confidence. When I first started, I did not know whether we* [speech pathologists] *could contribute to the care of the patient together. I think over these few months, there has been growth in terms of understanding that what I do for patients is what I do best. Sometimes it's working with other professions to achieve the same goal together confidently… If* [the] *patient wants to go back into the community and requires an AAC* [augmentative and alternative communication] *system, how can we work together with the OT to actually give that?* (P1, 12 months)

To summarise, the notion of confidence increased at each time point. Trends in the dataset indicated that confidence identifying as professionals provided the foundation for growing confidence in profession-specific practice, which in turn, fostered confidence practising interprofessionally in the workplace.

Commitment to client-centred care

Participants also linked their perceptions of an interprofessional identity to understanding how commitment to client-centred care presented in the workplace. During interviews at T1, commitment to client-centred care was described as knowing how to work interprofessionally with different professionals to ensure care was client-centred. Examples of interprofessional practice included:

Coordinating services for the client

I would say now I'm an advocate for my clients' needs in an interprofessional space as well as in a family-centred and family-friendly space… As an interprofessional team member, I need to ensure services are being accessed and coordinated, [by] *bringing that client in and ensuring they are linked in with* [the] *physio or OT, or whoever else that is needed. (P3, six weeks)*

Making appropriate referrals

I think it means you are open to understand other health professional roles. You are open to talk to them [over] *phone calls or emails when you need to if it's associated with your clients* [and] *for their best needs... so that they will take responsibility for the things they can help with.* (P7, six weeks)

Integrating contributions from other professions

There is such an emphasis on grabbing skills from a physiotherapist and a speech pathologist and incorporate [them] *into my session if I want. A parent might come to you with concerns X, Y and Z. You can still focus on the priority of that goal, whilst incorporating some physiotherapy elements like gross motor* [within] *that overall goal which might be improving attention. (P2, six weeks)*

Overall, these examples demonstrated that graduates' commitment to client-centred care was evident in the first weeks of workforce entry. Commitment involved an openness and ability to engage in different types of interprofessional work based on the client's needs within the service delivery expectations (norms, values, behaviours) of the workplace.

Participants reiterated their commitment to provide client-centred care by working interprofessionally during interviews at T2. However, their narratives shifted to include an awareness of barriers in the workplace that hindered their ability to deliver client-centred care. Three barriers were identified. They were beliefs about medical dominance, workplaces with only one profession represented, and scheduling difficulties. A representative quotation for each barrier is presented.

One participant described beliefs about medical dominance as, "I can say 'no actually, I think he would benefit from exercise physiology instead'. At the end of the day, it is still up to the GP, but I can go in and provide my recommendations." (P4, eight months).

Another reflected on the impact of having only one profession represented in the workplace as, "I think we are experts in different area, so sometimes we have to chat to each other about a patient's condition. But honestly in a private practice, I don't really need to talk to many people." (P8, six months).

Scheduling difficulties, the third barrier identified was described as:

For us, because it's an acute setting, it's [therapy sessions conducted by two professions] *not conducted on a regular basis. I can't say every Friday, I will meet the OT to do a joint session at this timing... At times, even* [on] *Fridays I have meetings or new cases* [that] *pop up,* [so] *I cannot do the videos* [videofluroscopic swallow examinations]. (P1, six months)

These examples suggested that as participants experienced the realities of practice and encountered organisational barriers to interprofessional practice, they realised delivering client-centred care consistently in the workplace was not as straightforward as initially thought (i.e., at T1).

By the end of the year (i.e., T3), participants' narratives focused on addressing the barriers identified at T2 by working interprofessionally with colleagues. For example, medical dominance was addressed by collaborating with other allied health professionals to present an alternative care plan focused on enhancing client outcomes through therapy:

With that one-year experience, I think it's really fighting for patients. Working with other professions to fight for your patients because doctors to us are very medically focused... I think for allied health, at least [for] *OT* [and] *PT, we are more functions-based. We know the medical condition, but we* [also] *want to know how it affects going back to your ADLs* [Activities of Daily Living]*... It's about working with the occupational therapist and PT to see whether our goals are aligned, whether we actually see that this patient has more potential than just being kicked into a nursing*

home. Then we come together, work together to show the team that there are certain

goals that we can achieve even in [an] *in-patient setting.* (P1, twelve months)

To promote interprofessional care in workplaces with a multiprofessional service delivery model, one participant modified the duration of back-to-back sessions by different professions to accommodate a joint session:

The difficulty comes down to billing. Who gets the bill? We usually do one [therapy session] *after the other, or sometimes we do it* [a joint session] *together, but it's* [shorter]. *My review sessions are usually billed* [using the code] *six. We bill* [using the code] *six, which is 30 minutes* [of speech pathology services]; *OT charges 15 minutes so we keep it* [the joint session] *within the 45 minutes of an hour, billed at the individual therapy rate for two 30minute sessions.* (P1, twelve months)

Another participant proposed broadening their own scope of practice:

The speechie stuff [speech pathology interventions] *is one part of what I do. We* [also] *do a lot of social work stuff* [because] *I don't have any clients where I can just get in, do artic* [articulation therapy] *and leave. A lot of it* [my work] *is, counselling the families, because our policy is routine-based and family-based practice… I'm more of a teacher to the parent, then a therapist doing things to the child. Do you know what I mean?* (P3, eleven months)

Summarising, participants developed a deeper commitment to interprofessional care as the year progressed. Commitment was grounded in the participants' ability to address the barriers experienced, when they tried to work interprofessionally to improve clients' care outcomes.

Maintaining dual identification in different contexts

This theme captured participants' understanding of the relationship between their professional and interprofessional identities at three time points, and the influence of this relationship on their ability to maintain dual identification as a professional and an interprofessional practitioner in different workplaces.

During interviews at T1, some participants described the relationship between both identities as grounding practice decisions based on the needs of the client. For example:

> *I think it's always knowing that the person needs holistic help. Physiotherapy is not going to fix everything. If appropriate, refer on or at least understand what other health professionals provide. I'm still the physio that works with an MDT* [multidisciplinary team] *in the back of my mind.* (P7, six weeks)

Similarly, another participant described how both identities guided client-centred practice decisions as:

> *I have to weigh up the pros and cons of what I can offer. If I can offer a basic level* [of therapy] *and I feel for that person, that's enough, I'll go with that. Otherwise, if I* [know that] *I'm not going to be able to offer enough for this person, as much as I'd like to try, I know that I should refer on. I put the patient's best interest in mind, and I go with that rather than what I would want to do.* (P6, four weeks)

Both examples suggested participants entered the workforce with an interprofessional mindset and ability to work interprofessionally. Perhaps more importantly, these examples highlight an emerging awareness of how context (e.g., service delivery model, resource limitations) influenced interprofessional practice decisions as new graduates.

Interviews at T2 suggested most participants had developed a deeper understanding of the interplay between context and dual identification. For example, one participant

described the relationship between both identities as important for working at role boundaries:

My professional identity is like within OT practice. They [professional and interprofessional identities] *link in together, but they are still quite separate, because professional identity as an OT is to support with your activities of daily life and things that we have had experience with. Your interprofessional identity, that feels like filling the gaps where the lines are a little bit more blurred in terms of how you support interventions. They come together.* (P2, eight months)

Similarly, another participant described both identities as necessary to enhance care outcomes:

I think my own professional identity is the core that allows me to expand into interprofessional identity. I need to know what my role is before I can do joint sessions or teach or advocate to other professions in terms of what I do. It's [interprofessional identity] *also not just knowledge sharing; it's also learning from them. Like joint sessions, I have to be very clear on what I do so that when they ask me questions, I can look back and see* [what] *am I doing correctly,* [what] *can I add on, or how else can I improve the session with the skills of other Ots and PTs.* (P1, six months)

Further to this, participants' descriptions of interprofessional practice suggested this became a natural way of working. For example:

I don't know how to answer this question. It's [interprofessional practice] *a natural thing now. To me interprofessional* [identity] *is like chatting to each other* [different professionals] *when* [needed] *if that improves* [the] *patient's outcome and definitely not an obligation.* (P8, six months)

The notion of both identities coming together to enhance care outcomes was also reflected in interviews at T3. One participant described the relationship between both identities and their importance for practice as:

My professional identity is my interprofessional identity. It [interprofessional identity] *is the strongest because I need to make sure that they* [clients] *are linked in with many professionals across the* [geographical] *region to ensure that they're tracked. I need every professional to know that I'm the speech pathologist in* [town]. *But I help this family to access many different services and that anyone can call me about this family, and I can give them information.* (P3, eleven months)

This example highlights that both identities are intertwined and necessary to guide client-centred practice. This view was shared by another participant:

I think both identities are mutually [related]. *There are some overlap here and there. Being client-centred is* [about] *working towards the goals that patients want, or what we know we can achieve for the patient, and that includes working together with the team. Having a multidisciplinary team to work together and achieve that* [patient's goals]. *Because sometimes, I have my own goal but working together with other therapists help to achieve the same goal better.* (P1, twelve months)

To summarise, over the year (T1-T3) data suggested participants experienced a merger of professional and interprofessional identities. The merging of identity occurred as participants developed a deeper understanding of the importance of interprofessional practice to improve care outcomes.

Discussion

This study explored interprofessional identity development in graduates during their first year of work as health professionals and the influence of interprofessional identity on practice. All graduates had prior interprofessional experiences as students. Findings demonstrated that, first, interprofessional identity development occurred along a continuum influenced by the practice context and the individual's commitment to client-centred care. Second, the degree of confidence to identify and practice as a healthcare professional provides the foundation for identifying as an interprofessional practitioner. Third, interprofessional identity development involves developing an increasingly sophisticated understanding of interprofessional practice, by viewing interprofessional identity through increasingly complex meaning-making lenses, according to Kegan's (19) constructive developmental theory of self.

The finding that graduates focused on developing confidence in identifying as professionals in the first few weeks of employment, before exploring ways to work interprofessionally as healthcare professionals, is not surprising. The transition from student to professional involves changes to roles and expectations, which can be stressful for the new graduate. (9) Graduates reflected that working interprofessionally gradually became a natural way of working as confidence in their professional role increased. This change suggests, whilst both professional and interprofessional identities develop concurrently, a clear understanding of professional identity provides the foundation for exploring interprofessional practice and further interprofessional identity development and commitment to work interprofessionally as interprofessional practitioners.

The complex relationship between interprofessional identity and interprofessional practice was evident from this study. Whilst the graduates acknowledged the importance of interprofessional practice as professionals and had generally positive experiences working

interprofessionally during the year, it was clear from the data that practising interprofessionally was not always straightforward. For example, confidence identifying as professionals was a key feature of the narratives obtained from graduates who have been working for a few weeks, whereas confidence practising as professionals and working at role boundaries dominated narratives obtained from graduates who have been working for at least six months. Similarly, compared to those who have been working for only a few weeks, graduates who have been working for a year had greater insight regarding the importance of ensuring barriers to interprofessional practice in the workplace are addressed to ensure care remained client-centred. These findings are explained further with reference to Kegan's (19) constructive developmental therapy of self. (18, 44, 45)

Graduates' increasingly sophisticated ways of describing interprofessional practice and interprofessional identity across the year indicated that multiple lens transformations (19, 21) occurred, as they developed insight regarding the impact of interactions among context (i.e., service delivery expectations and workplace barriers to interprofessional practice), mindset (i.e., commitment to client-centred care), and behaviours (e.g., profession-specific expertise) on their sense of self. As an example, the finding that most graduates expressed an awareness and acceptance of barriers to interprofessional practice in their workplace during their first six months of work suggests they could have viewed their interprofessional identity through the instrumental or socialised lens, or experienced a lens transformation from the instrumental to the socialised. (19, 21) Both explanations emphasised a willingness and ability to work interprofessionally within the service delivery expectations of the workplace. In comparison, during interviews conducted around twelve months following workforce entry, graduates highlighted their ability and commitment to navigate barriers to interprofessional practice to maintain an interprofessional approach of

delivering care. This mindset shift could have been informed by a lens transformation from socialised to self-authored (19), which occurred between six and twelve months of practice.

The contemporary health workforce requires professionals who are skilled in interprofessional practice to deliver client-centred care. (1, 2) Findings from this study indicated that working interprofessionally was not always straightforward, even for new graduates with prior interprofessional experiences as students. For example, although graduates' experiences of interprofessional practice during the year were generally positive, the data from this study highlighted that these graduates possessed a limited understanding of how they can deliver care interprofessionally in the first few months of practice. They developed insight into their interprofessional identity and its importance for guiding interprofessional practice as professionals as the year progressed. These findings suggest targeted strategies are required to support new graduates' transition to interprofessional practice. Several targeted strategies that are based on the findings from this study and the new graduates' transition to practice literature (9, 42, 46) are presented below.

First, ensure new graduates develop confidence practising with increasing autonomy and reducing guidance from colleagues with more experience (e.g., senior therapists, clinical supervisors), consistent with recommendations from the broader literature on new graduates' transition to practice (9, 42, 43) As confidence practising as professionals grows, employers should provide opportunities for graduates to learn why delivering healthcare interprofessionally, where appropriate, is important as professionals, followed by opportunities to work interprofessionally to meet the needs of the client. Identity and practice are intertwined; identity guides practice and practice facilitates identity development. (18, 44, 45) For example, during clinical supervision, clinical supervisors/mentors should initiate discussions about interprofessional practice, its relationship with interprofessional identity, and how interprofessional practice can be integrated into clinical practice.

Building on the strategies above, graduates' emergent interprofessionalism can be strengthened by attending interprofessional teamwork trainings, (43) observing experienced clinicians work interprofessionally with their clients and reflecting on these experiences with their clinical supervisors/mentors in the workplace. (9, 42, 43) These opportunities may trigger lens transformations (19, 21) and further insight into the relevance of interprofessional identity as health professionals. For example, graduates may experience a lens transition, from the instrumental to the socialised, (19, 21) as they reflect on their interprofessional learning experiences and develop a clearer understanding of how the interprofessional behaviours observed impacted the client's healthcare outcomes. Further research exploring the impact of role modelling and reflective practice on interprofessional identity development is recommended.

Another targeted strategy is for clinical supervisors to raise graduates' awareness of the barriers to interprofessional practice in the workplace, and jointly develop solutions to address these barriers. This strategy is based on the finding that graduates who knew how to navigate barriers to interprofessional practice in the workplace also regarded professional and interprofessional identities as one, at the one-year mark following entry into the health workforce. This navigation involves recognising, exploiting, and responding to opportunities in the workplace to ensure care remains client-centred.

In addition to facilitating interprofessional identity development in individuals, it can be argued that engendering a culture of providing care interprofessionally in the workplace is equally important. This strategy is developed by drawing from the literatures on change management (47-49) and interprofessional socialisation for interprofessional identity development. (3, 17, 18) This strategy also responds to a key finding from this study which is, to maintain identification as an interprofessional practitioner, the individual need to develop an increasingly sophisticated understanding of interprofessional practice. According

to Kegan's (19) constructive developmental theory of self, viewing interprofessional identity through increasingly complex meaning-making lenses is one way to develop further insight into interprofessional practice.

One way to build a culture of providing interprofessional care is by obtaining commitment from senior management to embed interprofessional practice into the culture of the workplace. (47-49) Senior management should demonstrate commitment to interprofessional practice by role modelling interprofessional communication, role clarity, and teamwork. For example, written and verbal communications with staff should be jargon-free. Management should also ensure all new graduates have a clear understanding of their roles. Another strategy is for management to create an interprofessional community of practice in the workplace for staff interested in interprofessional practice. (51) By allocating time for staff to meet regularly to discuss and reflect on their experiences working interprofessionally, a shared repertoire of resources (e.g., tools, success stories, strategies to barriers to interprofessional practice) that are specific to the workplace can be developed for use by all staff.

Of note, given all graduates in this study had prior interprofessional education as students, findings from this study support the inclusion of an interprofessional curricula with an explicit focus on facilitating students' interprofessional identity development. This recommendation echoes recommendations in previous studies exploring students' development of interprofessional identity. (26, 52, 53) A desired outcome is for new graduates to enter the health workforce with a clear understanding of, and commitment to, work interprofessionally in a range of service delivery contexts. Further research exploring how this proposed curriculum be designed and incorporated within health professional education is needed.

This is the first study to explore new graduates' interprofessional identity development during their first year of practice, underpinned by Kegan's (1982) constructive developmental theory of self. This study was methodological rigorous, which increased the credibility, trustworthiness, and dependability of findings. (34, 35) Findings advance the literature on graduates' development of interprofessional identity by demonstrating that to become interprofessional practitioners, graduates need to know how to navigate barriers to interprofessional practice to ensure care remains client-centred within the service delivery approach in the workplace.

Findings also suggest that prior interprofessional experiences as students facilitated graduates' interprofessional identity development and commitment to ground professional practice in an interprofessional mindset. Of note, graduates who participated in at least one follow-up interview worked in health workplaces with either a multiprofessional or interprofessional approach to service delivery (see Table 1). This suggests interprofessional identity is more relevant for guiding practice in workplaces where professionals from different professions work together to delivery health care, consistent with the notion of interprofessional practice. (36, 54) Future research exploring the clients' perceptions of the quality of healthcare received by professionals who work in an interprofessional team, compared to the quality of care received by professionals who work independently, in parallel, or sequentially with other healthcare professionals (36) is recommended.

This study had three limitations. First, participant attrition was high as the study progressed, despite employing a range of methods to retain participants throughout the study. (31-33) Consequently, not all professions' perceptions of interprofessional identity over time were represented and the transferability of findings from this qualitative study may be limited. (34, 35) This limitation was ameliorated by analysing the data obtained from each cohort of participants analysed cross-sectionally. (31) The themes obtained from both

cohorts of graduates from different professions were compared and found to convey similar notions of interprofessional identity development. Further to this, the sample size (comprising both participant cohorts) at each recruitment was clearly reported in Table 1. Collectively, these stratgies demonstated rigour in the data analysis completed and ensured that the findings were trustworthy. (31-33)

To minimise a high participant attrition rate in future longitudinal studies of graduates' interprofessional identity development, researchers should consider conducting participant observation studies. (55, 56) Unlike individual semi-structured interviews, graduates do not need to set side time to participate in an observational study, as researcher(s) are in the participants' workplaces, observing graduates' interprofessional interactions with clients and other healthcare professionals. (28, 55, 56)

The second limitation of this study was graduates' perceptions of interprofessional identity were likely influenced by prior interprofessional education. Further interprofessional identity research should compare graduates with and without prior interprofessional experiences. The third and final limitation was that the clients' perpectives of the quality of care received by graduates who worked in interprofessional healthcare teams compared to those who did not, was not explored in this study. The resource (time, personnel, logistics) limitations and complexities (multi-institutional ethics approvals, ensuring both graduates and clients are interviewed at each time point, and retaining both graduates and clients over time) of conducting longutidinal qualitative research with graduates and clients concurrently were two factors associated with this limitation. (31-33) Nonetheless, the findings from this study can be used as a starting point to inform the design of future longitudinal qualitative studies that explore clients' perceptions of the quality of healthcare received by professionals who work in an interprofessional team, compared to the

quality of care received by professionals who work independently, in parallel, or sequentially with other healthcare professionals. (36)

Conclusion

Exploring new graduates' interprofessional identity development during their first year of practice enables greater understanding of the impact of interprofessional education on subsequent professional practice, and informs ways for employers to support staff to develop an interprofessional identity. Findings demonstrated that interprofessional identity development occurred along a continuum influenced by the practice context and the individual's commitment to client-centred care. Confidence identifying and practising as a healthcare professional facilitates further interprofessional identity development. Maintaining identification as an interprofessional practitioner involves developing an increasingly sophisticated understanding of interprofessional practice by viewing interprofessional identity through increasingly complex meaning-making lenses according to Kegan's (19) constructive developmental theory of self. Findings support the inclusion of pre-licensure interprofessional education and inform further interprofessional identity research in professionals beyond their first year of practice.

Supporting information

S1 File. Interview questions.

Declaration of interest

The authors report no conflicts of interest.

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Author contributions

Conceptualisation: All authors

Data collection: First author

Data analysis: First author, with supervision from the other three authors

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S1 File

Interview questions

1) What does professional identity mean to you now?

   Prompts: Describe your current and previous roles if relevant. How long have you

   been   working in this role?

2) How has your professional identity developed since you started working?

3) What does interprofessional identity mean to you now?

4) How has your interprofessional identity developed since you started working?

5) How has your training at university prepared you for your current role?

6) Please described the relationship between your professional and interprofessional

   identities.

7) In what situations is one identity more important than the other?

8) Is there anything else you would like to share?

Supplementary material

Participants P4, P6, and P7 were from the first cohort of students that graduated at

the end of 2017 and entered the health workforce in 2018. Participants P1, P2, P3, P5, and

P8 were from the second cohort of students that graduated at the end of 2018 and entered the

health workforce in 2019.

Chapter 9 – Discussion

This chapter presents a critical discussion of the key findings from my research and their contribution to the interprofessional identity literature. This chapter is organised in four sections. The first section presents an integrated summary of key findings from each study related to the research aim and objectives. The second section provides methodological, theoretical, educational, practice, and policy implications for researchers, educators, employers and policy makers in health. Researchers can use the methodological and theoretical implications for advancing interprofessional identity scholarship. Educators wishing to design an identity-focused interprofessional curricula should consider the educational implications provided. Closely related to education is practice. Employers can support graduates' transition to interprofessional practice by referring to the practice implications presented. Next, policy implications refer to the potential of using an identity-focused interprofessional curriculum as one way to establish a common interprofessional education accreditation standard within health professional courses. The third section presents key strengths and limitations of my research followed by recommendations for future research. The chapter ends with concluding comments about the significance of this research for advancing the interprofessional field.

9.1 Aim, objectives and integrated summary of findings

9.1.1 Aim and objectives

The aim of my research was to explore healthcare students' interprofessional identity development during their health professional education and its influence on subsequent practice as professionals during their first year of work. This aim was addressed through six studies. A summary of the studies completed in relation to the research aim and objectives is presented in Table 5.

Table 5

A summary of the research aim, objectives, and studies conducted

Explore healthcare students' interprofessional identity development during their health professional education and its influence on subsequent practice as professionals during their first year of work.

Study	Type	Timepoint	Objectives
One	Scoping review	Not applicable	1. Understand how professional and interprofessional identities were defined, conceptualised, theorised, and measured in the interprofessional literature between 1997 and 2017.
Two	Quantitative	Start of first year	1. Measure students' interprofessional and professional identity strengths at the start of a faculty-wide interprofessional first year programme. 2. Identify demographic, stereotype, and contact factors that influence identity strengths.
Three	Quantitative	End of first year	1. Explore students' interprofessional and professional identity strengths following involvement in a faculty-wide interprofessional first year programme.
Four	Quantitative	End of final year	1. Explore the influence of different placement arrangements (only profession-specific or a combination of profession-specific placements and one dedicated interprofessional placement) on final year students' professional and interprofessional identity strengths between the start and end of the year.
Five	Qualitative	End of final year	1. Explore final year students' development of interprofessional identity during a dedicated interprofessional placement.
Six	Qualitative	Four weeks, six months, and one year from workforce entry	1. Explore graduates' development of interprofessional identity during their first year of work and its influence on their practice.

9.1.2 Integrated summary

Overall, my research has found that interprofessional identity development in students and graduates with prior interprofessional experiences involve moving from a limited understanding of interprofessional practice, to an in-depth understanding of, and commitment to, deliver care by working interprofessionally in different health service delivery contexts. This conceptual shift occurs as individuals form cognitive ties, followed by affective and psychological ties, to interprofessional identity. Cognitive ties form when individuals become aware of an interprofessional identity and make the connection between interprofessional practice and identity development. Affective and psychological ties develop as individuals understand the importance of interprofessional practice as (future) health professionals and internalise interprofessional identity into their professional identity.

Students internalise interprofessional identity through prelicensure interprofessional education that includes opportunities for students to form positive perceptions of their own profession and engage in quality interprofessional contact. The findings from my research suggest a clear understanding of professional identity precedes interprofessional identity development. This finding is consistent with other studies of identity in the interprofessional field (Khalili et al., 2013; Reinders et al., 2018, Woltenberg et al., 2019). Further interprofessional identity development occurred during graduates' first year of practice. Identity was enacted through growing confidence practising as qualified professionals, followed by an exploration of how one may deliver care interprofessionally and ensure care remains interprofessional by navigating barriers to interprofessional practice in the workplace.

Collectively, the findings from my exploration of interprofessional identity development in **Studies Two to Six** provide empirical evidence for the definition of interprofessional identity that I proposed in the scoping review of professional and

interprofessional identities (**Study One**). This definition was proposed in response to the absence of a shared understanding of interprofessional identity, a key finding from the scoping review. I define interprofessional identity as "the development of a robust cognitive, psychological and emotional sense of belonging to an interprofessional community(s), necessary to achieve shared context-dependent goals" (Tong, Brewer, et al., 2020, p.6). I wish to point out that this proposed definition has not been presented for stakeholder consultation and expert review at the time of thesis writing. As such, the proposed definition may be modified in the future following stakeholder consultation and expert review.

Studies Two to Six also addressed the short-term focus of existing identity research (another key finding from **Study One**) by tracking interprofessional and professional identity development from university entry to the one-year mark from health workforce entry. A conceptual diagramme illustrating the relationship between both identities during this period is proposed in Figure 2 followed by an explanation of the relationship. The diagram is based on findings from **Studies Two to Six**, the empirical studies in this research. It should be noted that further empirical evaluation of the proposed conceptual diagramme is needed due to high participant attrition in **Study Six**. For example, the circles at one year from workforce entry was based on one graduate's perceptions of both identities.

Figure 2

A conceptual diagram illustrating interprofessional identity development and its relationship with professional identity
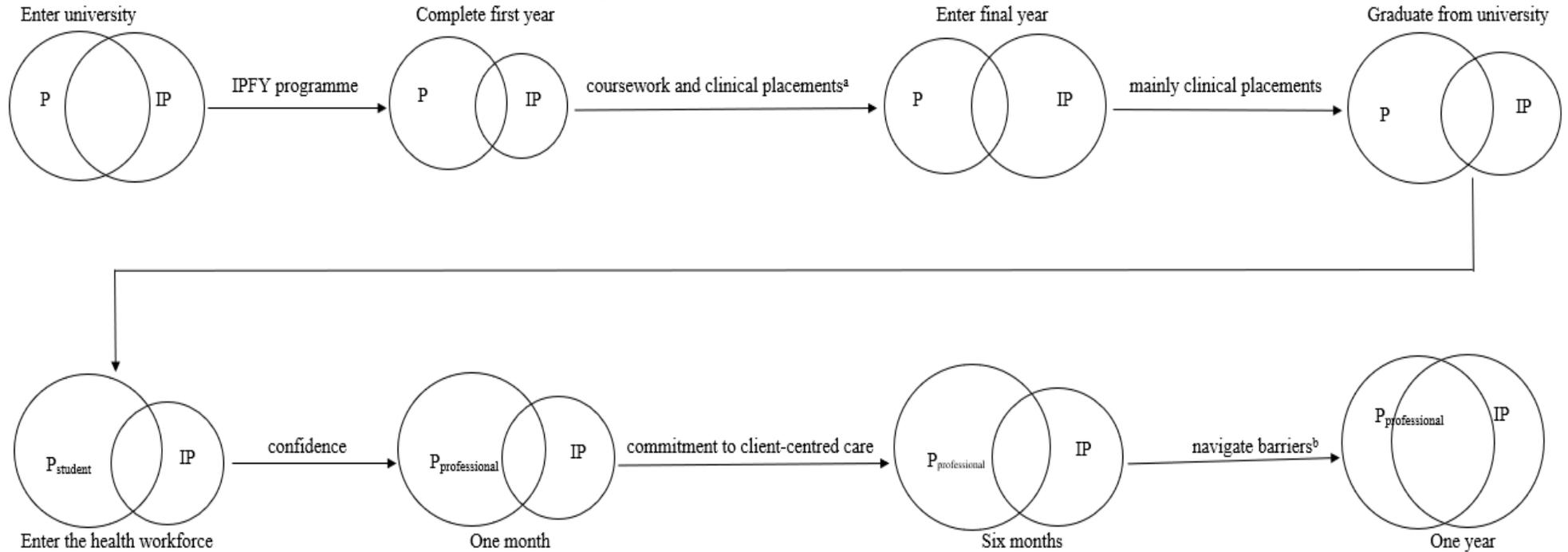
Note. P = Professional identity. IP = Interprofessional identity. IPFY = Interprofessional First Year Circle size varies according to the strength of each identity. The extent of overlap between both circles at each time point represents the strength of the relationship between professional and interprofessional identities. [a]Clinical placements comprise profession-specific and dedicated interprofessional placements. Most healthcare students in their final year of study are involved in supervised clinical practice in a range of health workplaces. [b]Barriers refer to organisational barriers to interprofessional practice. It should also be noted that further empirical evaluation of the diagramme is recommended due to high participant attrition in the longitudinal study of graduates' identity developments.

An interesting finding represented in Figure 2 was, fluctuations in identity (professional and interprofessional) strengths occurred between university entry and the end of graduates' first year of practice. The fluctuations are represented by changes in the size of each identity and the extent of overlap between both identities, at various points during this period of interest. This finding differs from Khalili et a's (2013) claim that students enter university with one identity, a uniprofessional identity. Students entered university with both identities, albeit strongly correlated. The identity fluctuations build on Khalili and colleagues' (Khalili, 2013; Khalili et al., 2013, Khalili & Orchard, 2020) work on dual—professional and interprofessional—identity research by demonstrating how individuals maintain a sense of belonging to one's own profession and to the interprofessional community over an extended period.

Another important finding with implications for interprofessional education and practice is neither identity was subordinate or superordinate to the other at any point throughout this period. As illustrated in Figure 2 (page 200), students and graduates held both identities over an extended period. This observation addresses the finding from my scoping review (**Study One**) that the relationship between interprofessional and professional identity lacks conceptual clarity. Perhaps more importantly, although neither identity was superior to the other, findings from my research highlighted that individuals' understanding of professional and interprofessional identities change over time. For example, first year students' highly correlated professional and interprofessional identities within the first six weeks from university entry (**Study Two**) could represent identities that were influenced by anticipatory socialisation into their chosen professional role (Price et al., 2013; Price et al., 2021). In comparison to first year students, final year students graduated from university with a professional identity that more closely reflected the realities of their own profession, and an interprofessional identity that represented a clear understanding of an

interprofessional mindset and client-centred practice (**Study Five**). These findings are discussed further in relation to the key findings from **Studies Two to Six** and contemporary interprofessional literature.

Study Two investigated the interprofessional and professional identity strengths of 253 healthcare students within the first six weeks of a faculty-wide interprofessional first year programme, and the influence of stereotype, contact, and demographic factors on identity strengths. I adapted and began validation of an interprofessional identity measure and a professional identity measure, as no psychometrically robust measures of professional or interprofessional identity that were grounded in social identity theory (Tajfel & Turner, 1986) were available when I commenced the research in 2016. The absence of measures was not surprising, given poor alignment exists among extant definitions, conceptualisations, theories, and measures of interprofessional identity (**Study One**). Furthermore, the short-term focus of extant identity research has constrained our understanding of how interprofessional identity develops and influences practice over time (**Study One**).

The identity measures that I adapted and began to validate were from the three-factor model of social identity measure (Cameron, 2004; adapted with permission). According to Cameron (2004), interprofessional and professional identities are social identities (Tajfel & Turner, 1986). Each social identity comprises three dimensions: centrality (the subjective importance of the group to a sense of self and the frequency that the group comes to mind), ingroup affect (emotions that arise from group membership), and ingroup ties (sense of belonging to the group; Tajfel & Turner, 1986). Both the interprofessional identity measure ($\alpha = .82$) and professional identity ($\alpha = .81$) measure are internally reliable. These measures were used in **Studies Two, Three and Four**.

It is worth noting that I also adapted and validated a quality of contact measure and two measures of stereotype in **Study Two**. These measures were adapted with permission

(see Appendix D, page 302) and used in **Studies Two, Three and Four**. Quality of contact measured by using five items within the dimensions of contact scale (Islam & Hewstone, 1993). This subscale was adapted by prefacing the items with "When you are in contact with students from other professions, was contact". As reported in **Study Two**, this adapted measure has acceptable internal reliability (α = .75). The stereotype measures were developed by adapting Hean et al.'s (2006) student stereotype rating questionnaire to measure autostereotype (perceptions of students from own profession) and heterostereotype (perceptions of students from one profession other than one's own). Both the autostereotype (α = .91) and heterostereotype (α = .90) measures are internally reliable (**Study Two**).

One main finding from **Study Two** was that professional and interprofessional identity were present in students within the first six weeks of a faculty-wide interprofessional first year programme. Both identities were significantly and positively correlated at this point in the curriculum. This finding suggests that students identified as members of both their own profession and the wider first year health sciences cohort early in their course, consistent with the notion that individuals can belong to multiple social groups and display multiple identity salience concurrently (Crisp & Hewstone, 2001; Ellemers et al., 2002).

Strongly correlated professional and interprofessional identities may also indicate that students did not understand how professional and interprofessional identities differed at this early stage of their health professional education. Instead, students could have entered university with an idealistic view of their future professional self (Browne et al., 2018; Hean et al., 2006; Khalili et al., 2013) that was shaped through anticipatory socialisation (Flanagan, 1979), combined with limited understanding of the complexity of interprofessional collaboration as future professionals (Price et al., 2019; Price et al., 2020).

The other main finding from **Study Two** was, in the first six weeks of the interprofessional first year programme, professional identity strength was associated with

the quality of contact with individuals (e.g., students, health professionals, lecturers) from professions other than their own and with positive perceptions students held about their own profession (autostereotypes). Interprofessional identity strength was associated with quality of contact and gender. Females had stronger interprofessional identity than males. This finding mirrors those of Curran et al. (2008) and Falk et al. (2015) who explored students' attitudes towards interprofessional teamwork and found that females were more positive about interprofessional teamwork than males.

Findings from **Study Two** support the inclusion of introductory interprofessional education programmes in students' first year of study to develop, maintain, or strengthen existing professional and interprofessional identities. These programmes must focus on the quality of interprofessional contacts. Given contemporary healthcare teams may include multiple professionals who may fill gender-stereotypical (e.g., female nurses) or gender-reversed (e.g., male speech pathologist) roles (Bell et al., 2014), further research exploring the relationship between gender and interprofessional identity is needed to identify gender-neutral solutions for effective teamwork. The learnings from this research will further enhance the design of quality interprofessional education.

Returning to the central focus of this research on interprofessional identity, **Study Three** explored quantitative changes in the strength of interprofessional and professional identity of 108 students from **Study Two** between the start and end of a faculty-wide first year interprofessional education programme. Results highlighted that, by the end of the first year, the correlation between both identities decreased; most students experienced a small decline in professional identity and a large drop in interprofessional identity. This finding mirrors findings from previous studies of first year healthcare students' perceptions of identity and interprofessional practice (Price et al., 2020; Stull & Blue, 2016). A common finding from these studies was first year students prioritised learning profession-specific

roles and responsibilities that reflected the realities of their chosen profession. To facilitate interprofessional identity development in first year students, Price et al. (2020) recommended providing students with opportunities to observe healthcare professional engage in interprofessional teamwork to deliver client-centred care. In comparison, Stull and Blue (2016) called for the use of Kegan's (1982) constructive developmental theory of self to inform the design of interprofessional education programmes are linked to realistic interprofessional learning outcomes by considering students' stage of professional identity. This recommendation was based on the finding that first year students were in the early stage of professional identity development, hence might not have understood the relevance of interprofessional practice (Stull & Blue, 2016).

A notable finding from **Study Three** was the large decline in interprofessional identity across first year applied to all courses other than nursing. All first year nursing students participated in a three-week placement in an aged-care facility during the year as a requirement of their course. During this placement, students gained opportunities to observe nurses work with other health professionals and experience being a member of an interprofessional healthcare team (J. Mason, personal communication, May 26, 2021). In comparison, students from most other professions do not commence placement experiences until the third or fourth year of their course. It would appear that opportunities to observe interprofessional collaboration in action early in their course is one way for students to strengthen an interprofessional identity. Whilst this observation is similar to recommendations by Price et al. (2020), further research is needed to validate this claim.

Another important finding from **Study Three** was, quality of contact with other professions and perceptions about their own profession (autostereotypes) were associated with stronger interprofessional identity by the end of the year. Quality of contact was consistently related to stronger interprofessional identity across the year (**Studies Two and**

Three). This finding supports the use of Pettigrew's (1998) intergroup contact theory to inform the design of introductory interprofessional education programmes that facilitate students' development of interprofessional identity during the first year of their course.

In addition to quality interprofessional contact opportunities, autostereotype was another factor that facilitated interprofessional identity development (**Study Three**). This finding extends work by Hind et al. (2003) by demonstrating that first year students who formed positive perceptions of own profession in the first six weeks from university entry also had stronger interprofessional identity. Hind et al. (2003) explored healthcare students' interprofessional perceptions of one another. They found that students who held positive stereotypes of their own and other professions had more positive attitudes toward interprofessional education compared to those that did not. Overall, the findings from **Studies Two and Three** demonstrated that introductory interprofessional education programmes need to include opportunities for students to form positive perceptions about their own profession and engage in quality interprofessional contact with peers from professions other than their own. These programmes may include opportunities for students to engage in early observation of interprofessional practice in the health workplace.

It should be noted that **Studies Two and Three** tracked the same cohort of first year students over a one year period. Similarly, **Study Four** tracked a cohort of final year students across the year. However, the final year students who participated in **Study Four** were from a different cohort compared to the first year students involved in **Studies Two and Three**. Consequently, conclusions regarding changes in identity strengths between first and final year cannot be conclusively made. Nonetheless, the observation that students from **Study Four** entered the final year of their health professional course with a high level of professional and interprofessional identity, suggests that these students continued to develop their interprofessional identity, possibly through interprofessional learning opportunities

during their second and third year of study (refer to an outline of the interprofessional education curriculum at Curtin University on pages 22 to 25).

Turning now to discuss the findings from **Study Four**, the aim of this study was to explore the influence of different placement arrangements (only profession-specific or a combination of profession-specific placements and one dedicated interprofessional placement) on final year students' professional and interprofessional identity strengths between the start and end of the year. Of note, the findings from **Study Four** should be interpreted with caution because it was based on an underpowered sample of 30 students. Of the 30 students, 17 were involved in only profession-specific placements while 13 completed a combination of profession-specific and dedicated interprofessional placements.

After controlling for identity strengths at the start of the year, results from the analysis of covariances (ANCOVAs) conducted to measure the effects of placement arrangement on professional and interprofessional identity strengths highlighted that placement arrangement had no statistically significant effect on the strength of professional and interprofessional identity at the end of the year. In other words, although students experienced changes to their identity strengths changed across the year, these changes were due to other factors not measured in this study. Specifically, across the year, students from both groups (only profession-specific placements or a combination of profession-specific placements and one dedicated interprofessional placement) experienced a significant and large increase in their professional identity. While there was a slight decrease in interprofessional identity regardless of placement arrangement, this change was not significant.

The finding that students involved in profession-specific placements and one dedicated interprofessional placement did not experience a significant change in the strength of their interprofessional identity was contrary to expectations. According to Brewer and

colleagues (Brewer & Barr, 2016; Brewer & Flavell, 2020), all dedicated interprofessional placements at Curtin University were developed according to the contact conditions (e.g., equal status, common goals, intergroup cooperation, authority support, friendship potential) outlined in Pettigrew's (1998) intergroup contact theory. The underpowered sample ($n = 13$) could have contributed towards this result. Consequently, this study's results might have represented a false negative finding (Type II error) as explained by Biau et al. (2008). Further research with adequately powered samples is needed. A second recommendation was the need for a qualitative study of interprofessional identity development during a dedicated interprofessional placement to explain if and how students' experiences during dedicated interprofessional placements influence their understanding of interprofessional identity. This recommendation was addressed in **Study Five**.

Study Five responded to a recommendation from **Study Four** by exploring interprofessional identity development in 38 final year students during a dedicated interprofessional placement. This study was grounded in Kegan's (1982) constructive developmental theory of self. Individual semi-structured interviews were conducted with students who participated in this study at the end of their placement. It should be noted that the narrative component of most interviews were short, possibly because the questions were open-ended but direct. In addition to describing their perceptions of identity, students were given the opportunity to illustrate the relationship between their professional and interprofessional identities. In comparison to the findings from **Study Four**, this study found that dedicated interprofessional placements facilitated students' development of interprofessional identity. Students developed their identity by progressing from conceptualising interprofessional identity as a requirement of the placement at the start of the placement, towards internalising an interprofessional identity by the end of their placement. This conceptual shift occurred as students became aware of the term

'interprofessional identity', its relationship to interprofessional practice, and the importance of interprofessional practice for improving healthcare outcomes as future professionals. Importantly, students' commitment to deliver client-centred care as future professionals increased as they developed a deeper understanding of relationship between interprofessional identity and practice during the dedicated interprofessional placement.

The other key finding from **Study Five** was that context, specifically access to shared workspaces, the attitudes of individuals in the workplace and team dynamics, influenced students' perceptions of interprofessional identity salience. Commitment from healthcare professionals to model interprofessional practice in the workplace combined with explicitly facilitating interprofessional identity development during health professional education, were recommended as important strategies to facilitate continued interprofessional identity development.

Findings from **Study Five** extend the literature on dedicated interprofessional placements (Brewer & Flavell, 2020; Jakobsen, 2016; Oosterom et al., 2019), by demonstrating that commitment to interprofessional practice, after completing one dedicated interprofessional placement, is underpinned by

- a clear understanding of the importance of interprofessional practice as future healthcare professionals, and
- opportunities to socialise in environments (e.g., workplaces, teams) that promote an interprofessional approach to health service delivery.

To understand how prelicensure interprofessional identity development influenced the subsequent practice as healthcare professionals, **Study Six** explored identity development in eight graduates at multiple time points during their first year of work. This study was grounded in the constructive developmental theory of self (Kegan, 1982). All graduates had completed interprofessional coursework and a dedicated interprofessional

placement. Despite having prior knowledge of interprofessional identity, most interviews were short, possibly because the questions were open-ended but direct. The main finding of this study was, to become interprofessional practitioners, graduates need to develop a commitment to work interprofessionally. Commitment develops as graduates learn to navigate the barriers to interprofessional practice in different health service delivery contexts. This navigation involves recognising, exploiting and responding to opportunities to ensure care remains client-centred.

Another important finding from **Study Six** was that graduates' confidence in identifying and practising as qualified professionals provided the foundation for further interprofessional identity development. This study supports the use of Kegan's (1982) constructive developmental theory of self to inform longitudinal interprofessional identity development. For example, although final year students were less willing to engage in interprofessional practice when they encountered barriers to this during their clinical placements (**Study Five**), after one year in the workforce, graduates were capable of navigating barriers to interprofessional practice to ensure the care they provided was client-centred (**Study Six**).

Interpreted according to Kegan's (1982) constructive developmental theory of self, the difference in how graduates (**Study Six**) navigated barriers to interprofessional care compared to final year students (**Study Five**), suggests multiple lens changes occurred as students transitioned to, and completed, their first year of professional practice. As reported in **Studies Five and Six**, these lens transitions involved movement from the instrumental, to the socialised, and finally to the self-authoring lens. In addition to a theoretical explanation of how interprofessional identity develops, the findings from **Study Six** suggest prelicensure interprofessional curricula should include a focus on facilitating students' development of an interprofessional identity (**Study Five**).

9.2 Implications of research findings

My research has methodological, theoretical, educational, practice, and policy implications for advancing interprofessional identity scholarship. The original contribution of my research is described in relation to each of these areas.

9.2.1 Methodological implications

My research provides empirical support for using a longitudinal mixed methods triangulation design (Creswell & Plano Clark, 2017; Plano Clark et al., 2014) to explain the complex mechanisms underpinning longitudinal interprofessional identity development and its influence on practice. For example, although the findings from **Studies Four** and **Five** appeared contradictory, it may be inferred from the integrated insight obtained, that informal socialisation experiences and the opportunity to complete a dedicated interprofessional placement facilitated students' development of interprofessional identity. This insight would not have been obtained based on findings from the individual quantitative and qualitative studies conducted (Creswell & Plano Clark, 2017; O'Cathain et al., 2010).

Another methodological advancement for interprofessional identity research is the use of participant-produced drawings (Rees, 2018) to illustrate the relationship between professional and interprofessional identity following an extended period of socialisation (e.g., from university entry to graduation). These drawings enriched the narrative accounts obtained during the semi-structured interviews conducted in **Study Five** by providing a means for participants to reflect and make explicit, tacit knowledge about interprofessional identity and its relationship with professional identity (Cristancho et al., 2017; Pain, 2012; Rees, 2018). Articulating tacit knowledge enables researchers to uncover and understand hidden and/or unspoken aspects of the topic of interest (Cristancho et al., 2017; Rees, 2018). Whilst novel to interprofessional identity research, drawings were used in **Study Five** for illustrative purposes only. Nonetheless, most participants in **Study Five** were receptive to

drawing their perceptions of interprofessional and professional identities. This finding suggests future identity studies should consider using drawings as both a methodology and method (Rees, 2018) in addition to interviews, to gain further insight into the relationship between both identities,

Moving on from discussing drawings, I have adapted and began validation of a pair of psychometrically robust and theoretically-sound measures of interprofessional identity and professional identity, detailed in **Study Two**. Using these measures, my research confirmed that professional and interprofessional identity coexist and develop concurrently, consistent with the broader interprofessional literature on identity development (Khalili & Orchard, 2020; Khalili et al., 2019; Reinders et al., 2018). Since the development of my measures, Reinders et al. (2020) developed the Extended Professional Identity Scale (EPIS) to evaluate interprofessional identity. Although Reinders et al.'s (2020) interprofessional identity measure is also psychometrically robust and grounded in social identity theory (Tajfel & Turner, 1986), this tool was developed to measure interprofessional identity as a superordinate identity to professional identity only.

In contrast, my work highlighted that interprofessional identity was not always the superordinate identity of professional identity for students (see Figure 2, page 200). Instead, individuals (students, graduates) can maintain identification with their professional and interprofessional identity over an extended period without regarding one identity as being subordinate or superordinate to the other. It, therefore, can be argued that both interprofessional and professional identity need to be measured at every point in any longitudinal exploration of identity. The pair of interprofessional and professional identity measures that I developed provide a starting point for quantifying the strength of each identity and the degree of correlation between identities at each point in time. Comparing changes in identity strength and correlation following a socialisation experience (e.g., an

interprofessional learning experience or a combination of interprofessional and professional learning experiences) is one way to gain insight into the factors that influence how students may graduate with both professional and interprofessional identities (see Figure 2, page 200).

9.2.2   Theoretical implications

My research highlights that both constructionist and constructivist perspectives are relevant for guiding longitudinal interprofessional identity research. When I started this research in 2016, I approached identity development through the theoretical lens of constructionism (Burr, 2015; Rees et al., 2020) and used social identity theory (Tajfel & Turner, 1986) and intergroup contact theory (Pettigrew, 1998) to explore and understand how social interactions influenced students' perceptions of their identities (interprofessional, professional). As mentioned in the **introduction** chapter, theorists who view identity through the constructionist lens argue that identity is an outcome of social interactions between individuals, rather than as an outcome of how individuals perceive and make sense of the world (i.e., constructionism) (Burr, 2015; Rees et al., 2020).

As my research progressed, I realised that constructionism did not adequately explain why, despite interprofessional socialisation opportunities that fulfilled the contact conditions stated in Pettigrew's (1998) intergroup contact theory, no significant changes in final year students' interprofessional identity strength was found (**Study Four**). This finding suggests conceptualising interprofessional identity development in terms of group membership changes does not adequately explain how students may "know" whether interprofessional identity is relevant to their identity as future health professionals.

To seek answers, I approached the qualitative studies of interprofessional identity (**Studies Five and Six**) from a constructivist perspective (Burr, 2015; Rees et al., 2020) and explored identity using Kegan's (1982) constructive developmental theory of self. Kegan's

(1982) theory has been described in detail in the introduction chapter and in **Studies Five and Six**. For brevity, Kegan (1982) believes that identity development involves developing increasingly sophisticated ways of understanding and responding to events in the social world. Insight develops as individuals experience multiple lens transformations (e.g., from instrumental to socialised lens, from socialised to self-authoring), and develop increasingly complex meaning making lenses (Lewin et al., 2019; Kegan, 1982). A lens transformation enables individuals to understand and manage challenges more effectively (Kegan, 1982). For example, final year students commented that their ability to deliver care interprofessionally during clinical placements was hindered, when other healthcare professionals that they worked with were not receptive to delivering care interprofessionally (**Study Five**). A likely explanation, according to Kegan's (1982) theory, is these students' understanding of interprofessional practice was shaped by a socialised lens. In comparison, graduates who had been working for one year (**Study Six**) enacted commitment to delivering care interprofessionally by identifying ways to ensure care remained interprofessional, even in workplaces where barriers (e.g., scheduling difficulties and beliefs about medical dominance) to interprofessional practice exist (**Study Six**). This finding suggests that, by the end of the year, these graduates viewed interprofessional practice through the self-authoring lens (Kegan, 1982).

To advance the theoretical perspectives associated with longitudinal interprofessional research, I recommend using a toolbox approach when selecting theory(s) to explain interprofessional identity development in different contexts. A proposed definition of a toolbox approach to theory selection within the interprofessional identity field is, "a collection of theories and theoretical orientations about what identity is, how it develops, and the epistemological assumptions associated with the theory(s) selected." This proposed definition is consistent with Hean et al.,'s (2012) conception of the term and acknowledges

the importance of considering theoretical positions underpinning theory selection when researching identity (Burr, 2015; Monrouxe & Rees, 2015; Talja et al., 2005).

Given researchers can approach *identity* from a variety of theoretical orientations (Mourouxe & Rees, 2015), it should be noted that the theories proposed in this toolbox are not the only ones that can be used to inform future longitudinal interprofessional identity research. Rather, my work has highlighted the benefits of a theory toolbox when conducting longitudinal interprofessional identity research. It should also be noted that regardless of the theory(s) selected, one needs to also ensure that theory aligns with the epistemological and ontological orientations associated with the work (Monrouxe & Rees, 2015). Refer to chapter one, introduction, for a detailed explanation of two theoretical orientations associated with the proposed theories in this toolbox.

Returning to my research, the theories in this toolbox are social identity theory (Tajfel & Turner, 1986), intergroup contact theory (Pettigrew, 1998), and the constructive developmental theory of self (Kegan, 1982). For clarity, a summary of the key concepts from each theory used in this research is presented in Table 6, followed by an illustration of the relationship among the theories, applied to inform interprofessional identity research, in Figure 3 (page 217).

Table 6

Identity development according to social identity theory (Tajfel & Turner, 1986), intergroup contact theory (Pettigrew, 1998), and the constructive developmental theory of self (Kegan, 1982)

	Theory		
	Social identity theory (Tajfel & Turner, 1986)	Intergroup contact theory (Pettigrew, 1998)	Constructive developmental theory of self (Kegan, 1982)
Description of theory	1. Identity is defined according to the characteristics of the group that one chooses to become a member of, and to which one feels a sense of belonging to. 2. Individuals form cognitive ties (i.e., thinking this is what I need to be), psychological ties (i.e., commitment to the group), and affective ties (i.e., positive feelings associated with group membership) to the group (ingroup). 3. Group membership is maintained by displaying ingroup favouritism and outgroup discrimination. 4. Group membership may change depending on the subjective importance of membership to the self.	1. Emphasises the contact conditions for creating attitude changes that are sustained beyond the immediate contact situation. 2. The contact conditions are equal group status within the contact situation, all groups working towards common goals, intergroup cooperation occurs, groups receive authority support, and the contact situation has potential for cross-group friendships to form.	1. Conceptualises identity development as a process of moving from a self-centered identity to a moral identity over the lifespan. Movement occurs as individuals make regular and progressive changes in how they make meaning over time (Eriksen, 2006, Kegan, 1982). 2. A lens/stage transition is triggered when a discrepancy arises between how one's understanding of identity and how one understands the experiences and challenges that one encounters (Kegan, 1982). 3. An outcome of a lens/stage transition is thinking becomes less rigid and simplistic and more flexible, open, and complex (Eriksen, 2006).

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Figure 3

Theories underpinning interprofessional identity development and sustained identification
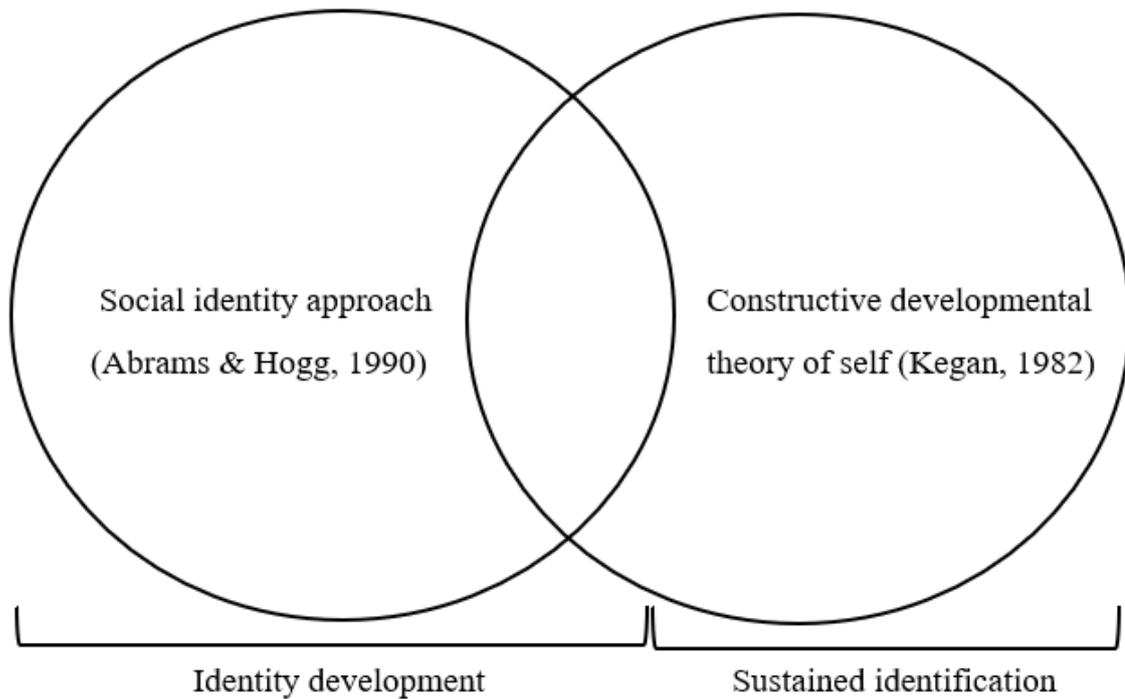
This figure demonstrates that social identity theory (Tajfel & Turner, 1986) and intergroup contact theory (Pettigrew, 1998) may be used to explain interprofessional identity development that occurs during one interprofessional education initiative. Kegan's (1982) constructive developmental theory of self adds explanatory power if the aim is to explore identity development over an extended period that includes multiple interprofessional and professional socialisation opportunities. Likewise, Kegan's (1982) theory is more suitable for explaining sustained identification with interprofessional identity in contexts that do not fulfil Pettigrew's (1998) conditions of contact (equal status, common goals, intergroup cooperation, authority support, friendship potential). A summary of how these theories may be used to improve understanding of interprofessional identity development in different contexts is presented in Table 7. This summary is based on the findings from **Studies Two to Six**. These theories may be used as a starting point for designing future longitudinal interprofessional identity in other similar contexts.

Table 7

Considerations for theory selection to inform interprofessional identity research

Aim	Theory	Process of identity development	Benefits	Limitations
Explore interprofessional identity development during one interprofessional education initiative.	Social identity theory (Tajfel & Turner, 1986) and Intergroup contact theory (Pettigrew, 1998)	1. Informed by a social identity approach (Abrams & Hogg, 1990) comprising both theories. 2. Involves movement from identifying uniprofessionally towards identifying with the group that comprises members with an interprofessional identity. 3. Movement between groups occurs during a contact situation that fulfills the contact conditions that lead to attitude changes which are maintained beyond the immediate contact situation (Pettigrew, 1998). 4. An individual maintains membership with the group by developing cognitive, affective, and psychological ties to interprofessional identity. 5. Group membership also involves confirming to the norms, values, and beliefs of the 'interprofessional group' to enhance one's sense of self as a healthcare professional with an interprofessional approach to practice.	1. Explains how students may develop an interprofessional orientation to practice after one interprofessional education initiative. 2. Interprofessional identity may be measured by using my interprofessional identity measure ($\alpha = 0.82$). This measure is grounded in social identity theory (Tajfel & Turner, 1986). 3. May inform the design of an interprofessional education initiative that facilitates interprofessional identity development. Intergroup contact theory (Pettigrew, 1998) outlines the conditions for successful intergroup interactions while social identity theory (Tajfel & Turner, 1986) outlines how interprofessional identity develops as an outcome of these intergroup interactions.	1. Does not adequately explain why fluctuations in interprofessional identity strength occurs over an extended period, following an interprofessional learning experience that fulfills the contact conditions outlined in intergroup contact theory (Pettigrew, 1998). One example of an extended period, based on my research, is between the first and final year of health professional courses.

Table 7 (*continued*)

Explore interprofessional identity development over an extended period (e.g., years) that includes multiple interprofessional education experiences.	Constructive developmental theory of self (Kegan, 1982)	1. Informed by a developmental approach (Kegan, 1982). 2. Involves transitioning through different meaning-making lenses. For students, this involves transitioning from viewing interprofessional identity through an instrumental lens to viewing identity through a socialised lens. Lens transition occurs as the individual moves from a superficial understanding of interprofessional identity at university entry, to a deeper understanding of identity by the end of health professional education.	1. Addresses the limitations of social identity theory (Tajfel & Turner, 1986) and intergroup contact theory (Pettigrew, 1998). 2. Provides a broad overview of interprofessional identity development during a profession-specific curriculum that includes formal and informal interprofessional education experiences. 3. Compliments a social identity approach (Abrams & Hogg, 1990) by providing a theoretical lens to explain how interprofessional identity develops over an extended period.	1. Limited to qualitative studies of identity as no psychometrically robust measure of interprofessional identity that is grounded in Kegan's (1982) theory exists.
Explore sustained identification as interprofessional practitioners during the first year of work.	Constructive developmental theory of self (Kegan, 1982)	1. Explains lens transitions over one year that may lead to the acquisition of a self-authoring identity by the end of the year.	1. Explains how commitment to deliver interprofessional care develops in different health service delivery contexts, despite encountering barriers to interprofessional practice.	1. Limited to qualitative studies of identity as no psychometrically robust measure of interprofessional identity that is grounded in Kegan's (1982) theory exists.

9.2.3 Educational implications

My findings suggest that an interprofessional education curriculum that supports students' development of interprofessional identity is required to ensure students are adequately prepared for the interprofessional health workforce. The aim of this curriculum should be to facilitate students' formation of cognitive ties, followed by affective, and psychological ties to interprofessional identity. Educators should introduce interprofessional identity within introductory interprofessional education programmes and reinforce this identity throughout the curriculum. Further to this, educators need to ensure that the learning activities implemented support identity development, and the assessment methods used, accurately evaluate identity development.

Of note, the design of an interprofessional education curriculum to support identity development should be based on a shared understanding of interprofessional identity. Educators may opt to use the definition of interprofessional identity I proposed in my scoping review: "the development of a robust cognitive, psychological and emotional sense of belonging to an interprofessional community(s), necessary to achieve shared context-dependent goals" (Tong et al., 2020, p. 6). Recommendations for building cognitive ties to interprofessional identity are presented below first, followed by recommendations for building affective and psychological ties, because my research demonstrates that cognitive ties are foundational to affective and psychological ties. Affective and psychological ties have been grouped together as these are interrelated constructs (Allport, 1954; Rosenberg, 1979).

Cognitive ties develop when students become aware of an interprofessional identity and understand its relevance as future healthcare professionals (Tong et al., 2021). Stronger interprofessional identity was linked to autostereotypes and quality of interprofessional contact (**Studies Two and Three**). As explained earlier on page 64 of the thesis,

autostereotypes refer to the perceptions students have about their own profession (Carpenter, 1995). Collectively, these findings suggest students form cognitive ties to interprofessional identity when educators support students' development of professional identity from the first year of their course and provide students with quality interprofessional learning experiences within introductory interprofessional education programmes.

To support professional identity development, educators need to teach students about professional identity and how it develops as students acquire profession-specific knowledge, beliefs, and values during their health professional education (Cruess et al., 2015; Cruess et al., 2019). According to Cruess et al. (2019) and others (Cruess et al., 2015; Leedham-Green et al., 2020; Monrouxe, 2016), educators can make the link between professional identity and practice explicit by providing students with opportunities to observe educators role model professional practice.

To address the second recommendation, which involves providing students with quality interprofessional learning experiences, educators may explore the feasibility of providing students with opportunities to observe health professionals engage in interprofessional teamwork in the workplace during their first year of study. This recommendation is based on findings from **Study Three** and a similar study by Price et al. (2020), detailed on page 199. Summarily, the results from **Study Three** highlighted that first year nursing students, the only profession involved in a clinical placement during the year, were exempt from the large fall in interprofessional identity. These students could have gained opportunities to observe nurses work collaboratively with other health professionals to deliver client-centred care (Tong et al., 2020). Similarly, Price et al. (2020) concluded that first year students may develop an interprofessional identity through opportunities to observe healthcare professionals engage in interprofessional teamwork.

Perhaps more importantly, the finding that quality interprofessional contact is associated with stronger interprofessional identity extends the interprofessional identity literature by demonstrating that opportunities for students to rectify inaccurate stereotypes about their own and other professions, and engage in interprofessional role learning (Khalili, 2013; Khalili & Orchard, 2020; Khalili et al., 2013) may be insufficient for students to strengthen cognitive ties to interprofessional identity. Educators also need to provide students with a clear understanding of how they can contribute profession-specific expertise within the interprofessional team for students to build strong ties to an interprofessional identity. This recommendation accords with recommendations from previous studies of identity development in interprofessional context(s) (Best & Williams, 2019; Khalili & Orchard, 2020; Reinders et al., 2018).

As students progress through their health professional course, educators should facilitate further development of cognitive ties by teaching students to recognise and address barriers to interprofessional practice in the clinical workplaces. This recommendation responds to the finding that final year students were less willing to engage in interprofessional practice when they encountered barriers to such practice during clinical placements (**Study Five**). In comparison, by the end of their first year of work, graduates were committed and capable of ensuring the provision of interprofessional care in different health service delivery contexts by navigating barriers to interprofessional practice (**Study Six**). Of note, this recommendation is contingent on prior knowledge of interprofessional capabilities/competencies (Tong et al., 2021), because central to navigating barriers effectively is the individual's ability to apply these capabilities (e.g., role clarification, communication, conflict resolution) flexibly (**Study Six**).

Integrating findings from **Studies Five and Six** with the literature on interprofessional clinical education in health workplaces (Kent et al., 2020; Kent et al., 2017;

Woltenberg et al., 2019), I believe that graduates' transition to interprofessional practice may be expedited if they are explicitly taught to identify and address these barriers as students. Educators may consider the following strategies during clinical placements:

- Teach students the notion of interprofessional practice barriers and how they may manifest in different health service delivery contexts.

- Reinforce students' understanding of why navigating barriers is important as future healthcare professionals and how students may work interprofessionally to ensure care remains client-centred despite barriers.

- Point out instances where barriers to delivering care interprofessionally have occurred (or may occur) and role model how these barriers are navigated.

- Use existing interprofessional capability/competency frameworks (Thistlethwaite et al., 2014) as a common starting point to frame discussions about how interprofessional capabilities/competencies may be applied flexibly to address barriers.

As mentioned on page 209, these cognitive ties are foundational to affective and psychological ties. Therefore, it is reasonable to suggest that as students develop an understanding of interprofessional practice and its relevance to them as future professionals (cognitive ties), educators should move on to address affective and psychological ties to interprofessional identity within interprofessional learning experiences. Three strategies to assist educators achieve this are presented.

The first strategy involves educators working together with students to identify tasks or projects that enable students to develop a stronger interprofessional identity. For example, senior students can act as interprofessional peer mentors for students who are beginning a dedicated interprofessional placement and/or are unfamiliar with delivering a health service by working interprofessionally. Supports may include role modelling the delivery of

interprofessional care, working together with their mentees to deliver care, and by providing guidance as mentees reflect on their interprofessional experiences. These recommendations are underpinned by the concept of job crafting (Bochatay et al., 2020; Wrzesniewski & Dutton, 2001). Job crafting involves taking the initiative to customise a work role to address the perceived mis-match between the work assigned and one's identity (Bochatay et al., 2020; Wrzesniewski and Dutton, 2001). This concept has been applied to explore professional identity development in medical students (Bochatay et al., 2020), but not interprofessional identity development.

The second strategy for building affective and psychological ties is to guide students to critically reflect on how their understanding of contextual factors (e.g., power narratives, service delivery models, team dynamics) and personal factors (e.g., own assumptions, values, and beliefs) influence their practice decisions and their developing identity (Delany & Watkin, 2009; McLeod et al., 2015). Findings from **Studies Five and Six** indicated that individual attitudes towards interprofessional practice and power were two barriers to maintaining interprofessional identity salience in the health workplace. To address these barriers, educators should consider discussing with students, the historical underpinnings related to power and hierarchy among the health professions (Baker et al., 2011; Cohen Konrad et al., 2019; Paradis & Whitehead, 2015) and their enduring effects on contemporary health professional practice. With this insight, students may become more willing to explore ways to navigate barriers to interprofessional practice during clinical placements in different health workplaces.

The third strategy is to upskill clinical educators in the health workplace with the capabilities and commitment to model an interprofessional approach to service delivery wherever practicable. For example, university academics from the interprofessional field may conduct interprofessional teamwork training for clinical educators (Brewer & Barr,

2016; Bridges et al., 2011; Hall & Zierler, 2015). Such training should be followed by opportunities for clinical educators to access ongoing support to further develop their ability to model interprofessional practice effectively.

To conclude this section, it should be noted that although the recommendations provided were based on undergraduate students' perceptions of interprofessional identity development, my research highlighted that both students and graduates held similar perceptions of interprofessional identity. A summary of how interprofessional identity was perceived by students and graduates is presented in Table 8. Given the conceptual similarity underpinning students' and graduates' view of interprofessional identity, it can be argued that these recommendations provide a starting point for educators wishing to design a postgraduate interprofessional education programme with an explicit focus on interprofessional identity development.

Table 8

Interprofessional identity in students and graduates

Ties to interprofessional identity	Students	Graduates with prior interprofessional experiences
Cognitive	1. Clear understanding of professional identity in an interprofessional context. 2. Ability to apply interprofessional capabilities flexibly to ensure client-centred care.	1. Clear understanding of professional identity in the workplace. 2. Know how to navigate barriers to interprofessional practice in the workplace as they arise to ensure care remains client-centred. 3. Confidence working interprofessionally.
Affective	1. Positive perceptions of own profession. 2. Willingness to work interprofessionally when the opportunity arises.	1. Regards professional identity and interprofessional identity as the same identity.
Psychological	1. Practice during placements is guided by an interprofessional mindset.	1. Practice is guided by an interprofessional mindset in different health service delivery contexts.

9.2.4 Practice implications

Supporting graduates' development of interprofessional identity is one way for employers and the government to grow an interprofessional health workforce over time, but the transition to interprofessional practice is not straightforward (**Study Six**). Findings from **Study Six** indicated that graduates' transition to interprofessional practice was contingent on their ability to manage significant changes to role and practice requirements as professionals. For example, graduates associated a significant change in practice requirement in the first few weeks of work with the ability to manage multiple, competing, and at times unpredictable, demands without the support of their clinical educator and university lecturers and/or tutors. These demands included understanding the work role,

learning new skills (e.g., caseload management, time management, and using systems in the workplace), and developing confidence practicing with greater autonomy (**Study Six**).

As confidence in professional practice increased, graduates began exploring ways to deliver care interprofessionally, followed by developing ways to navigate barriers to interprofessional practice to ensure care remained client-centred (**Study Six**). This finding highlights that interprofessional identity was enacted in a range of ways at different points during graduates' first year of practice. Analysed according to Kegan's (1982) constructive developmental theory of self, these findings suggest that to become interprofessional practitioners, graduates need to experience multiple lens transitions during their first year of practice (Kegan, 1982). These lens transitions were enacted through self-perceived confidence in professional practice and the willingness to explore ways of delivering care interprofessionally, despite barriers to interprofessional practice (**Study Six**). Employers wishing to support graduates' smooth transition to interprofessional practice and grow an interprofessional workforce overtime should consider the following strategies.

In new graduates' first few weeks of employment, employers need to provide supports that are designed to increase graduates' confidence managing a clinical workload with reducing guidance from colleagues with more experience. Graduates interviewed in **Study Six** commented that access to clinical supervision, informal support from colleagues, and feedback from clients facilitated their identity transition from student to professional, and confidence practising as professionals. These supports were consistent with recommendations from the broader transition to practice literature (Forbes et al., 2020; Opoku et al., 2020; Rees, 2017).

As professional confidence grows, employers should encourage graduates to deliver care interprofessionally, where appropriate. One strategy is for employers to include modules on interprofessional practice as part of new employees' onboarding/orientation

programmes (Will et al., 2016). Mirroring recommendations from the broader transition to practice literature (Hunter & Cook, 2018; Jones et al., 2021; Opoku et al., 2020), opportunities for new graduates to observe and reflect on how experienced clinicians work interprofessionally with clients is another strategy. This recommendation also responds to the finding from **Study Six** that, despite entering the health workforce with a commitment to deliver client-centred care, most graduates possessed a limited understanding of how they can deliver care interprofessionally in the first few months of practice.

Building on the recommendation above, the link between the interprofessional capabilities/competencies observed and their impact on client care needs to be explicitly discussed with graduates especially in the first few months of employment. Findings from **Study Six** suggest graduates are likely to view interprofessional identity through the instrumental lens in the first few months of work (Kegan, 1982). One explanation for this possibility, based on previous studies (Gilligan et al., 2014; Jones et al., 2021), is graduates could have entered the health workforce with different levels of preparation for professional and interprofessional practice. In other words, it may be unrealistic to expect graduates with prior interprofessional experiences to deliver care interprofessionally from workforce entry. Nonetheless, employers wishing to grow an interprofessional workforce should consider employing graduates with prior interprofessional experiences, as my research demonstrates that these experiences provide the foundation for graduates to develop a commitment to deliver interprofessional care, as confidence in professional practice increases.

Given how complex healthcare and interprofessional practice is, providing graduates with opportunities to engage in interprofessional collaboration with a limited range of health professions (e.g., one or two) before participating in interprofessional collaboration within a larger team comprised of multiple professions is recommended. The focus on learning to work interprofessionally with one or two professions initially aligns with the

Centre for the Advancement of Interprofessional Education (CAIPE)'s (2017) conceptualisation of continuing interprofessional development. According to CAIPE (2017), continuing interprofessional development occurs when "members of two or more professions learn with, from and about teach other to extend and reinforce collaborative competence to improve quality and safety in practice." (p. 1) It, therefore, care be argued that scaffolding graduates' interprofessional practice experiences during their first few months of practice provides a positive and supportive environment for graduates to explore how care is delivered interprofessionally within fewer professionals, before engaging in the delivery of interprofessional care as a member of a larger healthcare team.

Further to this, in the same way that new graduates require effective mentoring to enhance clinical practice (Jones et al., 2021; Opoku et al., 2020; van Rooyen et al., 2018), employers should also consider appointing (or employing) interprofessional mentors to guide and support mentees (new graduates) further develop their interprofessional identity. According to Marshall and Gordon (2010), interprofessional mentors are responsible for guiding and supporting mentees (new graduates) to embed an interprofessional approach to practice. For example, interprofessional mentors should role model interprofessional teamwork and guide mentees to reflect on these observations. Another strategy is for mentors to support and create interprofessional networking opportunities for mentees in the workplace. Both strategies align with recommendations by Tay et al. (2020) following a systematic scoping review of the literature on interprofessional mentoring in medicine.

Further to the above, as mentees' self-perceived confidence delivering care interprofessionally grows, mentors should focus on exploring the barriers to delivering care interprofessionally with graduates and guide mentees to learn to navigate these barriers effectively. The focus on barrier navigation responds to the finding that graduates who identified as interprofessional practitioners were also capable of recognising, exploiting, and

responding to opportunities in different health service delivery contexts to ensure care remained client-centred (**Study Six**). Interprofessional mentors should consider using similar strategies, as recommended for educators wishing to strengthen students' cognitive ties to an interprofessional identity (refer to page 220). Specifically, I encouraged educators to point out instances where barriers to delivering care interprofessionally have occurred (or may occur) wherever practicable, and role model how these barriers are navigated.

Of note, in addition to equipping mentees with the capabilities to work interprofessionally, Tay et al. (2020) urged mentors to evaluate the effectiveness of the supports provided regularly, to ensure that the supports provided meet mentees' current interprofessional learning needs. Evaluation methods may include observing graduates' interprofessional interactions with clients and other healthcare professionals and obtaining feedback from clients and colleagues regarding the quality of care provided by graduates with an interprofessional orientation to practice (Tay et al., 2020). Further to this, I call for employers to provide the resources (time, space, training) to ensure that the interprofessional mentoring initiatives implemented are sustained over the long term.

It is also worth noting that the recommendations above align with the general recommendations from the literature on clinical supervision of healthcare professionals (Snowdon et al., 2017; Snowdon et al., 2019) and best practice in faculty development (Steinert, 2020; Steinert et al., 2016; Steinert et al., 2019). For example, Snowdon et al. (2019) highlighted the importance enlisting organisation support (time, space, training) to facilitate effective clinical supervision of allied health professionals. Similarly, Steinert et al. (2019) pointed out that ongoing mentoring, reflection, and networking opportunities are important for educators in higher education to develop their professional identity.

Before concluding this section on practice implications, it should be pointed out that some students and graduates from **Studies Five and Six** respectively, noted that power and

hierarchy existed among some professions in their health workplace(s). This finding is not surprising given power and hierarchy have historically contributed towards unequal relationships between professionals in health and educational institutions (Baker et al., 2011; Cohen Konrad et al., 2019; Paradis & Whitehead, 2015). Consequently, whilst the intent is to deliver care interprofessionally, the successful implementation of this agenda is often obstructed by tacit power narratives and hierarchies within healthcare teams (Engel et al., 2017; Paradis & Whitehead, 2015; Seaton et al., 2021).

Future research exploring health professionals' interprofessional identity development during their career may be one way to uncover new solutions to address longstanding issues of power and hierarchy in the health workplace. This recommendation addresses the finding from **Study Six** that to maintain identification as interprofessional practitioners during the first year of work, graduates need to learn to navigate barriers to delivering care interprofessionally in the workplace. However as discussed in **Study Six**, whilst students need to develop skills to navigate power, the onus should not be placed solely on the individual(s) experiencing power dispartity during interprofessional engagements to find ways to overcome this obstacle. One further strategy is for senior management to embed a culture of interprofessional teamwork (**Study Six**) and explicitly name and address the effects of power on the quality of care delivered in the workplace (Cohen Konrad et al., 2019; World Health Organisation, 2017).

9.2.4 Policy implications

Policy implications are discussed within the context of student preparation for an interprofessional health workforce through interprofesisonal identity development. It is beyond the scope of this thesis to discuss the policy implications for employers in health because graduates' interprofessional identity development over an extended period was not a focus of this thesis.

Most health professional accreditation bodies in Australia require students to demonstrate evidence of interprofessional education experiences, in addition to profession-specific capabilities, for entry level practice (Australian Health Practitioner Regulation Agency (AHPRA), 2020; Australian Medical Council, 2012; Australian Nursing and Midwifery Accreditation Council, 2012; Occupational Therapy Board of Australia, 2018; Physiotherapy Board of Australia & Physiotherapy Board of New Zealand, 2015; Speech Pathology Australia, 2011). This requirement aligns with the Health Professions Accreditation Collaborative Forum (HPAC; the Forum)'s (2020) goal of ensuring health professional graduates are ready for interprofessional collaborative practice. This requirement also aligns with the aim of the 'Securing an interprofessional future for Australian health professional education and practice' (SIF) project (Dunston et al., 2020): Ensure every new graduate from an Australian university with a health profession qualification, possess the capabilities needed to work interprofessionally and engage in continuing interprofessional learning throughout their health professional career (Dunston et al., 2020).

Whilst aspirational, Bogossian and Craven (2020) pointed out that no common interprofessional education accreditation standard currently exists in Australia. This was not unexpected given the implementation of interprofessional education and delivery of interprofessional care is complex (Cohen Konrad et al., 2019). Furthermore, Australia currently lacks a unifying governance framework for informing effective interprofessional education and the delivery of interprofessional care in the health workplace (O'Keefe et al., 2020). Given the growing need to prepare students for an interprofessional health workforce (Forman, 2020; Fraher & Brandt, 2019; Institute of Medicine, 2015), it is now imperative to explore ways to establish a common Australian interprofessional education standard against which extant interprofessional education programmes are evaluated.

My research demonstrates that students develop an interprofessional identity during their health professional education (**Studies Two to Six**). Developing an interprofessional curriculum focused on ensuring students' development of interprofessional identity is, therefore, one way for health professional accreditation bodies in Australia to work towards establishing a common interprofessional education standard within health professional courses. My definition of interprofessional identity in **Study One**, the psychometrically robust identity measures that I adapted in **Study Two**, theory toolbox proposed, and the interprofessional education strategies I have outlined provide a strong basis for the design/redesign of a curriculum that supports interprofessional identity development.

In addition to curriculum design/redesign, I call for the establishment of a panel of experts from the interprofessional field to work with accreditation bodies to ensure sustainable implementation of the proposed curriculum within health professional courses. The work of this leadership consortium should align with recommendations from the SIF project (Duston et al., 2020). For example, the leadership consortium should consider developing guidelines for evaluating the proposed identity-focused curriculum through expert review, stakeholder consultation, and by submitting curriculum evaluation data to health professional accreditation bodies as part of the accreditation process.

O'Keefe et al.'s (2017) set of common interprofessional learning competency statements may inform the development of these guidelines. For example, one competency statement was, "On completion of their program of study, graduates of any professional entry-level healthcare degree will be able to describe the areas of practice of other health professions." (O'Keefe et al., 2017, p. 466). This competency statement maps against the interprofessional capabilities of role clarification and communication which students and graduates felt, were associated with an interprofessional identity (**Studies Five and Six**).

Furthermore, these competencies/capabilities are also frequently cited in the wider interprofessional literature (e.g., Brewer & Jones, 2013; Thistlethwaite et al., 2014)

Finally, feedback from a diverse representation of stakeholders from the interprofessional field and health is recommended to inform the guidelines for evaluating an identity-focused interprofessional curriculum. Stakeholders may include representatives from the Australian Health Practitioner Regulation Agency (Ahpra), employers in health, clients, health professional educators, and experts from national (e.g., the Australian and New Zealand Association for Health Professional Educators) and international bodies (e.g., CAIPE, Interprofessionl.Global) in the field. Ensuring diverse stakeholder representation as part of an accreditation process aligns with best practice in the accreditation of health professional courses (Australian Health Practitioner Regulation Agency (AHPRA), 2020; Frank et al., 2020; Palermo et al., 2021). Collectively, the recommendations presented provide a starting point for exploring the use of an identity-focused interprofessional curriculum as one way to establish a common interprofessional education accreditation standard within health professional courses.

9.3 Strengths, limitations and future directions

9.3.1 Strengths

The strengths of each study in my research have been covered in the discussion section of the relevant published papers and unpublished chapters. I present five additional strengths that are related to this body of research below.

First, this research demonstrates the relevance of a longitudinal mixed methods triangulation design (Creswell & Plano Clark, 2017; Plano Clark et al., 2014) for advancing longitudinal interprofessional identity research. This research design focused on ensuring that the definition and conceptualisation of interprofessional identity aligned with the theories and measures used to explore identity development. Not only does this attention to

alignment address the issue of poor alignment in the field (**Study One**), but it also provides the foundation for ensuring this research can be replicated and/or compared across other similar studies (Khalili et al., 2019).

Returning to the suitability of the mixed methods design selected, this design is a strength of my research because it enabled the findings from quantitative and qualitative studies of identity to be integrated to gain further insight into interprofessional identity development. Specifically, I found that to become interprofessional practitioners, students and graduates need to develop commitment to work interprofessionally in different health workplaces to deliver client-centred care. As illustrated in Figure 2 (page 200), this interprofessional insight develops over time and through a variety of socialisation experiences during health professional education and subsequent practice as professionals in different health workplaces.

The second strength of my research is a proposed interprofessional education curriculum that facilitates student development of interprofessional identity. Educators are encouraged to integrate an identity-focused curriculum into existing capability-/competency-based interprofessional curriculum. The third strength is the adaptation and validation of three outcome measures (see **Study Two**). These are a pair of measures of interprofessional identity ($\alpha = .82$) and professional identity ($\alpha = .81$), and a measure of autostereotype (perceptions of students from own profession) and heterosterotype (perceptions of students from one profession other than one's own). Both the autostereotype ($\alpha = .91$) and heterosterotype ($\alpha = .90$) measures are internally reliable. The third measure captures quality of contact among students from different professions. This measure has acceptable internal reliability ($\alpha = .75$).

The fourth strength of my research is the identification of the nuanced differences that exist between identity development and sustained identification with an

interprofessional identity. These differences necessitate the use of different theoretical approaches, detailed in the section on theoretical implications to critically understand longitudinal interprofessional identity development in different contexts. The fifth and final strength of my research is the inclusion of some implications for employers and policy makers that, if implemented, will contribute towards growing the interprofessional health workforce. Collectively, these strengths represent a novel and significant contribution to the interprofessional identity literature as they advance contemporary interprofessional identity scholarship.

9.3.2 Limitations

This research had several limitations. First, all participants were self-selected, and findings were based on self-reported data. Individuals with positive interprofessional education and practice experiences could have been more motivated to participate in this research. Further, the data could have been subjected to response bias as findings were based on self-reported data. Rosenman et al. (2011) described response bias as a phenomenon that occurs where individuals consciously or unconsciously offer biased estimates of self-assessed behaviour, when completing surveys and/or during interviews. Social-desirability measures can be included in future interprofessional identity research to minimise response bias and increase the validity of the results obtained from quantitative and qualitative measures of interprofessional identity. For example, the Marlowe-Crowne Social Desirability Scale (MC-SDS; Crowne & Marlowe, 1960), is a reliable ($\alpha = .85$) measure of social disability that researchers could use.

The second limitation was a high participant attrition rate across the three longitudinal studies (**Studies Three, Four and Six**). To address this common limitation in longitudinal research (Bryman, 2016; Calman et al., 2013; Creswell & Plano Clark, 2017), I employed a number of strategies recommended from the longitudinal research design literature (Bryman,

2016; Calman et al., 2013; Creswell & Plano Clark, 2017). For example, I maintained email contact with participants who were interested in further studies of interprofessional identity. I provided incentives to encourage students to participate in follow-up surveys. I offered graduates the option of in-person, online, or phone interviews at each interview.

This attrition rate limitation was addressed in the quantitative studies (**Studies Three and Four**) by conducting *t*-tests to determine whether the participants who completed the second component of the research were representative of the initial sample. High participant attrition in **Study Six**, the longitudinal qualitative study of identity, was addressed by analysing the data obtained from each cohort of participants analysed cross-sectionally (Grossoehme & Lipstein, 2016), comparing the themes obtained from both cohorts of graduates from different professions for consistency, and describing the sample size at each interview. Collectively, these stratgies ensured that the findings obtained in **Study Six** were trustworthy despite high participant attrition during follow-up interviews (Fadyl et al., 2017; Grossoehme & Lipstein, 2016; SmithBattle et al., 2018).

The third limitation of this research was that, beyond the interprofessional first year and dedicated interprofessional placement, the effects of other interprofessional learning opportunities on students' interprofessional and professional identities were not captured in my research. This limitation reflects a common limitation of educational research: it is unrealistic for researchers to methodologically or statistically control for a diverse range of factors that may influence identity development (Cain & Allan, 2017). Students who participated in my research were likely to have observed and/or participated in interprofessional teamwork whilst on profession-specific clinical placements in the health workplace, and/or engaged in other interprofessional learning during coursework (e.g., case studies, presentations, simulations, workshops). Students' developing interprofessional identity could have been shaped by experiences not captured in this research.

The fourth limitation was that most interviews conducted in **Studies Five and Six** were short. As mentioned earlier, one possible explanation could be because the interview questions were open-ended but direct. On further reflection, short interviews could have also been a reflection of my experience conducting interviews as a research student. These limitations may be addressed by including interview questions that elicit narratives of individuals' understanding and experiences (pleasant and unpleasant) of identity (professional, interprofessional), as well as the factors (e.g., placement duration, clients' presenting health condition(s), peer learning opportunities, and clinical educators' approach to facilitate learning) that informed their understanding (Flanagan, 1954). For example, researchers can use the critical incident technique (CIT; Flanagan, 1954). Flanagan (1954) describes CIT as "a procedure for gathering certain important facts concerning behaviour in defined situations." (p. 9) CIT has been used as a qualitative research method in many health professions, such as nursing, medicine and dentistry (FitzGerald et al., 2008). Given its precedence in health education research, it seems reasonable to use this method to guide future qualitative studies of interprofessional identity.

The fifth and final limitation was that the relationship between professional and interprofessional identities could have been explored more critically by drawing on concepts from the literature on intersectionality (Monrouxe, 2015; Tsouroufli et al., 2011) and social identity complexity (Roccas & Brewer, 2002). This body of research may provide insight into how individuals with multiple ingroup identities perceive the relationships between them in different situations, and why gender (female) and perceptions of power differences between the professions influenced interprofessional identity salience.

9.3.3 Future directions

Five future research directions are recommended to build on the findings from this research. First, interprofessional identity development needs to be explored both

quantitatively and qualitatively in students not involved in interprofessional education. Such research could capture and clarify the effects of informal interprofessional socialisation opportunities gained during health professional education on students' perceptions of interprofessional identity and its relevance for practice.

Second, qualitative explorations of interprofessional identity development in students early in their health professional education (i.e., first year students) are needed. Findings may clarify whether anticipatory socialisation to the professional role (Price et al., 2021) contributed to strongly correlated interprofessional and professional identities reported at university entry (**Study One**). A key finding from my research was quality of contact and positive perceptions of own profession facilitated interprofessional identity development in first year students. Whilst I recommended the provision of opportunities for first year students to experience interprofessional practice in the health workplace, this opportunity is likely to be costly and logistically difficult to organise for some universities with large student cohorts such as Curtin University (Brewer et al., 2014). Instead, further qualitative research exploring identity development in first year students may clarify the notion of what constitutes a quality interprofessional learning experience, for example, the type of interprofessional activity, tasks involved and duration of the experience. This research could then inform the resources required (e.g., educators, space) to provide these experiences for large student cohorts.

The third suggested future direction is to conduct participant observation studies (Coffey, 2006; Guest et al., 2013) in addition to individual interviews. Observation studies minimise the potential for high participant attrition associated with longitudinal research, as the participants (e.g., students, professionals) do not need to dedicate time to participate in the research. Instead, researcher(s) collects data by observing participants' interprofessional interactions with clients, student peers, and/or other healthcare professionals in the health

service delivery context that participants are in (Bryman, 2016; Coffey, 2006; Guest et al., 2013).Fourth, explore healthcare professionals' interprofessional identity development over an extended period (years) and its impact on the quality of healthcare delivered, as perceived by clients. Including the client perspective may uncover other attributes in addition to commitment that are associated with sustained identification with interprofessional identity beyond graduates' first year of practice.

The fifth and final suggested future research direction is to explore how graduates without prior interprofessional experiences understand interprofessional identity. Findings may lead to new insight into how individuals might 'know' if and how interprofessional interactions influence interprofessional identity. It should be noted that although interprofessional care is the expected standard of health service delivery (Frenk et al., 2010; Khalili et al., 2021), interprofessional practice is not yet the norm (Baird et al., 2019; Cuff et al., 2014). One explanation may be because the implementation of interprofessional education programmes vary substantially across countries (Herath et al., 2017). For example, interprofessional education is not yet the norm in some health professional education programmes in developing nations (Botma & Snyman, 2019; Faisal et al., 2020). It, therefore, is possible for future interprofessional identity research to compare graduates with and without prior interprofessional education experiences.

9.4   Concluding comments

This thesis makes a novel contribution to the interprofessional identity literature by exploring students' interprofessional identity development during health professional education and its influence on subsequent practice as professionals during their first year of work. This body of research was underpinned by a longitudinal mixed methods research design.

My research demonstrates that interprofessional identity development involves moving from a limited understanding of interprofessional practice as students begin their

health professional education, to an in-depth understanding of how barriers to interprofessional practice in the workplace can be navigated, to ensure that the care delivered as healthcare professionals with one year of work experience, remains client-centred in different service delivery contexts. Prelicensure interprofessional education that includes opportunities for students to form positive perceptions of their own profession and engage in quality interprofessional contact, followed by dedicated interprofessional placement opportunities in students' final year of education, facilitate identity development.

Overall, my research highlighted that to become interprofessional practitioners, individuals need to recognise, exploit, and respond to opportunities to ensure care remains client-centred, across different health service delivery contexts. A paradigm shift in how students are prepared for interprofessional practice through interprofessional education is proposed. This shift involves moving from a focus on teaching and assessing interprofessional capability/competency acquisition as an outcome of interprofessional education, towards teaching and assessing interprofessional identity development. Identity is enacted through the learner's ability to apply interprofessional capabilities/competencies flexibly in different health service delivery contexts. In addition to engaging students in identity-focused interprofessional coursework, university educators need to work collaboratively with health professionals in various health workplaces to facilitate students' interprofessional identity development during clinical placements.

Recommendations are provided for researchers to advance interprofessional identity scholarship and for educators to design interprofessional curricula that facilitates students' development of interprofessional identity. Recommendations for employers to support further interprofessional identity development in graduates and for policy makers to establish a common interprofessional education accreditation standard within health professional courses are also provided. I believe that by supporting students to develop their

interprofessional identity such that they graduate with the capabilities and commitment to maintain their identification as interprofessional practitioners, the enduring effects of interprofessional education on client care outcomes and health systems will become visible over time.

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Appendix A - Ethics approvals

Curtin University

Office of Research and Development

GPO Box U1987
Perth Western Australia 6845

Telephone +61 8 9266 7863
Facsimile +61 8 9266 3793
Web research.curtin.edu.au

24-Oct-2016

Name: Lynne Roberts
Department/School: School of Psychology and Speech Pathology
Email: Lynne.Roberts@curtin.edu.au

Dear Lynne Roberts

RE: Ethics approval
Approval number: HRE2016-0407

Thank you for submitting your application to the Human Research Ethics Office for the project **Dual identity development in healthcare students and implications for professional and interprofessional practice**.

Your application was reviewed through the Curtin University low risk ethics review process.

The review outcome is: **Approved**.

Your proposal meets the requirements described in National Health and Medical Research Council's (NHMRC) *National Statement on Ethical Conduct in Human Research (2007).*

Approval is granted for a period of one year from **24-Oct-2016** to **23-Oct-2017**. Continuation of approval will be granted on an annual basis following submission of an annual report.

Personnel authorised to work on this project:

Name	Role
Tong, Ruyi	Student
Roberts, Lynne	CI
Flavell, Helen	Supervisor

Standard conditions of approval

1. Research must be conducted according to the approved proposal
2. Report in a timely manner anything that might warrant review of ethical approval of the project including:
   - proposed changes to the approved proposal or conduct of the study
   - unanticipated problems that might affect continued ethical acceptability of the project
   - major deviations from the approved proposal and/or regulatory guidelines

- serious adverse events
3. Amendments to the proposal must be approved by the Human Research Ethics Office before they are implemented (except where an amendment is undertaken to eliminate an immediate risk to participants)
4. An annual progress report must be submitted to the Human Research Ethics Office on or before the anniversary of approval and a completion report submitted on completion of the project
5. Personnel working on this project must be adequately qualified by education, training and experience for their role, or supervised
6. Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, that bears on this project
7. Changes to personnel working on this project must be reported to the Human Research Ethics Office
8. Data and primary materials must be retained and stored in accordance with the Western Australian University Sector Disposal Authority (WAUSDA) and the Curtin University Research Data and Primary Materials policy
9. Where practicable, results of the research should be made available to the research participants in a timely and clear manner
10. Unless prohibited by contractual obligations, results of the research should be disseminated in a manner that will allow public scrutiny; the Human Research Ethics Office must be informed of any constraints on publication
11. Ethics approval is dependent upon ongoing compliance of the research with the Australian Code for the Responsible Conduct of Research, the National Statement on Ethical Conduct in Human Research, applicable legal requirements, and with Curtin University policies, procedures and governance requirements
12. The Human Research Ethics Office may conduct audits on a portion of approved projects.

Special Conditions of Approval
None.

This letter constitutes ethical approval only. This project may not proceed until you have met all of the Curtin University research governance requirements.

Should you have any queries regarding consideration of your project, please contact the Ethics Support Officer for your faculty or the Ethics Office at hrec@curtin.edu.au or on 9266 2784.

Yours sincerely

Dr Catherine Gangell
Manager, Research Integrity

Curtin University

16-May-2017

Name: Lynne Roberts
Department/School: School of Psychology and Speech Pathology
Email: Lynne.Roberts@curtin.edu.au

Dear Lynne Roberts

RE: Amendment approval
Approval number: HRE2016-0407

Thank you for submitting an amendment request to the Human Research Ethics Office for the project **Dual identity development in healthcare students and implications for professional and interprofessional practice**.

Your amendment request has been reviewed and the review outcome is: **Approved**

The amendment approval number is HRE2016-0407-01 approved on 16-May-2017.

The following amendments were approved:
The recruitment of first year undergraduate health sciences students who are starting their respective course(s) in Semester Two, 2017

Any special conditions noted in the original approval letter still apply.

Standard conditions of approval

1. Research must be conducted according to the approved proposal
2. Report in a timely manner anything that might warrant review of ethical approval of the project including:
   - proposed changes to the approved proposal or conduct of the study
   - unanticipated problems that might affect continued ethical acceptability of the project
   - major deviations from the approved proposal and/or regulatory guidelines
   - serious adverse events
3. Amendments to the proposal must be approved by the Human Research Ethics Office before they are implemented (except where an amendment is undertaken to eliminate an immediate risk to participants)
4. An annual progress report must be submitted to the Human Research Ethics Office on or before the anniversary of approval and a completion report submitted on completion of the project
5. Personnel working on this project must be adequately qualified by education, training and experience for their role, or supervised
6. Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, that bears on this project
7. Changes to personnel working on this project must be reported to the Human Research Ethics Office
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12. The Human Research Ethics Office may conduct audits on a portion of approved projects.

Should you have any queries regarding consideration of your project, please contact the Ethics Support Officer for your faculty or the Ethics Office at hrec@curtin.edu.au or on 9266 2784.

Yours sincerely

Dr Catherine Gangell
Manager, Research Integrity

24-Aug-2017

Name: Lynne Roberts
Department/School: School of Psychology and Speech Pathology
Email: Lynne.Roberts@curtin.edu.au

Dear Lynne Roberts

RE: Amendment approval
Approval number: HRE2016-0407

Thank you for submitting an amendment request to the Human Research Ethics Office for the project **Dual identity development in healthcare students and implications for professional and interprofessional practice**.

Your amendment request has been reviewed and the review outcome is: **Approved**

The amendment approval number is HRE2016-0407-04 approved on 24-Aug-2017.

The following amendments were approved:
Margo Brewer has been added as Co-Investigator.

Any special conditions noted in the original approval letter still apply.

Standard conditions of approval

1. Research must be conducted according to the approved proposal
2. Report in a timely manner anything that might warrant review of ethical approval of the project including:
   - proposed changes to the approved proposal or conduct of the study
   - unanticipated problems that might affect continued ethical acceptability of the project
   - major deviations from the approved proposal and/or regulatory guidelines
   - serious adverse events
3. Amendments to the proposal must be approved by the Human Research Ethics Office before they are implemented (except where an amendment is undertaken to eliminate an immediate risk to participants)
4. An annual progress report must be submitted to the Human Research Ethics Office on or before the anniversary of approval and a completion report submitted on completion of the project
5. Personnel working on this project must be adequately qualified by education, training and experience for their role, or supervised
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8. Data and primary materials must be retained and stored in accordance with the Western Australian University Sector Disposal Authority

(WAUSDA) and the Curtin University Research Data and Primary Materials policy

9. Where practicable, results of the research should be made available to the research participants in a timely and clear manner

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11. Ethics approval is dependent upon ongoing compliance of the research with the Australian Code for the Responsible Conduct of Research, the National Statement on Ethical Conduct in Human Research, applicable legal requirements, and with Curtin University policies, procedures and governance requirements

12. The Human Research Ethics Office may conduct audits on a portion of approved projects.

Should you have any queries regarding consideration of your project, please contact the Ethics Support Officer for your faculty or the Ethics Office at hrec@curtin.edu.au or on 9266 2784.

Yours sincerely

Amy Bowater
Acting Manager, Research Integrity

Appendix B – Participant recruitment materials

First year psychology students

Curtin University

Interprofessional education and identity

Are you currently in your first year of a psychology degree within the Faculty of Health Sciences?

Are you 17 and above?

Yes? Please take a moment to read on.

We are conducting the **first longitudinal study** exploring students' professional and interprofessional identity development. Findings from this study may be used to inform learning and teaching in future Health Sciences' courses.

Study Aims

1) Understand how the relationship between discipline professional identity and interprofessional identity develops throughout your course.
2) Understand how professional practice post-graduation is shaped by identity.

Link to this study: https://curtin.au1.qualtrics.com/jfe/form/SV_25C9yxq7b4H7x7D

Participation involves completing an online survey which will take about 20 minutes of your time. The questions are simple and are about your identity and your interactions with other students within the Faculty of Health Sciences. If you register for this study in SONA, you will be awarded 1 participation point for completing this survey.

This survey is conducted by
Ruyi Tong, PhD student, ruyi.tong@postgrad.curtin.edu.au
A/Prof Lynne Roberts (Supervisor): Lynne.Roberts@curtin.edu.au Ph: 9266 7183
Dr Helen Flavell (Co-supervisor): h.flavell@curtin.edu.au Ph: 9266 2025
Dr Margo Brewer (Co-supervisor): M.Brewer@curtin.edu.au Ph: 9266 9288

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number: HRE2016-0407-01). Please contact Ruyi if you have any questions about this study.

Ruyi Tong
ruyi.tong@postgrad.curtin.edu.au
https://curtin.au1.qualtrics.com/jfe/form/SV_25C9yxq7b4H7x7D

Ruyi Tong
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Curtin University

Interprofessional education and identity survey

Participant information sheet

I am Ruyi Tong, a PhD student at Curtin University. My research explores how students' professional and interprofessional identity develop during their studies; and how professional practice after graduation, is shaped by identity. This is the first longitudinal study of its kind. My supervisors, A/Prof Lynne Roberts and Dr Helen Flavell are assisting me with this research.

Why am I being asked to take part and what will I have to do?

I would like to invite you to take part in my study if you are over the age of 17 and currently enrolled in the first year of a degree in the Faculty of Health Sciences at Curtin University. My study involves completing an online survey. The questions are simple and should only take approximately 20 minutes of your time. The questions are about your identity and interactions with other students within the Faculty of Health Sciences. Your survey responses are saved automatically, and you can submit your completed survey by clicking the 'submit' button at the end of the survey. You are unable to amend your work once it is electronically submitted. **I will assume that you consent for your responses to be used in this study when you click the 'submit' button at the end of the survey.**

At the end of the survey, you may leave your contact details if you wish, so that I can contact you to inform you about a follow up study – an online survey at the end of this year. Questions in both surveys will be exactly the same. Your participation in this follow up survey is important for me to understand how identity develops over time.

You can also participate in this study and choose NOT to provide your contact details for the follow up study.

Are there any benefits to being involved in this study?

You will be awarded 1 participation point by completing this survey, if you are a member of the School of Psychology and Speech Pathology participant pool AND have registered for this study in SONA. If you would like to be awarded the participation point, please follow the link to provide your name and student number at the end of the survey. This information will be stored in a different location to your survey responses. This ensures neither my supervisors nor myself will be able to link your personal information with your survey responses unless you have provided your contact details for future studies.

1

Are there any risks, side-effects, discomforts or inconveniences from being involved in this study?

Apart from giving up some of your time, I do not anticipate any other risks or inconveniences from participating in this study. You may skip questions that cause discomfort. You may also access counselling support through Curtin counselling services in confidence, if you feel distressed.

Who will have access to my information?

All information collected in this study is confidential and password-protected. Only my supervisors, myself and the Curtin University Ethics Committee will have access to this information. This information will be kept under secure conditions at Curtin University for 7 years after the study has ended, and then it will be destroyed.

Will you tell me the results of this study?

Only group results will be reported, and made available in my thesis, which contributes towards a Doctor of Philosophy qualification from Curtin University. Results may also be used for academic publications and in conference presentations. You will not be identifiable from the results published. You may contact myself or my supervisors if you would like to find the results of this study.

Do I have to take part in this study?

Participation is entirely voluntary. You do not have to agree to participate if you do not want to, and are free to skip questions that cause discomfort, or start then stop the survey at any time without reason. Regardless of your decision, your relationship with the University, staff and colleagues will not be affected. Please note that if you choose to leave the study at any point, I am unable to destroy your information unless you had included your contact details (optional), in your survey.

What happens next and who can I contact about this study?

Either myself or my supervisors can answer any further questions.

Ruyi Tong: ruyi.tong@postgrad.curtin.edu.au
A/Prof Lynne Roberts (Supervisor): Lynne.Roberts@curtin.edu.au Ph: 9266 7183
Dr Helen Flavell (Co-supervisor): h.flavell@curtin.edu.au Ph: 9266 2025

Please click   >>   below to begin the survey.

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number 2016-0407). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.

Thank you for your interest in my study.

Sincerely,
Ruyi Tong

2

Curtin University

Interprofessional education and identity survey

Participant information sheet

I am Ruyi Tong, a PhD student at Curtin University. My research explores how students' professional and interprofessional identity develop during their studies; and how professional practice after graduation, is shaped by identity. This is the first longitudinal study of its kind. My supervisors, A/Prof Lynne Roberts and Dr Helen Flavell are assisting me with this research.

Why am I being asked to take part and what will I have to do?
I would like to invite you to take part in my study about identity development and interprofessional education, you are over the age of 17 and currently enrolled in the first year of a degree in the Faculty of Health Sciences at Curtin University. My study involves completing an online survey. The questions are simple and should only take approximately 20 minutes of your time. The questions are about your identity and your interactions with other students within the Faculty of Health Sciences. Your survey responses are saved automatically, and you can submit your completed survey by clicking the 'submit' button at the end of the survey. You are unable to amend your work once it is electronically submitted. **I will assume that you consent for your responses to be used in this study when you click the 'submit' button at the end of the survey.** You may participate in this study **regardless of prior involvement** in other studies related to interprofessional education and identity.

Are there any benefits to being involved in this study?
There may be no direct benefit to you by participating in this study. However, as a token of appreciation, you can enter a prize draw after completing the survey, with a chance of winning one of three $50 iTunes vouchers. I will only contact you on the email address provided if you win a voucher. This email address will not be linked to your survey responses.

Are there any risks, side-effects, discomforts or inconveniences from being involved in this study?
Apart from giving up some of your time, I do not anticipate any other risks or inconveniences from participating in this study. You may skip questions that cause discomfort. You may also access counselling support through Curtin counselling services in confidence, if you feel distressed.

Who will have access to my information?
All information collected in this study is confidential and password-protected. Only my supervisors, myself and the Curtin University Ethics Committee will have access to this

1

Are there any risks, side-effects, discomforts or inconveniences from being involved in this study?

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Will you tell me the results of this study?

Only group results will be reported, and made available in my thesis, which contributes towards a Doctor of Philosophy qualification from Curtin University. Results may also be used for academic publications and in conference presentations. You will not be identifiable from the results published. You may contact myself or my supervisors if you would like to find the results of this study.

Do I have to take part in this study?

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What happens next and who can I contact about this study?

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Ruyi Tong: ruyi.tong@postgrad.curtin.edu.au
A/Prof Lynne Roberts (Supervisor): Lynne.Roberts@curtin.edu.au Ph: 9266 7183
Dr Helen Flavell (Co-supervisor): h.flavell@curtin.edu.au Ph: 9266 2025

Please click `>>` below to begin the survey.

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Sincerely,
Ruyi Tong

2

Interprofessional education and identity survey

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Why am I being asked to take part and what will I have to do?
I would like to invite you to take part in my study if you are over the age of 17 and currently involved in Curtin's interprofessional first year programme. My study involves completing an online survey. The questions are simple and should only take approximately 20 minutes of your time. The questions are about your interactions with other students within the Faculty of Health Sciences. Your survey responses are saved automatically, and you can submit your completed survey by clicking the 'submit' button at the end of the survey. You are unable to amend your work once it is electronically submitted. **I will assume that you consent for your responses to be used in this study when you click the 'submit' button at the end of the survey.** You may participate in this research **regardless of prior involvement** in other studies related to interprofessional education and identity.

Are there any benefits to being involved in this study?
You will be awarded 1 participation point by completing this survey, if you are a member of the School of Psychology and Speech Pathology participant pool AND have registered for this study in SONA. If you would like to be awarded the participation point, please follow the link to provide your name and student number at the end of the survey. This information will be stored in a different location to your survey responses. This ensures neither my supervisors nor myself will be able to link your personal information with your survey responses unless you have provided your contact details for future studies.

Are there any risks, side-effects, discomforts or inconveniences from being involved in this study?
Apart from giving up some of your time, I do not anticipate any other risks or inconveniences from participating in this study. You may skip questions that cause discomfort. You may also access counselling support through Curtin counselling services in confidence, if you feel distressed.

Who will have access to my information?
All information collected in this study is confidential and password-protected. Only my supervisors, myself and the Curtin University Ethics Committee will have access to this

Are there any risks, side-effects, discomforts or inconveniences from being involved in this study?
Apart from giving up some of your time, I do not anticipate any other risks or inconveniences from participating in this study. You may skip questions that cause discomfort. You may also access counselling support through Curtin counselling services in confidence, if you feel distressed.

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Will you tell me the results of this study?
Only group results will be reported, and made available in my thesis, which contributes towards a Doctor of Philosophy qualification from Curtin University. Results may also be used for academic publications and in conference presentations. You will not be identifiable from the results published. You may contact myself or my supervisors if you would like to find the results of this study.

Do I have to take part in this study?
Participation is entirely voluntary. You do not have to agree to participate if you do not want to, and are free to skip questions that cause discomfort, or start then stop the survey at any time without reason. Regardless of your decision, your relationship with the University, staff and colleagues will not be affected. Please note that if you choose to leave the study at any point, I am unable to destroy your information unless you had included your contact details (optional), in your survey.

What happens next and who can I contact about this study?
Either myself or my supervisors can answer any further questions.

Ruyi Tong: ruyi.tong@postgrad.curtin.edu.au
A/Prof Lynne Roberts (Supervisor): Lynne.Roberts@curtin.edu.au Ph: 9266 7183
Dr Helen Flavell (Co-supervisor): h.flavell@curtin.edu.au Ph: 9266 2025

Please click [>>] below to begin the survey.

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number 2016-0407). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.

Thank you for your interest in my study.

Sincerely,
Ruyi Tong

2

First year non psychology students

Curtin University

Interprofessional education and identity

Are you currently in your first year of a degree within the Faculty of Health Sciences?

Are you 17 and above?

Yes? Please take a moment to read on.

We are conducting the **first longitudinal study** exploring students' professional and interprofessional identity development. Findings from this study may be used to inform learning and teaching in future Health Sciences' courses.

Study Aims
1) Understand how the relationship between discipline professional identity and interprofessional identity develops throughout your course.
2) Understand how professional practice post-graduation is shaped by identity.

Link to this study: https://curtin.au1.qualtrics.com/jfe/form/SV_3QUbS1u9ULWIQbX

Participation involves completing an online survey which will take about 20 minutes of your time. The questions are simple and are about your identity and your interactions with other students within the Faculty of Health Sciences. Once you complete the survey you can enter a prize draw to **win one of three $50 iTunes vouchers**.

> **This survey is conducted by**
> Ruyi Tong, PhD student, ruyi.tong@postgrad.curtin.edu.au
> A/Prof Lynne Roberts (Supervisor): Lynne.Roberts@curtin.edu.au Ph: 9266 7183
> Dr Helen Flavell (Co-supervisor): h.flavell@curtin.edu.au Ph: 9266 2025
> Dr Margo Brewer (Co-supervisor): M.Brewer@curtin.edu.au Ph: 9266 9288

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number: HRE2016-0407-01). Please contact Ruyi if you have any questions about this study.

Ruyi Tong ruyi.tong@postgrad.curtin.edu.au https://curtin.au1.qualtrics.com/jfe/form/SV_3QUbS1u9ULWIQbX	Ruyi Tong ruyi.tong@postgrad.curtin.edu.au https://curtin.au1.qualtrics.com/jfe/form/SV_3QUbS1u9ULWIQbX	Ruyi Tong ruyi.tong@postgrad.curtin.edu.au https://curtin.au1.qualtrics.com/jfe/form/SV_3QUbS1u9ULWIQbX	Ruyi Tong ruyi.tong@postgrad.curtin.edu.au https://curtin.au1.qualtrics.com/jfe/form/SV_3QUbS1u9ULWIQbX	Ruyi Tong ruyi.tong@postgrad.curtin.edu.au https://curtin.au1.qualtrics.com/jfe/form/SV_3QUbS1u9ULWIQbX	Ruyi Tong ruyi.tong@postgrad.curtin.edu.au	Ruyi Tong ruyi.tong@postgrad.curtin.edu.au https://curtin.au1.qualtrics.com/jfe/form/SV_3QUbS1u9ULWIQbX	Ruyi Tong ruyi.tong@postgrad.curtin.edu.au https://curtin.au1.qualtrics.com/jfe/form/SV_3QUbS1u9ULWIQbX

Curtin University

Interprofessional education and identity survey

Participant information sheet

I am Ruyi Tong, a PhD student at Curtin University. My research explores how students' professional and interprofessional identity develop during their studies; and how professional practice after graduation, is shaped by identity. This is the first longitudinal study of its kind. My supervisors, A/Prof Lynne Roberts and Dr Helen Flavell are assisting me with this research.

Why am I being asked to take part and what will I have to do?
I would like to invite you to take part in my study if you are over the age of 17 and currently enrolled in the first year of a degree in the Faculty of Health Sciences at Curtin University. My study involves completing an online survey. The questions are simple and should only take approximately 20 minutes of your time. The questions are about your identity and your interactions with other students within the Faculty of Health Sciences. Your survey responses are saved automatically, and you can submit your completed survey by clicking the 'submit' button at the end of the survey. You are unable to amend your work once it is electronically submitted. **I will assume that you consent for your responses to be used in this study when you click the 'submit' button at the end of the survey**.

At the end of the survey, you may leave your contact details if you wish, so that I can contact you to inform you about a follow up study - an online survey at the end of this year. Questions in both surveys will be exactly the same. Your participation in this follow up survey is important for me to understand how identity develops over time.

You can also participate in this study and choose NOT to provide your contact details for the follow up study.

Are there any benefits to being involved in this study?
There may be no direct benefit to you by participating in this study. However, as a token of appreciation, you can enter a prize draw after completing the survey, with a chance of winning one of three $50 iTunes vouchers. I will only contact you on the email address provided if you win a voucher. This email address will not be linked to your survey responses.

Are there any risks, side-effects, discomforts or inconveniences from being involved in this study?
Apart from giving up some of your time, I do not anticipate any other risks or inconveniences from participating in this study. You may skip questions that cause discomfort. You may also

1

access counselling support through Curtin counselling services in confidence, if you feel distressed.

Who will have access to my information?
All information collected in this study is confidential and password-protected. Only my supervisors, myself and the Curtin University Ethics Committee will have access to this information. This information will be kept under secure conditions at Curtin University for 7 years after the study has ended, and then it will be destroyed.

Will you tell me the results of this study?
Only group results will be reported, and made available in my thesis, which contributes towards a Doctor of Philosophy qualification from Curtin University. Results may also be used for academic publications and in conference presentations. You will not be identifiable from the results published. You may contact myself or my supervisors if you would like to find the results of this study.

Do I have to take part in this study?
Participation is entirely voluntary. You do not have to agree to participate if you do not want to, and are free to skip questions that cause discomfort, or start then stop the survey at any time without reason. Regardless of your decision, your relationship with the University, staff and colleagues will not be affected. Please note that if you choose to leave the study at any point, I am unable to destroy your information unless you had included your contact details (optional), in your survey.

What happens next and who can I contact about this study?
Either myself or my supervisors can answer any further questions.

Ruyi Tong: ruyi.tong@postgrad.curtin.edu.au
A/Prof Lynne Roberts (Supervisor): Lynne.Roberts@curtin.edu.au Ph: 9266 7183
Dr Helen Flavell (Co-supervisor): h.flavell@curtin.edu.au Ph: 9266 2025

Please click   >>   below to begin the survey.

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number: HRE2016-0407). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.

Thank you for your interest in my study.

Sincerely,
Ruyi Tong

2

Final year students (quantitative study)

Curtin University

Interprofessional education and identity

Are you currently in your final year of a degree within the Faculty of Health Sciences?

Are you currently involved in clinical/fieldwork placements?

Yes? Please take a moment to read on.

We are conducting the **first longitudinal study** exploring students' professional and interprofessional identity development. Findings from this study may be used to inform learning and teaching in future Health Sciences' courses.

Study Aims
1) Understand how the relationship between discipline professional identity and interprofessional identity develops throughout your course.
2) Understand how professional practice post-graduation is shaped by identity.

Participation involves completing an online survey which will take about 20 minutes of your time. The questions are simple and are about your identity and your interactions with other students within the Faculty of Health Sciences. Once you complete the survey you can enter a prize draw to **win one of three $50 iTunes** vouchers. Link to this study:
https://curtin.au1.qualtrics.com/SE/?SID=SV_3kq5TVooUocDCCN

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number: HRE2016-0407). Please contact Ruyi or scan the QR code if you wish to participate.

<table>
<tr>
<td>Ruyi Tong
ruyi.tong@postgrad.curtin.edu.au
https://curtin.au1.qualtrics.com/SE/
?SID=SV_3kq5TVooUocDCCN</td>
<td>Ruyi Tong
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</tr>
</table>

Curtin University

Interprofessional education and identity survey

Participant information sheet

I am Ruyi Tong, a PhD student at Curtin University. My research explores how students' professional and interprofessional identity develop during their studies; and how professional practice after graduation, is shaped by identity. This is the first longitudinal study of its kind. My supervisors, A/Prof Lynne Roberts and Dr Helen Flavell are assisting me with this research.

Why am I being asked to take part and what will I have to do?
I would like to invite you to take part in my study if you are over the age of 17 and currently involved in clinical/fieldwork placements. My study involves completing an online survey. The questions are simple and should only take approximately 20 minutes of your time. The questions are about your interactions with other students within the Faculty of Health Sciences. Your survey responses are saved automatically, and you can submit your completed survey by clicking the 'submit' button at the end of the survey. You are unable to amend your work once it is electronically submitted. **I will assume that you consent for your responses to be used in this study when you click the 'submit' button at the end of the survey.**

At the end of the survey, you may leave your contact details if you wish, so that I can contact you to inform you of about a follow up study – an online survey at the end of this year. Questions in both surveys will be exactly the same. Your participation in this follow up survey is important for me to understand how identity develops over time.

You can also participate in this study and choose NOT to provide your contact details for the follow up study.

Are there any benefits to being involved in this study?
There may be no direct benefit to you by participating in this study. However, as a token of appreciation, you can enter a prize draw after completing the survey, with a chance of winning one of three $50 iTunes vouchers. I will only contact you on the email address provided if you win a voucher. This email address will not be linked to your survey responses.

Are there any risks, side-effects, discomforts or inconveniences from being involved in this study?
Apart from giving up some of your time, I do not anticipate any other risks or inconveniences from participating in this study. You may skip questions that cause discomfort. You may also access counselling support through Curtin counselling services in confidence, if you feel distressed.

1

access counselling support through Curtin counselling services in confidence, if you feel distressed.

Who will have access to my information?
All information collected in this study is confidential and password-protected. Only my supervisors, myself and the Curtin University Ethics Committee will have access to this information. This information will be kept under secure conditions at Curtin University for 7 years after the study has ended, and then it will be destroyed.

Will you tell me the results of this study?
Only group results will be reported, and made available in my thesis, which contributes towards a Doctor of Philosophy qualification from Curtin University. Results may also be used for academic publications and in conference presentations. You will not be identifiable from the results published. You may contact myself or my supervisors if you would like to find the results of this study.

Do I have to take part in this study?
Participation is entirely voluntary. You do not have to agree to participate if you do not want to, and are free to skip questions that cause discomfort, or start then stop the survey at any time without reason. Regardless of your decision, your relationship with the University, staff and colleagues will not be affected. Please note that if you choose to leave the study at any point, I am unable to destroy your information unless you had included your contact details (optional), in your survey.

What happens next and who can I contact about this study?
Either myself or my supervisors can answer any further questions.

Ruyi Tong: ruyi.tong@postgrad.curtin.edu.au
A/Prof Lynne Roberts (Supervisor): Lynne.Roberts@curtin.edu.au Ph: 9266 7183
Dr Helen Flavell (Co-supervisor): h.flavell@curtin.edu.au Ph: 9266 2025

Please click   `>>`   below to begin the survey.

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number: HRE2016-0407). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.

Thank you for your interest in my study.

Sincerely,
Ruyi Tong

2

Curtin University

Interprofessional education and identity survey

Participant information sheet

I am Ruyi Tong, a PhD student at Curtin University. My research explores how students' professional and interprofessional identity develop during their studies; and how professional practice after graduation, is shaped by identity. This is the first longitudinal study of its kind. My supervisors, A/Prof Lynne Roberts and Dr Helen Flavell are assisting me with this research.

Why am I being asked to take part and what will I have to do?

I would like to invite you to take part in my study if you are over the age of 17 and currently involved in clinical/fieldwork placements. My study involves completing an online survey. The questions are simple and should only take approximately 20 minutes of your time. The questions are about your identity and your interactions with other students within the Faculty of Health Sciences. Your survey responses are saved automatically, and you can submit your completed survey by clicking the 'submit' button at the end of the survey. You are unable to amend your work once it is electronically submitted. **I will assume that you consent for your responses to be used in this study when you click the 'submit' button at the end of the survey.** You may participate in this study **regardless of prior involvement** in other studies related to interprofessional education and identity.

At the end of the survey, you may leave your contact details if you wish, so that I can contact you to inform you of about a follow up study - an interview with me about identity development and interprofessional education. Your input in this interview is important because it will contribute valuable information about identity and interprofessional education and may inform learning and teaching in courses in the future.

You can also participate in this study and choose NOT to provide your contact details for the follow up study.

Are there any benefits to being involved in this study?

There may be no direct benefit to you by participating in this study. However, as a token of appreciation, you can enter a prize draw after completing the survey, with a chance of winning one of three $50 iTunes vouchers. I will only contact you on the email address provided if you win a voucher. This email address will not be linked to your survey responses.

1

Are there any risks, side-effects, discomforts or inconveniences from being involved in this study?
Apart from giving up some of your time, I do not anticipate any other risks or inconveniences from participating in this study. You may skip questions that cause discomfort. You may also access counselling support through Curtin counselling services in confidence, if you feel distressed.

Who will have access to my information?
All information collected in this study is confidential and password-protected. Only my supervisors, myself and the Curtin University Ethics Committee will have access to this information. This information will be kept under secure conditions at Curtin University for 7 years after the study has ended, and then it will be destroyed.

Will you tell me the results of this study?
Only group results will be reported, and made available in my thesis, which contributes towards a Doctor of Philosophy qualification from Curtin University. Results may also be used for academic publications and in conference presentations. You will not be identifiable from the results published. You may contact myself or my supervisors if you would like to find the results of this study.

Do I have to take part in this study?
Participation is entirely voluntary. You do not have to agree to participate if you do not want to, and are free to withdraw at any time without reason. If you choose not to take part or start and then stop the survey, your relationship with the University, staff and colleagues will not be affected. Please note that if you chose to leave this study at any point, I am unable to destroy your information unless you had included your contact details (optional), in your survey.

What happens next and who can I contact about this study?
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Ruyi Tong: ruyi.tong@postgrad.curtin.edu.au
A/Prof Lynne Roberts (Supervisor): Lynne.Roberts@curtin.edu.au Ph: 9266 7183
Dr Helen Flavell (Co-supervisor): h.flavell@curtin.edu.au Ph: 9266 2025

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Thank you for your interest in my study.

Sincerely,
Ruyi Tong

Curtin University

Interprofessional education and identity interview

Participant information sheet

I am Ruyi Tong, a PhD student at Curtin University. My research explores how students' professional and interprofessional identity develop during their studies; and how professional practice after graduation, is shaped by identity. This is the first longitudinal study of its kind. My supervisors, A/Prof Lynne Roberts and Dr Helen Flavell are assisting me with this research.

Why am I being asked to take part and what will I have to do?

I would like to invite you to take part in this study about interprofessional education and identity. You have been invited because you were involved clinical/fieldwork placements. This research involves participating in a 45-60 minutes' interview session with me. During the interview, I will ask questions about your clinical/fieldwork placement experiences and identity. You will also be asked to draw image(s) about these relationships. I can hold our interview at a mutually convenient location on or off campus. The interview will be digitally recorded for post-interview data analysis purposes.

At the end of the interview, you will be given the choice of leaving your contact details so that I can contact you about my final study related to this research project, in three to six months' time. You can also participate in this study and choose NOT to provide your contact details.

Are there any benefits to being involved in this study?

As a token of appreciation, you will be given a $10 iTunes voucher. If interviews are held on campus, you are entitled to up to 2hours of parking fees reimbursed, at Curtin's visitors' parking rate.

Are there any risks, side-effects, discomforts or inconveniences from being involved in this study?

Apart from giving up some of your time, I do not anticipate any other risks or inconveniences from participating in this study. You may decline answering any questions that may cause discomfort without reason, during the interview, or request to cease the interview. You may also access counselling support through Curtin counselling services in confidence, if you feel distressed.

Who will have access to my information?

All information collected in this study is confidential and password-protected. Only my supervisors, myself and the Curtin University Ethics Committee will have access to this information. This information will be kept under secure conditions at Curtin University for 7 years after the study has ended, and then it will be destroyed.

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Will you tell me the results of this study?
Only group results will be reported, and made available in my thesis, which contributes towards a Doctor of Philosophy qualification from Curtin University. Results may also be used for academic publications and in conference presentations. You will not be identifiable from the results published. You may contact myself or my supervisors if you would like to find the results of this study.

Do I have to take part in this research project?
Participation is entirely voluntary. You do not have to agree to participate if you do not want to, and are free to withdraw at any time without reason. Your decision will not affect your relationship with the University, staff and colleagues. I am able to destroy your information if you chose to leave the interview at any point.

What happens next and who can I contact about this study?
Either myself or my supervisors can answer any further questions.

Ruyi Tong: ruyi.tong@postgrad.curtin.edu.au
A/Prof Lynne Roberts (Supervisor): Lynne.Roberts@curtin.edu.au Ph: 9266 7183
Dr Helen Flavell (Co-supervisor): h.flavell@curtin.edu.au Ph: 9266 2025

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Thank you for your interest in my research.

Sincerely,
Ruyi Tong

2

Curtin University

Interprofessional education and identity interview

Participant information sheet

I am Ruyi Tong, a PhD student at Curtin University. My research explores how students' professional and interprofessional identity develop during their studies; and how professional practice after graduation, is shaped by identity. This is the first longitudinal study of its kind. My supervisors, A/Prof Lynne Roberts and Dr Helen Flavell are assisting me with this research.

Why am I being asked to take part and what will I have to do?
I would like to invite you to take part in this follow-up study about interprofessional education and identity. You have been invited to participate as you were involved in professional and/or interprofessional clinical/fieldwork placements as a student. This research involves participating in a 45-60 minutes' interview session with me. During the interview, I will ask questions about your work experiences, past student experiences and identity. You will also be asked to draw image(s) about these relationships. I can hold our interview at a mutually convenient location. The interview will be digitally recorded for post-interview data analysis purposes.

Are there any benefits to being involved in this study?
You will be given a $10 iTunes voucher as a token of appreciation. If interviews are held on campus, you are entitled to up to 2 hours of parking fees reimbursed, at Curtin's visitors' parking rate.

Are there any risks, side-effects, discomforts or inconveniences from being involved in this study?
Apart from giving up some of your time, I do not anticipate any other risks or inconveniences associated with participating in this study. You may decline answering any questions that may cause discomfort without reason, during the interview, or request to cease the interview.

Who will have access to my information?
All information collected in this research is confidential and password-protected. Only my supervisors, myself and the Curtin University Ethics Committee will have access to this information. This information will be kept under secure conditions at Curtin University for 7 years after the research has ended, and then it will be destroyed.

Will you tell me the results of this research?
Only group results will be reported, and made available in my thesis, which contributes towards a Doctor of Philosophy qualification from Curtin University. Results may also be used for academic publications and in conference presentations. You will not be identifiable

1

from the results published. You may contact myself or my supervisors if you would like to find the results of this research.

<u>Do I have to take part in this research project?</u>
Participation is entirely voluntary. You do not have to agree to participate if you do not want to, and are free to withdraw at any time without reason. Your decision will not affect your relationship with the University, staff and colleagues will not be affected. I am able to destroy your information if you chose to leave the interview at any point.

<u>What happens next and who can I contact about this research?</u>
Either myself or my supervisors can answer any further questions.

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Thank you for your interest in my research.

Sincerely,
Ruyi Tong

Appendix C – Online surveys

Appendix C contains all the measures that were used in the online surveys for

Studies Two, Three, and Four. All surveys were hosted via Qualitrics (2017).

Demographic Questionnaire for the studies that involve first year students
(Studies Two and Three)

Please indicate your responses to the following questions by clicking on the most relevant response for choice questions, and by typing your responses on the lines provided for open-ended questions.

1. How do you identify your gender?
    Male   Female   Another gender (please specify)
2. Age: _____ years

3. Course enrolled:
    _____

4. Year of course:
    1   2   3   4   5

5. What is your enrolment status?
    Full time   Part time

6. Do you consider yourself as a(n)
    Domestic student   International student

7. What is your main mode of study?
    On-campus   Fully online learning

8. Have you completed previous qualification(s) prior to the course you are currently enrolled in?
    Yes   No
    If yes, please list qualification(s) below.
    _____
    _
9. Have you worked or volunteered in a health care setting (e.g., hospital, community health) in the past?
    Yes   No
    If yes, please indicate the nature of the work.

10. Please include your contact details if you would like to participate in a follow up study at the end of this year. By participating in this follow up study, you will be contributing important information about how students' professional and interprofessional identities develop over the course of a common interprofessional first year curriculum.

Email address, mobile number, and best time to reach you (e.g., between 2-4pm or between 6-8pm).

Additional demographic questions for final year students (Study Five)

In addition to the questions above, the demographic questionnaire for the quantitative study that involves final year students (Study Four) will also include the following questions.

1. Please list all clinical/fieldwork placements you have completed to date, including *location*, *duration* and whether you choose this placement or were assigned to it by a staff member in the space below. For example, "Adult neuro, Royal Perth, 6 weeks".

Placement	Location	Duration	Chosen-Assigned

2. Please include your contact details if you would like to participate in a follow up study at the end of this year. By participating in this follow up study, you will be contributing important information about how students' professional and interprofessional identity development change, following participation in profession-specific and/or interprofessional placements.

   Email address, mobile number, and best time to reach you (e.g., between 2-4pm or between 6-8pm).

Adapted Three-factor Model of Social Identity Scale (Cameron, 2004) measuring Professional Identity

The following statements are about your relationships with people (students, professionals) *within the profession* you are currently studying. Please click on the most relevant number for each statement.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
I have a lot in common with other people from my profession.	1	2	3	4	5	6
I feel strong ties with other people from my profession.	1	2	3	4	5	6
I find it difficult to form a bond with other people from my profession.	1	2	3	4	5	6
I don't feel a sense of being "connected" with other people from my profession.	1	2	3	4	5	6
I often think about the fact that I am part of this profession.	1	2	3	4	5	6
Overall, being part of this profession has very little to do with how I feel about myself.	1	2	3	4	5	6
In general, being part of this profession is an important part of my self-image.	1	2	3	4	5	6
The fact that I am a part of this profession rarely enters my mind.	1	2	3	4	5	6
In general, I'm glad to be part of this profession.	1	2	3	4	5	6
I often regret that I am part of this profession.	1	2	3	4	5	6
I don't feel good about being part of this profession.	1	2	3	4	5	6
Generally, I feel good when I think about myself as being part of this profession.	1	2	3	4	5	6

Adapted Three-factor Model of Social Identity Scale (Cameron, 2004) measuring Interprofessional Identity

The following statements are about your relationships with *other health science professionals*. This also includes students studying to become health science professionals in disciplines other than your own. Please click on the most relevant number for each statement.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
I have a lot in common with other health science professionals.	1	2	3	4	5	6
I feel strong ties to people from other health science professionals.	1	2	3	4	5	6
I find it difficult to form a bond with other health science professionals.	1	2	3	4	5	6
I don't feel a sense of being "connected" with other health science professionals.	1	2	3	4	5	6
I often think about the fact that I am a health science professional.	1	2	3	4	5	6
Overall, being a health science professional has very little to do with how I feel about myself.	1	2	3	4	5	6
In general, being a health science professional is an important part of my self-image.	1	2	3	4	5	6
The fact that I am a health science professional rarely enters my mind.	1	2	3	4	5	6
In general, I'm glad to be a health science professional.	1	2	3	4	5	6
I often regret that I am a health professional.	1	2	3	4	5	6
I don't feel good about being a health science professional.	1	2	3	4	5	6
Generally, I feel good when I think about myself as a health science professional.	1	2	3	4	5	6

Note. The professional identity measure was adapted with permission from Abu-Rish, E., Kim, S., Choe, L., Varpio, L., Malik, E., White, A. A., Craddick, K., Blondon, K., Robins, L., Nagasawa, P., Thigpen, A., Chen, L.-L., Rich, J., & Zierler, B. (2012). Current trends in interprofessional education of health sciences students: A literature review. *Journal of Interprofessional Care, 26*(6), 444-451. https://doi.org/10.3109/13561820.2012.715604

Adapted Dimensions of Contact scale (Islam & Hewstone, 1993)

The following questions are about your opinions about contact you may have with students from *other professions* within the Faculty of Health Sciences. Please click on the most relevant number for each question.

When you were in contact with students from other professions, was contact:

perceived as equal?	1	2	3	4	5	6	7
	definitely not	moderately	slightly	neutral	slightly	moderately	definitely yes

involuntary or voluntary?	1	2	3	4	5	6	7
	definitely involuntary	moderately	slightly	neutral	slightly	moderately	definitely voluntary

superficial or intimate?	1	2	3	4	5	6	7
	very superficial	moderately	slightly	neutral	slightly	moderately	very intimate

experienced as pleasant?	1	2	3	4	5	6	7
	not at all	moderately	slightly	neutral	slightly	moderately	very

competitive or co-operative?	1	2	3	4	5	6	7
	very competitive	moderately	slightly	neutral	slightly	moderately	very cooperative

Please indicate the amount of time, expressed in hours, in response to the following questions.

You may indicate 0 if the question(s) do not apply to you.

1. How much time on average do you spend each week with students from other professions while at University?
    _____ hours
2. How much time on average do you spend each week with students from other professions outside University?
    _____ hours

Note. The Dimensions of Contact scale was adapted from Islam, M. R., & Hewstone, M. (1993). Dimensions of Contact as Predictors of Intergroup Anxiety, Perceived Out-Group Variability, and Out-Group Attitude: An Integrative Model. *Personality and Social Psychology Bulletin, 19*(6), 700-710. https://doi.org/10.1177/0146167293196005

Adapted Student Stereotype Rating questionnaire (Hean et al., 2006)

The following questions are about your perceptions of students from your own and *one* other profession within the Faculty of Health Sciences that you frequently make contact with.

1. When you were in contact with students within the Faculty of Health Sciences, which *profession other than your own*, did you make frequent contact with? Please list *one* profession only.

   _____

2. With this profession in mind, how would you rate students from this profession on the following? Please click on the most relevant number for each item.

	Very high	High	Neutral	Low	Very low
academic ability	1	2	3	4	5
professional competence	1	2	3	4	5
leadership abilities	1	2	3	4	5
interpersonal skills (e.g. warmth, sympathy, communication)	1	2	3	4	5
the ability to work independently	1	2	3	4	5
the ability to be a team player	1	2	3	4	5
the ability to make decisions	1	2	3	4	5
practical skills	1	2	3	4	5
confidence	1	2	3	4	5

3. How would you rate students from your *own profession* on the following? Please click on the most relevant number for each item.

	Very high 1	High 2	Neutral 3	Low 4	Very low 5
academic ability	1	2	3	4	5
professional competence	1	2	3	4	5
leadership abilities	1	2	3	4	5
interpersonal skills (e.g. warmth, sympathy, communication)	1	2	3	4	5
the ability to work independently	1	2	3	4	5
the ability to be a team player	1	2	3	4	5
the ability to make decisions	1	2	3	4	5
practical skills	1	2	3	4	5
confidence	1	2	3	4	5

This is the end of the survey. Please submit your survey by clicking on the "submit" button. Thank you for participating.

From: Jim Cameron <Jim.Cameron@smu.ca>
Sent: Wednesday, 23 May 2018 8:42 PM
To: Ruyi Tong <ruyi.tong@postgrad.curtin.edu.au>
Subject: Re: The Three-Factor Model of Social Identity Scale

Dear Ruyi,

Thank you for your note. In my mind, no permission is required to use and modify the scale; in any case, I'm happy that it was of use in your research. (The item wording you used looks good to me.) I think there is still a relative lack of research on the development of social identities, and I would indeed be interested to see any publications that arise from your work. Best of luck with it,

Jim

Department of Psychology
Saint Mary's University

From: Ruyi Tong <ruyi.tong@postgrad.curtin.edu.au>
Sent: Wednesday, May 23, 2018 5:37:21 AM
To: Jim Cameron
Subject: The Three-Factor Model of Social Identity Scale

Dear A/Prof Cameron,

I am Ruyi Tong, PhD candidate from Curtin University in Perth, Western Australia. My research explores how undergraduate healthcare students across the Faculty of Health Sciences develop their professional and interprofessional identities throughout their training, and subsequent identity manifestations post-graduation. It is hypothesised that students exposed to interprofessional education in addition to profession-specific education during their training will graduate with both identities, identifying with members of their respective profession (professional identity), as well as with members of the wider healthcare team (interprofessional identity). My research is being supervised by A/Prof Lynne Roberts, Dr Helen Flavell and Dr Margo Brewer.

The Three-Factor Model of Social Identity Scale was chosen to measure both identities in first and final year healthcare students across the Faculty following a review of current identity measures, and in consultation with my supervisors.

1. Professional identity was measured by replacing "(ingroup members)" with "people from my profession" for all items tapping "Ingroup Ties", and "a(n) (ingroup member) with "being part of this profession" for all items tapping "Centrality" and "Ingroup Affect".
2. Interprofessional identity was measured by replacing "(ingroup members)" with "health science professionals" for all items tapping "Ingroup Ties", and

"a(n) (ingroup member)" with "a health science professional" for all items tapping "Centrality" and "Ingroup Affect".

No other modifications were made to your scale. I have acknowledged your scale in my work as follows "Professional identity was measured using the Three-Factor Model of Social Identity Scale (Cameron, 2004). If you have a specific statement of attribution that you would like for me to include, please provide it in your response. Additionally, confirmatory factor analysis and reliability analysis (total scale and subscales) were conducted on the professional identity and interprofessional identity measures. Both measures were internally reliable.

The adapted measures were administered as part of an online questionnaire comprising identity, stereotype and contact scale measures and single-item measures of demographics. This survey was hosted on Qualtrics.com, a web-based survey tool.

Prior permission to modify your measure was not sought as it was in the public domain. I sincerely apologise for this oversight and acknowledge this error. I will use the modified measures only for my research and appreciate your advice regarding the modifications made.

In addition to seeking your permission to modify your measure, I seek permission to reproduce the modified measures in my dissertation and publications related to this research. At your request, I will send a copy of all published works containing these modified measures to you.

Thank you for considering these requests.

Sincerely,
Ruyi Tong

Ruyi Tong

BAppSci (Hons)
PhD Candidate
School of Psychology | Faculty of Health Sciences

Curtin University
Mobile | 0416 560 871
Email | ruyi.tong@postgrad.curtin.edu.au

Web | www.curtin.edu.au

From: Ruyi Tong <ruyi.tong@postgrad.curtin.edu.au>
Sent: Tuesday, 11 May 2021 4:19 PM
To: Academic UK Non Rightslink <permissionrequest@tandf.co.uk>
Subject: Re: Reusing part or all of my article somewhere else (UK)

Dear Jo,
Thanks for granting permission both articles to be included in my thesis as 'Accepted Manuscripts'. I will acknowledge the original source of both publications as

This is an '**Accepted Manuscript'** of an article published by Taylor & Francis Group in Journal of Interprofessional Care on 13 February 2020, available online: https://doi.org/10.1080/13561820.2020.1713063

This is an '**Accepted Manuscript'** of an article published by Taylor & Francis Group in Journal of Interprofessional Care on 30 March 2021, available online: https://doi.org/10.1080/13561820.2021.1883564

in my thesis.

Regards,
Ruyi

Ruyi Tong

BAppSci (Hons)
PhD Candidate
School of Psychology | Faculty of Health Sciences

Curtin University
Mobile | 0416 560 871
Email | ruyi.tong@postgrad.curtin.edu.au
Web | www.curtin.edu.au

Dear Ruyi Tong,

Material Requested: R Tong, M. Brewer, H. Flavell & L. D. Roberts (2020) Professional and interprofessional identities: a scoping review, Journal of Interprofessional Care, DOI: 10.1080/13561820.2020.1713063

Ruyi Tong, Margo Brewer, Helen Flavell & Lynne D. Roberts (2021) Facilitating interprofessional identity development in healthcare students through dedicated interprofessional placements, Journal of Interprofessional Care, DOI: 10.1080/13561820.2021.1883564

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From: Ruyi Tong <ruyi.tong@postgrad.curtin.edu.au>
Sent: Wednesday, 12 May 2021 8:27 PM
To: Permissions Helpdesk <permissionshelpdesk@elsevier.com>
Subject: Re: Requesting permission to reproduce a paper in my doctoral thesis. [210511-017032]

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Tong, R., Roberts, L. D., Brewer, M., & Flavell, H. (2020). Quality of contact counts: The development of interprofessional identity in first year students. Nurse Education Today, 86(March), 104328. https://doi.org/10.1016/j.nedt.2019.104328

Regards,
Ruyi

Ruyi Tong

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Mobile | 0416 560 871
Email | ruyi.tong@postgrad.curtin.edu.au

Web | www.curtin.edu.au

Curtin University

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Regards,

Subash Balakrishnan
ELSEVIER | Permissions Granting Team

From: Ruyi Tong
Sent: Wednesday, 23 May 2018 10:36 PM
To: miles.hewstone@psy.ox.ac.uk <miles.hewstone@psy.ox.ac.uk>
Subject: The Dimensions of Contact Scale

Dear Professor Hewstone,

I am Ruyi Tong, PhD candidate from Curtin University in Perth, Western Australia. My research explores how undergraduate healthcare students across the Faculty of Health Sciences develop their professional and interprofessional identities throughout their training, and subsequent identity manifestations post-graduation. It is hypothesised that students involved in interprofessional education in addition to profession-specific education during their training will graduate with both identities, identifying with members of their respective profession (professional identity), as well as with members of the wider healthcare team (interprofessional identity). One of my studies examined the relationship contact (quality and quantity) and identity strengths in first year undergraduate students beginning a faculty-wide interprofessional programme. My research is being supervised by A/Prof Lynne Roberts, Dr Helen Flavell and Dr Margo Brewer.

The Dimensions of Contact qualitative aspects of contact subscale was adapted in consultation with my supervisors for use in this study. This subscale was adapted by prefacing the items of this subscale with "When you are in contact with students from other professions, was contact". The adapted scale has acceptable internal reliability (α = .75). No other adaptations were made. I have acknowledged your scale in my work. If you have a specific statement of attribution that you would like for me to include, please provide it in your response.

The adapted scale was administered as part of an online questionnaire comprising identity, stereotype and contact scale measures and single-item measures of demographics. This survey was hosted on Qualtrics.com, a web-based survey tool.

Prior permission to adapt your scale was not sought as it was in the public domain. I sincerely apologise for this oversight and acknowledge this error. I will use the adapted scale only for my research and appreciate your advice regarding the adaptations made.

I also ask your permission to reproduce the adapted scale in my dissertation and publications related to this research. At your request, I will send a copy of all publications containing the adapted scale to you. Thank you for considering these requests.

Sincerely,
Ruyi Tong

Ruyi Tong

BAppSci (Hons)
PhD Candidate
School of Psychology | Faculty of Health Sciences

Curtin University
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From: Macleod Clark J.L. <J.Macleod-Clark@soton.ac.uk<mailto:J.Macleod-Clark@soton.ac.uk>>
Sent: Thursday, 24 May 2018 11:13:20 AM
To: Ruyi Tong
Subject: RE: The Student Stereotype Rating Questionnaire

Dear Ruyi - thank you for your email.   I can confirm that you have our permission to use the Student Stereotype Rating Questionnaire and to publish your adapted version in your thesis and publications assuming that attribution to the original work is always included. The work you are doing and the adaptations you have made seem very appropriate. It would be good to have sight of any outputs.

As it happens, I frequently visit Perth - and am in fact here right now but leave at the weekend!   I would be interested in hearing about the interprofessional programme at Curtin and your findings - Does your supervisor - Prof Lynne Roberts run this programme?   Perhaps we can all meet up on my next visit - which is likely to be in the New Year?   I don't have Lynne's email address, so would be grateful if you could forward her a copy of this email.

Do let me know if you require any further confirmation of permission.

best wishes

Jill Macleod Clark

Professor Dame Jill Macleod Clark
Faculty of Health Sciences
University of Southampton
jmc@soton.ac.uk

Professor Dame Jill Macleod Clark
Faculty of Health Sciences
University of Southampton
jmc@soton.ac.uk

From: Ruyi Tong [ruyi.tong@postgrad.curtin.edu.au]
Sent: 23 May 2018 15:21
To: Macleod Clark J.L.
Subject: The Student Stereotype Rating Questionnaire

Dear Professor Macleod Clark,

I am Ruyi Tong, PhD candidate from Curtin University in Perth, Western Australia. My research explores how undergraduate healthcare students across the Faculty of Health Sciences develop their professional and interprofessional identities throughout their training, and subsequent identity manifestations post-graduation. One of my studies examined the relationship between stereotypes (autostereotype and heterostereotype) and identity strengths in first-year undergraduate students involved in a faculty-wide interprofessional programme. My research is being supervised by A/Prof Lynne Roberts, Dr Helen Flavell and Dr Margo Brewer.

The Student Stereotype Rating Questionnaire was adapted in consultation with my supervisors for use in this study.

   1. Heterostereotype was measured by prefacing the questionnaire with "When you were in contact with students with the Faculty of Health Sciences, which profession other than your own, did you make frequent contact with? Please list one profession only. With this profession in mid, how would you rate students from this profession on the following?" The adapted questionnaire is internally reliable (α = .90);

   2. Autostereotype was measured by prefacing the questionnaire with "How would you rate students from your own profession on the following?" The adapted questionnaire is internally reliable (α = .91).

Confirmatory factor analysis indicated the unidimensional factor structure of both adapted questionnaires. No other modifications were made. I have acknowledged your questionnaire in my work. If you have a specific statement of attribution that you would like for me to include, please provide it in your response.

The adapted questionnaires were administered as part of an online questionnaire comprising identity, stereotype and contact scale measures and single-item measures of demographics. This questionnaire was hosted on Qualtrics.com, a web-based survey tool.

Prior permission to adapt your questionnaire was not sought as it was in the public domain. I sincerely apologise for this oversight and acknowledge this error. I will use the adapted questionnaires only for my research and appreciate your advice regarding the adaptations made. Further to this, I seek permission to reproduce the adapted questionnaire in my dissertation and publications related to this research. At your request, I will send a copy of all publications containing the adapted questionnaires to you.

Thank you for considering these requests.

Sincerely,

Ruyi Tong

Ruyi Tong
BAppSci (Hons)
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Mobile | 0416 560 871
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Appendix E – Attribution Statement for the published papers

Tong, R., Brewer, M., Flavell, H., & Roberts, L. D. (2020). Professional and interprofessional identities: a scoping review. *Journal of Interprofessional Care*. https://doi.org/10.1080/13561820.2020.1713063

	Conception and Design	Acquisition of Data and Method	Data Conditioning and Manipulation	Analysis and Statistical Method	Interpretation and Discussion
Co-Author 1 Ruyi Tong	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 2 Margo Brewer	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 3 Helen Flavell	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 4 Lynne Roberts	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					

Tong, R., Brewer, M., Flavell, H., & Roberts, L. D. (2021). Facilitating interprofessional identity development in healthcare students through dedicated interprofessional placements. *Journal of Interprofessional Care*, 1-9. https://doi.org/10.1080/13561820.2021.1883564

	Conception and Design	Acquisition of Data and Method	Data Conditioning and Manipulation	Analysis and Statistical Method	Interpretation and Discussion
Co-Author 1 Ruyi Tong	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 2 Margo Brewer	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 3 Helen Flavell	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 4 Lynne Roberts	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					

Tong, R., Roberts, L. D., Brewer, M., & Flavell, H. (2020). Quality of contact counts: The development of interprofessional identity in first year students. *Nurse Education Today, 86*(March), 104328. https://doi.org/10.1016/j.nedt.2019.104328

	Conception and Design	Acquisition of Data and Method	Data Conditioning and Manipulation	Analysis and Statistical Method	Interpretation and Discussion
Co-Author 1 Ruyi Tong	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 2 Lynne Roberts	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 3 Margo Brewer	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 4 Helen Flavell	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					

Appendix F
Attribution Statement for the manuscripts that are currently under review

The work in **Chapter Four** is being developed for a publication entitled "Students' professional and interprofessional identities at the commencement of a faculty-wide interprofessional first-year programme" with co-authors Brewer, M., Flavell, H., & Roberts, L. D. This work is in the later stages of a peer review process with a journal. This paper was revised and resubmitted on 29th April 2021. Harvard referencing style was used in this manuscript as a requirement of the journal.

	Conception and Design	Acquisition of Data and Method	Data Conditioning and Manipulation	Analysis and Statistical Method	Interpretation and Discussion
Co-Author 1 Ruyi Tong	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 2 Lynne Roberts	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 3 Margo Brewer	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 4 Helen Flavell	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					

The work in **Chapter Eight** is being developed for a publication entitled "Exploring interprofessional identity development in healthcare graduates and its impact on practice" with co-authors Brewer, M., Flavell, H., & Roberts, L. D. This work is in the later stages of a peer review process with a journal. This manuscript was revised and resubmitted on 20th August 2021. Vancouver referencing style was used in this paper as a requirement of the journal.

	Conception and Design	Acquisition of Data and Method	Data Conditioning and Manipulation	Analysis and Statistical Method	Interpretation and Discussion
Co-Author 1 Ruyi Tong	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 2 Margo Brewer	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 3 Helen Flavell	√	√	√	√	√
Co-Author 1 Acknowledgement: I acknowledge that these represent my contribution to the above research output, and I have approved the final version. Signed:					
Co-Author 4 Lynne Roberts	√	√	√	√	√
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