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3 **Parents' work patterns and adolescent mental health**
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7 **Abstract**
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10 Previous research demonstrates that working non-standard work schedules undermines the
11 stability of marriage and reduces family cohesiveness. Limited research has investigated the
12 effects of parents working non-standard schedules on children's health and wellbeing and no
13 published Australian studies have addressed this important issue. This paper contributes to
14 bridging this knowledge gap by focusing on adolescents aged 15 to 20 years and by including sole
15 parent families which have been omitted in previous research, using panel data from the
16 Household, Income and Labour Dynamics in Australia Survey. Multilevel linear regression models
17 are estimated to analyse the association between parental work schedules and hours and
18 measures of adolescents' mental health derived from the SF-36 Health Survey. Evidence of
19 negative impacts of parents working non-standard hours upon adolescent wellbeing is found to
20 exist primarily within sole parent families.
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3 **Background**
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5 Several factors have contributed to the advent of around-the-clock economies. Technological
6 change has led to a dramatic growth of the service economy that requires more around-the-clock
7 employees than does manufacturing based industry (Presser, 2003: pp.3-7; Presser, 2004). This
8 economic shift has, in turn, increased consumer demand for continuously available services. As
9 Strazdins and colleagues have observed (Strazdins, Korda, Lim, Broom & D'Souza, 2004, p.
10 1518), globalisation mandates that employers must hire workers to meet increasing service
11 demands as a result of "the global movements of people, goods, and information across time
12 zones and national borders." Another factor is the deregulation of the labour market over the last
13 decade, which itself may be driven by increases in consumer demands for around-the-clock
14 services (Presser, 2003).
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28 In her book, "Working in a 24/7 Economy", Presser (2003) shows that 40 percent of the American
29 labour force works mostly in the evenings, overnight, on rotating or variable shifts, or on weekends.
30 In 1997, 28 percent of dual-earner married couples in the United States had one spouse working
31 late or rotating shifts and 25 percent of dual-earner couples with a child under 5 had a parent
32 working such a schedule. These percentages are higher among low-income couples, families
33 under financial stress and single mothers (Presser, 2004, p. 3).
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42 These labour market trends are also evident in other developed economies. In 13 European Union
43 countries, 9.7 to 22.2 percent of all employees worked evening and night hours (Presser, 2003,
44 pp.46-49). The percentage of total employees who work weekends in Europe ranges from 11.4
45 percent for Belgium to 33.1 percent for Italy, a prevalence higher than that of the United States. In
46 Canada, about one-third of the labour force works non-standard hours on a regular basis
47 (Akyeampong, 1997), and in three quarters of dual-earner couple households with children aged
48 between 2 and 11 years, one or both parents regularly worked non-standard hours (Strazdins et
49 al., 2004).
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3 Existing research in Australia has found that the proportion of employees who worked some of
4 their hours at night or on the weekend in the previous four weeks increased from 56 percent in
5 1993 to 64 percent in 2000; 33 percent of employees regularly work overtime and 13.9 percent
6 worked shift hours in the previous four weeks in 2000 (Australian Bureau of Statistics, 2002a).

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10 Table 1 presents data from the first four waves of the Household, Income and Labour Dynamics in
11 Australia Survey, the data used in this study. Among persons who hold only one job, 25.2 percent
12 of workers regularly work weekends and 14.6 percent regularly work some form of shift-work. In
13 total, 42.7 percent regularly work some form of non-standard hours. The incidence of all forms of
14 non-standard work is higher among part-time workers, of whom more than half work non-standard
15 schedules.
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24 The arrival of a 24/7 economy has changed the organisation of work and the pattern of labour force
25 participation of parents, thus reshaping the interface between work and the family (Strazdins et al.,
26 2004). A number of studies have found evidence of negative impacts of working non-standard
27 hours upon the health of workers themselves, although results are by no means unanimous (Ulker,
28 2006). A substantial body of literature demonstrates that working non-standard work schedules
29 has a negative impact on the stability of marriage and family cohesiveness (Presser 2003: pp.80-
30 109; Presser 2004). This in turn has consequences for children (Strazdins et al., 2004; Strazdins,
31 Clements, Korda, Broom & D'Souza, 2006). Yet, only a limited amount of research has
32 investigated the effects of parents working non-standard schedules on children's health and
33 wellbeing and no published Australian studies have addressed this important issue.
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46 There is some evidence from previous studies that non-standard employment of parents is
47 associated with poor child outcomes in terms of cognitive abilities (Han, 2002), educational
48 outcomes (Heyman, 2000), behavioural problems (Bogen & Joshi, 2001) and self-esteem among
49 girls (Barton, Aldridge & Smith, 1998). Strazdins et al. (2004), the first comprehensive study of the
50 association between parents' non-standard work and children's wellbeing, found that children from
51 parents who worked non-standard times are more likely to have emotional and behavioural
52 problems. This association persisted after adjusting for parental socioeconomic status, parent part-
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3 time versus full-time work, childcare use and regardless of whether it was the mother, father or
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5 both parents who worked non-standard times.
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9 There may also be positive effects of parents working non-standard hours, depending on the family
10 structure and which parent is working non-standard hours. Barnett and Gareis (2007) has shown
11 that in some American dual-earner families fathers whose wives work evenings versus days spend
12 more time with children, know more about children's activities, receive more disclosures from
13 children, and have better parenting skills. Parents' non-standard work may have a positive effect
14 on children because parents earn a higher income to afford better education and recreational
15 activities for children. Arguably, the positive and negative effects of parents working non-standard
16 hours may offset one another, such that there is no significant net impact on children.
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28 Some limitations of previous studies are the exclusion of single parent households, one-earner or
29 non-earner households, and of variables capturing the intensity of work (number of hours worked).
30 Yet, the percentage of parents working non-standard schedules is even higher among low-income
31 couples, families under financial stress and single parent families (Presser, 2004, p. 3). By
32 omitting single parent and one-earner households, previous research may have cropped a key
33 element of the picture of parents' non-standard work patterns and children's wellbeing. A further
34 limitation of previous studies is that they did not separate different types of non-standard
35 schedules. Presser's (2004) longitudinal analysis has shown that it is night (very late hours) and
36 rotating shifts that significantly increase the risk of separation and divorce for couples with children.
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49 Finally, the relationship between parents' non-standard hours of work and adolescent health and
50 well-being has not been examined in previous research. It has been suggested that the impact of
51 parents' non-standard work may depend on the age of the child: young children may be affected
52 more than adolescent children because the former have a greater need for physical care and
53 constant supervision and are thus more dependent on their family (Strazdins et al., 2006).
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3 However, adolescence is a critically important period of human development and adolescents face
4 greater challenges than younger children in terms of their changing identities, social relationships,
5 sexuality, risky behaviours, education and taking on adult work roles. On top of these special
6 needs, adolescents are also in a phase of rapid and far-reaching changes which create a mixture
7 of complex challenges, freedoms, uncertainties and opportunities (Lawrence, 2005), and for many
8 the dissolution of the primary social institution (eg. family). What distinguishes adolescence from
9 childhood and hence makes the former more vulnerable is that adolescents face the transition to
10 adulthood and this transition is fluid and elastic often with ambiguity and uncertainties whereas
11 various developmental stages from infancy and late childhood are well defined and set out for
12 children. In light of these factors, adolescents need the support and resources to make their
13 transitions into adulthood possible and smooth without lasting damage (Lawrence, 2005).

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15 Abundant research supports the view that parents play a very important role in the lives of their
16 adolescent children (Zubrick et al., 1995; Silburn et al, 1996; Sawyer et al., 2000) and the role of
17 family continues to be critical for the healthy development and optimal social functioning of young
18 people. The family provide the context in which basic socialisation takes place but it also gives
19 young people a sense of identity and connection (Pitman, Herbert, Land, & O'Neill, 2003). In
20 Australia the majority of young people aged between 15 and 24 years (61.9 percent) were living at
21 home in 2001 either as dependent students (35.7 percent) or as non dependents (26.2 percent)
22 (Pitman, et al., 2003).

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44 **Why is parents' work important to children's health and wellbeing?**

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46 In addressing this question we appeal to the 'resource framework' developed by Brooks-Gunn,
47 Brown, Duncan and Anderson Moore (1995) which is based upon earlier contributions by
48 economists and sociologists: Becker (1991), Coleman (1988) and Haveman and Wolfe (1994).

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50 The approach emphasizes the role of financial, physical, human and social capital resources that
51 are utilised differentially by families and communities in fostering children's health and well-being.
52 Brooks-Gunn et al., (1995) categorize these resources into five key domains: income, time, human
53 capital, psychological capital and social capital. Access to these resources is strongly correlated
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3 with child behavioural, emotional and cognitive outcomes, and in many cases causal mechanisms
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5 have been proposed (Kendall & Li, 2005).
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8 Time has been identified as a fundamental family resource. Yet only limited research has
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10 examined its impact on child health and wellbeing. The way in which parents organize their labour
11
12 market activities determines the availability of this resource for their marital relationship and their
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14 children. Compensatory and reinforcing interactions between these resource domains ensure a
15
16 complex relationship between resource endowments and developmental health outcomes. Equally,
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18 the quality and not just quantity of resources, particularly of parental time spent with children, may
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20 be important mediating factors (Zubrick, Silburn & Vimpani, 2000). Parents' non-standard work
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22 may negatively impact on family functioning by depleting an important family resource, namely time
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24 together and opportunities for family engagement, both of which are essential for building close
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26 family relationships (Deutsch, 1999: p.177; La Valle et al., 2002); and increase the risk of
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28 separation and divorce for couples with children (Presser 2003).
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33 Strazdins et al. (2006) investigated three mediating factors that might explain the negative
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35 association between parents' non-standard work hours and children's mental health. The study
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37 has shown that non-standard work schedules are associated with poor family functioning, parent
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39 depressive symptoms and ineffective parenting. This in turn increases the risk of children having
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41 emotional and behavioural problems. These mediating factors explained a significant portion but
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43 not all of the association, suggesting that there are other underlying reasons why non-standard
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45 work is detrimental to children's wellbeing. Previous research has not considered the amount of
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47 time that parents spend with children as a likely mechanism, although this factor may be
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49 endogenous within the measure of family functioning as the latter depends on the former.
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54 Because adolescents face greater challenges than younger children for reasons which we have
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56 discussed above, they may be particularly vulnerable to a lack of adequate parental involvement
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58 and supervision. The amount of time parents spend with children is an indicator of parental
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60 involvement and supervision. We argue that this factor underpins the link between parent work
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3 time and adolescent children in both couple and sole parent families. However, the pathway is
4 likely to be stronger in sole parent families because adolescents growing up in single-parent
5 families suffer from cumulative disadvantages and thus are at a higher risk for poor mental health
6 and risk-taking behaviours (Sigle-Rushton, Hobcraft & Kiernan, 2005; Brown, 2006). Based on
7 previous evidence that non-standard work hours are associated with parent depressive symptoms,
8 which in turn increases the risk of young children having emotional and behavioural problems
9 (Strazdins et al., 2006), we further hypothesise that parental mental health mediates the effect of
10 non-standard work on adolescent mental health.
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21 **Present study**

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23 This paper aims to bridge a significant knowledge gap by focusing on adolescents and by including
24 sole parent families. The dependent variable used is a measure of mental health derived from the
25 SF-36 Health Survey, an internationally recognised diagnostic tool for assessing functional health
26 status and wellbeing. The main independent variables include parental employment, work
27 schedules and hours. The analysis adjusts for potential mechanisms such as time parents spend
28 with children and parental mental health (as indicators of family resources) and confounding
29 factors including parents' education, financial circumstances and whether or not it is the father or
30 mother who works non-standard schedules. There are several reasons for why it is important to
31 adjust for these factors. First of all, households from high socioeconomic status (SES) may be able
32 to purchase domestic services so that parents can spend quality time with their children when they
33 are not at work. Secondly, previous research suggests that the impact of non-standard work hours
34 on personal wellbeing depends on reasons why people work such hours and how they view their
35 non-standard work patterns (Gray, Qu, Stanton & Weston, 2004; Wooden & Warren, 2004). While
36 we did not have a direct measure of this factor, parents' SES is used as a proxy because low SES
37 parents often cannot choose when and where they work (Presser, 2004). Third, because low
38 parental SES is associated with both non-standard work and poor child outcomes (Strazdins et al.
39 2006; Presser, 2004, p. 3), it is a potential confounder that must be taken into account.
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3 **Methodology**

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5 Data

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7 The analysis is based on data from four waves of the Household, Income and Labour Dynamics in
8 Australia (HILDA) Survey, Australia's first nationally representative household panel survey. The
9 panel was established through the 'Wave 1' interviews of a randomly selected sample of 7,682
10 households commencing from late August 2001 (see <http://melbourneinstitute.com/hilda/> for
11 details on the survey and sampling frame). HILDA contains rich information on personal
12 characteristics, socio-economic background, family circumstances, current activities and lifestyles
13 along with a wealth of attitudinal data. All members of the household aged 15 or over are surveyed,
14 and thus measures of wellbeing can only be observed from age 15. Our unit of analysis is
15 respondents aged between 15 and 20, of whom there were 1462, 1394, 1379 and 1383
16 respondents in Waves 1-4, respectively. This definition of adolescents is broader than the
17 conventional one in light of evidence that the path to adulthood and independence has been
18 lengthened in contemporary Western countries (Furstenberg et al., 2004; Pitman et al. 2003).
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34 Variables

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36 *Outcome variable* – the HILDA questionnaires include the set of questions that make up the
37 Medical Outcomes Study Short-Form General Health Survey (SF-36), a self-reported multi-
38 dimensional measure of general health status or quality of life. The 36 survey items are used to
39 produce an 8-scale profile of functional health and wellbeing scores as well as psychometrically-
40 based physical and mental health summary measures (Ware 2004; Ware, Snow and Kosinski
41 2000; Medical Outcomes Trust 1991). The SF-36 mental health summary score is derived from a
42 factor analysis of the 8 individual scales. The same approach is taken in deriving the mental health
43 measure used in this paper, except that some physical health scales are given a zero weighting to
44 avoid the seemingly undesirable property that measured mental health increases as a
45 consequence of deterioration in physical health (see Dockery 2006). The mental health score is
46 standardised to have a mean of 50 and standard deviation of 10 across the full sample of
47 respondents.
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5 *Main predictors* - The main predictors include family type, parental hours spent with children,
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7 parental employment status and work schedules. The variable on hours spent with children is
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9 based on the parent's response to a question asking how much time is spent in a typical week
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11 "playing with your children, helping them with personal care, teaching, coaching or actively
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13 supervising them, or getting them to child care, school or other activities". A limitation of this
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15 variable is that where there is more than one child in the household, we cannot say how that time
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17 is distributed between them. Work schedules are differentiated into two categories: standard
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19 (regular day time) and non-standard (regular weekend work, evening and night shifts, rotating
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21 shifts, split shift, other [on call, irregular schedule and other]). The sensitivity of the results to this
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23 definition is tested by varying the type of schedules that are counted as non-standard. A limitation
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25 is that the survey questions relating to work schedules are asked only with respect to an
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27 individual's 'main job'. Families in which one of the parents holds multiple jobs are therefore
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29 excluded from the analysis to avoid classifying parents as working standard schedules when in fact
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31 they work non-standard hours in a second job.
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36 *Confounding and mediating factors* – we adjust for three main potential confounders: parents'
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38 education levels, distribution of employment within the household and parent-assessed 'wealth', all
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40 of which are entered as proxies for SES. The 'wealth' variable is based upon the mother's
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42 response to a question on their family's prosperity given their current needs and responsibilities,
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44 however the fathers' assessment is used where there was no response from the mother. The
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46 amount of time parents spend with children and parental mental health scores are included to
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48 investigate to what extent these factors mediate the impact of non-standard work on adolescent
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50 mental health.
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53 54 55 Analytical strategy 56

57 To identify the impact of parents' working patterns the sample is restricted to youth who at age 15-
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59 20 were dependent or non-dependent children or students in the household and either lived at
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3 home in a family with both biological parents, or lived in a sole parent family with their mother or
4 father. Youth who lived within a two-parent family where one of the parents was not a biological
5 parent are excluded (n=335) because of potentially differential effects of characteristics of natural
6 and non-natural parents. A further 493 cases were excluded because one or other parent held
7 multiple jobs (see above).
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15 The data represent an unbalanced panel in which individual youth may contribute up to four
16 observations. As HILDA is a household based survey, the observations are stratified or 'clustered'
17 at two levels: by individual (over time) and by household. To accommodate the expected within-
18 cluster structure of the error terms, a multilevel linear regression model with random effects is
19 estimated using STATA's 'xtmixed' routine. Fitting such a model requires a hierarchical structuring
20 of the data that does not allow youth to be observed in more than one household. Households are
21 defined in terms of the parents present. Thus, for example, if the parents in a couple household
22 were to separate and the youth was to continue to live with the mother in a sole parent household,
23 that youth would have been observed in two different households. Only observations in a youth's
24 first observed household are retained. This reduces the number of households available in the
25 estimations by 30.
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40 **Results**

41 Descriptive statistics

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44 The exclusions detailed above result in a sample of 3,429 observations across the four years on
45 1,691 youth from 1,197 different 'households'. Table 2 shows that 42.8 percent of these youth
46 lived in a family in which one of their parents worked non-standard hours broadly defined. Around
47 one-quarter lived in sole parent families, and for around two-thirds of those youth the parent was
48 employed. In this sample, the incidence of non-standard work is much the same for employed sole
49 parents as it is for couple families with a single income earner. Youth from two-parent families in
50 which both parents are in work represent 50.5 percent of the sample. As would be expected, the
51 likelihood of any one parent in these families working non-standard hours is higher at 57.3 percent.
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3 Both parents worked non-standard hours in 20 percent of the couple families in which the mother
4 and the father worked.
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9 Working non-standard hours is defined here on the basis of whether any working parent works
10 anything other than a regular day-time schedule. Adolescents in sole parent families have lower
11 average mental health scores than those living with both parents (Table 3). This disadvantage is
12 particularly acute where the sole parent does not work, but it is important to note that youth who
13 live with both parents but where neither of those parents are in work have equally inferior mental
14 health. There is only weak evidence of inferior outcomes where parents work non-standard hours.
15 Mental health is highest for youth from a two parent family in which one parent is employed. For
16 youth living in families with a working parent or working parents, average mental health is always
17 marginally lower if that work involves non-standard hours. The difference is statistically significant
18 only for youth from sole parent families.
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32 Table 4 presents bivariate associations between non-standard work schedules and the variables
33 proposed as mediators, namely parental mental health and time spent with children. Parents who
34 work in jobs with non-standard hours have lower mental health than their working counterparts with
35 regular day-time schedules, consistent with our *a priori* expectations. While working fathers with
36 non-standard schedules do report spending less time with their children: an average of 4.4 hours
37 as opposed to 4.8 hours per week, the difference is only weakly significant. Working mothers
38 however, spend significantly more time with their children if they have non-standard hours. For two
39 parent families in which at least one partner works, there is no difference in the total time parents
40 spend with their children between families with and without non-standard hours. Sole parents with
41 non-standard hours also spend longer, on average, with their children, although the reverse is true
42 for male sole parents. Neither of the differences for sole parents is statistically significant. These
43 results are likely to reflect that for many women who work non-standard hours their jobs are also
44 part-time, enabling greater time spent with children.
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3 Multivariate analysis
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5 The full results for the multi-level regression models and accompanying diagnostic statistics are
6 reported in Appendix Tables A1 to A3 available through the *Social Science & Medicine* website.
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8 For brevity, only the coefficients and associated significance levels on the main variables of
9 interest are reported here. In all cases the overall models are significant and the likelihood ratio
10 tests confirm the mixed-level model is the preferred specification over a simple linear regression of
11 the pooled data. Initially, models of youths' mental health scores are estimated across all family
12 types. Among the results on the control variables, mental health appears to be highest at age 15,
13 falling to a nadir at age 17; young males have markedly higher mental health and having a long-
14 term disability reduces mental health. The level of prosperity of the family does not appear to have
15 a significant independent effect on young people's mental health (Appendix Table A1).
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18 Family structure and parental employment are captured by a series of mutually exclusive dummy
19 variables, where the default category is a two parent family in which both parents are employed.
20 For youth living at home, these results confirm that the 'traditional' two parent family has the most
21 beneficial effect provided at least one parent is working. A dummy variable indicating whether or
22 not any parent works non-standard hours is included. Starting with Model 5.1, the effect of working
23 non-standard hours is negative and significant at the 5 percent level. The mental health summary
24 score has a standard deviation of around 9, so the estimated coefficient of -0.79 is modest; it
25 equates to around one-quarter of the effect of having a disability or one-half of the effect of having
26 both parents out of work as opposed to both employed.
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29 The following two sections develop models separately for youth from sole parent families and
30 those who live with both parents. The reasons for doing so are two-fold. First, there is a range of
31 other variables relating to the parents that one would like to include to capture potential
32 confounding or mediating factors, and this is problematic with both couple and sole parent families
33 in the sample. Second, variables may have differential effects by family type. A potential
34 mediating variable which can be included for the full sample is total parental hours per week spent
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3 with children (Model 5.2). We also include a squared term on the assumption that adolescent
4 wellbeing would increase with hours of parental time but at a declining rate. The coefficients are
5 small and insignificant, and there is little change to the coefficient on non-standard work. Dividing
6 the reported time by the number of resident children does not alter the results in any substantive
7 way (this applies for all relevant models reported). Consistent with such mediators having
8 differential effects by family type, the deleterious effect of living in a sole parent family increases
9 once parental time with children is controlled for. Recall that sole parents who work non-standard
10 hours actually spend more time, on average, with their children (Table 4).
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21 *Youth in sole parent families*

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23 In models estimated for sole parent families a number of additional control or mediating variables
24 relating to the parent are added. These include gender, parent's own mental health score and their
25 level of education. The dummy variables for the survey wave were insignificant in these models
26 and hence omitted (see Appendix Table A2). Model 6.1 presents the results for an initial model
27 which excludes any mediating variables. After the relevant exclusions there are 724 observations
28 available for estimation. The sole parent is the mother in 84 percent of cases.
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38 The estimated coefficient of -1.90 for non-standard work is significant at the 5 percent level and
39 suggests a much larger effect for youth living in sole parent families than was the case for the full
40 sample. In Model 6.2 the parent's mental health score and number of hours each week spent with
41 their children are added as potential mediating variables. The coefficient on the parent's mental
42 health score is positive as anticipated, though the effect is small. No relationship between the time
43 the parent spends with their children and adolescent mental health is identified. The estimated
44 effect of working non-standard hours is essentially unchanged, providing no evidence that time
45 spent with children is a mechanism through which the effect of non-standard hours impacts upon
46 youth.
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3 As an alternative specification for measuring non-standard work the 'non-standard hours' dummy
4 was interacted with usual weekly hours worked. Data are not available on the actual number of
5 non-standard hours worked, however the interaction term will serve to give a greater weighting to
6 parents in full-time jobs or long-hours jobs which involve working non-standard hours as opposed
7 to those who have non-standard hours but work only a small number of hours each week. The full
8 results are not reported, however, when this interaction term is used in place of the non-standard
9 hours dummy in Model 6.1, the coefficient is -0.05 ($p=0.03$). The estimates are again insensitive to
10 the inclusion of the intended mediating variables.
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20 *Youth in two-parent families*

21 Little evidence of an impact of parents working non-standard hours upon youth from two-parent
22 families is identified despite a range of specifications being tested, including:
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- 25 • Separate dummy variables indicating whether the mother ($\beta=-0.44$, $p=0.34$) and the father
26 ($\beta=-0.26$, $p=0.53$) worked non-standard hours
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- 29 • A variable indicating whether the primary wage earner worked non-standard hours, with the
30 primary wage earner determined on the basis of who works the most hours ($\beta=-0.09$,
31 $p=0.82$). Note that this will exclude from the definition of working non-standard hours those
32 families in which one parent works standard hours in a full-time job, while the other works a
33 small number of non-standard hours in a part-time job
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- 36 • A dummy variable taking on a value of one only if both parents worked non-standard hours
37 ($\beta=-0.04$, $p=0.95$)
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- 40 • Including the actual number of hours worked in jobs that are non-standard separately for
41 mother ($\beta=-0.02$, $p=0.20$) and father ($\beta=0.00$, $p=0.94$); and in total ($\beta=-0.01$, $p=0.38$).
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51 The most robust evidence of any impact of parents working non-standard hours was found by
52 using a dummy variable taking on a value of one if either parent worked non-standard hours.
53 Estimated models using this specification are presented in Table 7, first including this dummy
54 (Model 7.1) and then with the addition of potential mediators. The estimated effect of non-standard
55 work is of some magnitude (-0.61), although not statistically significant at the 10 percent level. It is
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3 only when the parents' own mental health scores are also included that the estimated impact of
4 working non-standard hours becomes significant (see Model 7.2). If hours spent with children by
5 each parent are also included (not reported), neither variable is significant and the estimate on
6 non-standard hours again becomes insignificant and decreases in magnitude.
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12 The set of explanatory variables can also now be expanded to include separate variables for the
13 mother's and the father's education levels, however, these show no clear association with
14 adolescent mental health (see Appendix Table A3). The family's self-assessed level of prosperity
15 was also found to be insignificant.
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22 23 *Sensitivity analysis*

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25 The results above are based on a very broad definition of non-standard work which includes any
26 work schedule other than a regular daytime schedule and/or where the worker 'usually' works on
27 Saturday or Sunday. As noted, Presser's (2004) longitudinal analysis suggested that it is late
28 hours and rotating shifts that have the greatest impact on family cohesion. Table 8 reveals the
29 sensitivity of our results to alternative specifications. The first column reproduces results from
30 Models 5.1, 6.1 and 7.1, which are based on the broad interpretation of non-standard hours. The
31 remaining columns report the coefficients and associated significance levels when this variable is
32 replaced with more restrictive specifications of the non-standard hours variable.
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44 It can be seen that the conclusions would have been essentially unchanged had day-time weekend
45 work been excluded from the definition. This is also the case had non-standard hours been
46 restricted only to shift work (encompassing regular evening shifts, regular night shifts, or shifts that
47 rotate between daytime and night or evening shifts). As a result of the small number of cases, and
48 possibly greater variability of the effects, the estimates are markedly less precise when the
49 definition is restricted to night shifts.
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3 **Discussion and Conclusion**
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5 Our study has demonstrated that in two parent families, the impact of a parent working shift work
6 or non-standard hours more generally defined on the mental health of their adolescent children is,
7 at most, very minor. This finding persisted across a variety of models that were tested to measure
8 the presence and extent of non-standard work between parents. However, these results differ
9 substantially from those for adolescents living in sole parent families. First, it is clear that these
10 adolescents had lower mental health than their peers living in two parent families in which one or
11 both of the parents were employed. Second, adolescents in sole parent families were observed to
12 have better mental health if their parent was in work rather than not working. As the models
13 adjusted for families' financial circumstances, this positive impact of the sole parent being in work
14 is additional to any benefit that accrues through higher earned income. However, adolescents in
15 sole parent families whose parent worked non-standard hours displayed mental health inferior to
16 their peers whose parent worked standard hours.
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32 Previous findings reported by Strazdins et al. (2004) show that Canadian children aged 2-11 living
33 in two parent families where parents worked non-standard times are more likely to have emotional
34 and behavioural problems, regardless of parental socioeconomic status and other psychosocial
35 factors. In contrast, our thorough analysis based on a representative Australian sample finds very
36 limited evidence that parents' non-standard work has a negative effect on the mental health of
37 adolescents who live in two parent families. We suggest three plausible explanations. Firstly, the
38 outcome measures used in the two studies are not directly comparable. Using the Canadian
39 National Longitudinal Survey of Children and Youth (NLSCY), Strazdins et al. (2004) were able to
40 identify mental health problems in a number of discrete domains, such as anxiety, depression,
41 hyperactivity and inattention. The SF-36 mental health summary score employed in our study, on
42 the other hand, is a generic measure. To our knowledge no previous study has compared results
43 using both measures. Furthermore, the NLSCY mental health measure was parent reported
44 whereas the current measure was self-reported. There is likely to be some degree of under or
45 over-reporting associated with the different informants.
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5 Secondly, Strazdins et al. (2004) studied the impact of non-standard work hours on children 2-11
6 years of age, whereas we focused on adolescents and youth aged from 15 to 20 years. Within two-
7 parent families, it is likely that the impact of parental work arrangements diminish as children enter
8 adolescence and become more independent of their parents in terms of physical care. That is not
9 to say that parental emotional support is not equally important for adolescents and previous
10 research suggests quite the opposite (Pocock & Clarke, 2004). It may be that in two parent families
11 at least one parent is available to attend to their adolescent children during non-standard hours
12 when the other parent works. It is also likely that the time parents spend with their adolescent
13 children is qualitatively different to the time spent with young children.
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26 Thirdly, the social support systems that help working parents balance work and family, and hence
27 attenuate the detrimental effect of non-standard work on children, may be stronger in Australia
28 than in Canada. For example, a greater number of Australian children might have access to
29 extended family members, such as a grandmother, or family friends within geographical proximity.
30 Australian schools might have more effective pastoral care programs. Future research that is
31 based on longitudinal data for children and adolescents within the same country and that employs
32 similar measures of specific mental health problems will shed more light on these issues.
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43 Turning to the second major finding of the study: why is it that a parent working non-standard hours
44 has a negative impact upon the mental health of their adolescent children in sole parent families
45 but not in two-parent families? The most obvious explanation is that within a sole parent family
46 non-standard work hours more directly conflict with parental time devoted to the children. A two-
47 parent family offers greater flexibility to combine work and family priorities. In fact, within a two
48 parent family, the availability of work during non-standard hours may enable an increase in the
49 time in which at least one parent is available to spend time with the children as found in previous
50 research (Barnett and Gareis 2007), compared to the situation where both parents work standard
51 schedules.
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5 However, our data suggests that working non-standard hours is associated with reduced hours
6 spent with children only in the case of working fathers. Working mothers in sole parent families in
7 fact spend more time with their children if they work non-standard hours. Furthermore, hours
8 parents spend with children are not associated with adolescent mental health. Therefore, the
9 negative effect of non-standard work hours in sole parent households was not diminished by the
10 inclusion of the number of hours which the parent spent with adolescent children. We have
11 hypothesised that poor parental health associated with non-standard work might also be a
12 mechanism. However, our results do not support this hypothesis. Our finding has a theoretical
13 implication for the resource model that identifies parental time devoted to children as an important
14 resource influencing the outcomes of children's health and wellbeing. Perhaps, it is not so much
15 time *per se* but rather the quality of time spent with children and parenting style that matter. Future
16 research is needed to examine if the quality of parental time devoted to adolescents mediates the
17 link between non-standard work hours and child mental health. Effective parenting has been found
18 to mediate some of the negative effect of parents working non-standard hours on young children's
19 mental health (Strazdins, et al., 2006). It remains to be seen if this holds true for adolescents.
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38 This study has raised a number of important questions that can only be answered through further
39 empirical work. Importantly, our findings appear to reject the two the most obvious hypotheses that
40 the link between parents working non-standard hours and the wellbeing of youth is mediated
41 through reduced hours of parenting time and the parents' own mental health which have been
42 identified as two critical family resources for child health and development.
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51 The implication of our findings for social policy is that non-standard working hours should not be
52 seen as negative *per se*, especially in two parent families. To the extent that non-standard hours
53 may be a mechanism for meeting the needs of some families, such flexibility is clearly desirable.
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55 The challenge for employment practices and employment legislation is to enable such flexibility in
56 work schedules for those who desire it without also increasing the incidence of employer-imposed
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3 non-standard hours that detract from family functioning. The challenge for future research is to
4 more adequately distinguish between 'voluntary' and 'imposed' non-standard work, or between the
5 family circumstances in which non-standard work is conducive to rather than detrimental to
6 wellbeing. One limitation of our study is that due to the limited longitudinal dimension of the data
7 we were unable to investigate whether parents' non-standard work hours in earlier childhood might
8 have accumulating impacts on adolescents. Therefore, another priority for future research is to
9 make greater allowance for the permanency of non-standard work schedules and the time horizon
10 during which effects may be realised. Here we have focussed upon contemporaneous impacts
11 and variables. A potential avenue for further investigating mediating linkages is to separately
12 analyse the impact of parents' non-standard work on specific dimensions of the SF-36 mental
13 health summary score.
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27 **References**

- 28 Akyeampong, E. A. (1997). Working arrangements: 1995 overview. *Perspectives on Labor and*
29 *Income*, Spring, 48-52.
30
31
32
33 Australian Bureau of Statistics (2007), *Schools Australia 2007*. Catalogue 4221.0, Canberra: ABS.
34
35 Australian Bureau of Statistics (2002a), *Australian Social Trends 2002*. Catalogue 4102.0,
36
37 Canberra: ABS.
38
39 Australian Bureau of Statistics (1997), *1995 National Health Survey: SF-36 population norms*
40 *Australia*. ABS Catalogue No. 4399.0, Canberra: ABS.
41
42
43 Barnett, R.C. & Gareis, K.C. (2007). Shift work, parenting behaviours, and children's
44 socioemotional well-being: A within family study. *Journal of Family Issues*, 28, 727-748.
45
46
47 Barton, J., Aldridge, J. & Smith, P. (1998). "The emotional impact of shift work on the children of
48 shift workers". *Scandinavian Journal of Work, Environment and Health*, 24 Suppl(3), 146-
49
50 150.
51
52
53
54 Becker, G. (1991). *A treatise on the family*. Cambridge, MA: Harvard University Press.
55
56 Bogen, K. & Joshi, P. (2001). Bad work or good move: the relationship of part-time and non-
57
58 standard work schedules to parenting and child behaviour in working poor families. *Paper*
59
60
61
62
63
64
65

1
2
3 presented to the Conference on Working Poor Families: Coping as Parents and Workers,
4
5 National Institutes of Health. Bethesda, MD. Nov 13 -14.

6
7 Brooks-Gunn, J., Brown, B., Duncan, G. J. & Anderson Moore, K. (1995). *Child development in the*
8
9 *context of family and community resources: an agenda for national data collections.*
10
11 Washington, DC: The National Academy of Sciences.

12
13 Brown S. (2006). Family Structure transitions and adolescent well-being. *Demography*, 43, 447-
14
15 461.

16
17 Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of*
18
19 *Sociology*. 94(Supplement), S95-S120.

20
21 Deutsch, F. (1999). *Halving it all: how equally shared parenting works*. Cambridge, Massachusetts:
22
23 Harvard University Press.

24
25 Dockery, A. M. (2006). Mental health and labour force status: panel estimates with four waves of
26
27 HILDA, CLMR Discussion Paper 06/01, Perth: Centre for Labour Market Research.

28
29 Furstenberg Jr.F, Kennedy, S, McLoyd VC, Rumbaut RG, Settersten Jr. RA. (2004). Growing up is
30
31 harder to do. *Contexts*, 3(3), 1-6.

32
33 Gray, M, Qu, L, Stanton, D, Weston, R. (2004). Long work hours and the wellbeing of fathers and
34
35 their families. *Australian journal of Labour Economics*, 7(2), 255-273.

36
37 Han, W.J. (2002). Nonstandard work schedules and child cognitive outcomes. *Paper presented for*
38
39 *the Family and Work Policies Committee of the National Research Council/Institute of*
40
41 *Medicine's Board on Children, Youth and Families.*

42
43 Haveman, R. & Wolfe, B. (1994). *Succeeding generations: On the effects of investments in*
44
45 *children*. New York: Russell Sage Foundation.

46
47 Heyman, J. (2000). *The widening gap: Why America's working families are in jeopardy and what*
48
49 *we can do about it*. New York: Basic Books

50
51 Kendall, G. E. & Li, J. (2005). Early childhood socialization and social gradients in adult health: A
52
53 commentary on Singh-Manoux and Marmot's "Role of socialization in explaining social
54
55 inequality in health". *Social Science & Medicine*, 61(11), 2272-2276.

- 1
2
3 La Valle, I., Arthur, S., Millward, C., Scott, J. & Clayden, M. Happy families? Atypical work and its
4
5 influence on family life. Bristol, UK: The Policy Press.
6
7 Lawrence, Jeannette. (2005). Young people in transition: challenges and opportunities for
8
9 contemporary Australian youth. In *No time to lose: The wellbeing of Australia's children*,
10
11 edited by Sue Richardson and Margot Prior, Melbourne: Melbourne University Press.
12
13 Medical Outcomes Trust (1991). *Medical Outcomes Trust: Improving medical outcomes from the*
14
15 *patient's point of view*. Boston, MA: Medical Outcomes Trust.
16
17 Pocock, B. & Clarke, J. (2003). Can't buy me love: Young Australians' view on parental work, time,
18
19 guilt and their own assumption. Discussion Paper Number 61, The Australian Institute.
20
21 Pitman, S., Herbert, T., Land, C. & O'Neill, C. (2003). Profile of Young Australians: Facts, Figures
22
23 & Issues. Melbourne: The Foundation of Young Australians, 2003.
24
25 Presser, H. B. (2004). "The economy that never sleeps", *Contexts*, 3(2), 1-5.
26
27 Presser, H. B. (2003). *Working in a 24/7 Economy: Challenges for American Families*. New York:
28
29 Russ Sage Foundation.
30
31 Sawyer, M. G., Kosky, R. J., Graetz, B. W., Arney, F., Zubrick, S. R. & Baghurst, P. (2000). The
32
33 National Survey of Mental Health and Wellbeing: the child and adolescent component.
34
35 *Australian & New Zealand Journal of Psychiatry*, 34(2), 214-220.
36
37 Sigle-Rushton, W., Hobcraft J. & Kiernan K. (2005). Parental divorce and subsequent
38
39 disadvantage. *Demography*, 42, 427-446.
40
41 Silburn, S. R., Zubrick, S. R., Garton, A., Gurrin, L., Burton, P., Dalby, R., Carlton, J., Shepherd, C.
42
43 & Lawrence, D. (1996). *Western Australian Child Health Survey: family and community*
44
45 *health*. Perth, Western Australia: Australian Bureau of Statistics and the TVW Telethon
46
47 Institute for Child Health Research.
48
49 Strazdins, L., Korda, R.J. Lim, L L-Y, Broom, DH, D'Souza R M. (2004). Around-the-clock: parent
50
51 work schedules and children's well-being in a 24-h economy, *Social Science & Medicine*,
52
53 59, 1517-1527.
54
55
56
57
58
59
60
61
62
63
64
65

- 1
2
3 Strazdins, L., Clements, MS, Korda, RJ., Broom, DH, D'Souza RM. (2006). Unsocialised Work?
4
5 Nonstandard work schedules, family relationships, and children's wellbeing. *Journal of*
6
7 *Marriage and Family*, 68, 394-410,
8
9 Ulker, A. (2006). Do non-standard hours cause negative health effects? Some evidence from panel
10
11 data. Centre for Economic Policy Research Discussion Paper No. 518, Australian National
12
13 University.
14
15 Ware, J. E. (2004). *SF-36 Health Survey Update*, the SF Community website, www.sf-36.org.
16
17 Ware, J. E., Snow, K. K. & Kosinski, M. (2000). *SF-36 Health Survey: Manual and interpretation*
18
19 *guide*. Lincoln, Rhode Island: Quality Metric Incorporated.
20
21 Wooden, M. & Warren, D. (2004). Non-Standard employment and job satisfaction: evidence from
22
23 the HILDA Survey, *The Journal of Industrial Relations*, 46(3), 275-297.
24
25 Zubrick, S. R., Silburn, S. R., Garton, A., Burton, P., Dalby, R., Carlton, J., Shepherd, C. &
26
27 Lawrence, D. (1995). *Western Australian Child Health Survey: developing health and well-*
28
29 *being in the nineties*. Perth, Western Australia: Australian Bureau of Statistics and the
30
31 Institute for Child Health Research.
32
33 Zubrick, S. R., Silburn, S. R. & Vimpani, G. (2000). Indicators of Social and Family Functioning.
34
35 Canberra: Commonwealth of Australia, Department of Family and Community Services.
36
37
38
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40
41
42
43
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Table 1
Incidence of non-standard work, employed persons 2001-2004

	Night shift	Other shift ^a	Weekends	Any non-standard schedule ^b	Obs
Employed full-time	1.3%	10.3%	24.3%	37.8%	20647
Employed part-time	3.3%	18.5%	27.5%	54.0%	8825
All employed	1.9%	12.7%	25.2%	42.7%	29472

Notes: Persons with multiple jobs excluded. a. includes regular evening shifts and rotating day time and night or evening shifts; b. includes previous columns plus split shifts, being on call, 'irregular schedule' and workers who selected 'other' rather than 'regular daytime schedule'.

Table 2
Number of youth by family type and incidence of parents working non-standard hours; 15-20 year olds, 2001-2004

		Number of youth	Percentage of youth	Parent works non-standard hours (%)
<i>Two parent family</i>	Both working	1731	50.5	57.3
	One working	609	17.8	40.9
	None working	187	5.5	n.a.
	All	2527	73.7	49.1
<i>Sole parent family</i>	One working	575	16.8	39.1
	Not working	327	9.5	n.a.
	All	902	26.3	24.9
<i>Total</i>		3429	100.0	42.8

Table 3
Mental health summary score for 15-20 year olds: means by family type and parental employment and working arrangements

	By family type and employment		Any parent working non-standard hours?		t-test ^c
	Mean	t-test ^a	No (mean)	Yes (mean)	
Two parent family	51.7				
Sole parent family	50.3	***			
Two parent family -		t-test ^b			
Both working	51.8		52.0	51.7	
One works	52.0		52.0	51.9	
None works	49.7	***	—	—	
Sole parent family -					
One works	50.7	***	51.2	49.8	*
None works	49.8	***	—	—	

Notes: ***, ** and * denote that the mean is significantly different to that for the comparison category of youth at $p \leq 0.01$, 0.05 and 0.1 levels, respectively. The comparison categories for the t-tests are a. two parent families; b. two parent families in which both work; and c. standard hours v. non-standard hours in the same family category.

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3 **Table 4**
4 **Parents' mental health scores and time spent with children, means by standard and non-standard**
5 **work schedules**

	Standard hours	Non-standard hours	t-test
Parents' mental health score			
Working fathers	52.7	51.6	***
Working mothers	51.9	50.2	***
Time Spent with Children			
Working fathers	4.8	4.4	*
Working mothers	7.5	9.2	***
Couple families (at least one in work)			
- total time	14.0	13.9	
Working sole parents	6.8	7.7	

19 Notes: ***, ** and * denote that the means in the table row are significantly different at the $p \leq 0.01$, 0.05 and 0.1 levels,
20 respectively.

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23 **Table 5**
24 **Youth's mental health summary score – multilevel regression results: All families.**

Variable	Model 5.1		Model 5.2	
	Estimate	Pr > t	Estimate	Pr > t
Parental employment:				
Couple, both working	—		—	
Couple, one works	-0.01	0.99	0.00	0.99
Couple, neither works	-1.59	0.08	-1.52	0.12
Sole parent working	-1.59	0.01	-1.79	0.00
Sole parent not working	-2.05	0.01	-2.30	0.00
Parent has non-std hours	-0.79	0.03	-0.75	0.04
Parental time spent with children (hrs/week) ^a			-0.03	0.33
Hours with children squared ^a			0.00	0.30
Observations	2853		2643	
Individuals	1522		1456	

40 Notes: a. Hours spent with children are calculated as the sum of hours reported by the mother and the father for couple
41 families.

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3 **Table 6**
4 **Youth's mental health summary score – multilevel regression results: Sole parent families**

Variable	Model 6.1		Model 6.2	
	Estimate	Pr > t	Estimate	Pr > t
Parent is the father	-1.20	0.28	-1.36	0.25
Parent is not working	-0.92	0.32	-0.65	0.52
Parent has non-std hours	-1.90	0.03	-1.89	0.04
Parent's mental health score			0.06	0.08
Parental time spent with children (hrs/week)			-0.01	0.79
Hours with children squared			0.00	0.90
Observations	724		671	
Individuals	402		379	

18 **Table 7**
19 **Youth's mental health summary score – multilevel regression results: Two parent families**

Variable	Model 7.1		Model 7.2	
	Estimate	Pr > t	Estimate	Pr > t
Parental employment:				
Couple, both working				
Couple, one works	0.03	0.95	0.29	0.56
Couple, neither works	-1.70	0.07	-0.86	0.38
Parent has non-std hours	-0.61	0.13	-0.73	0.07
Mother's mental health score			0.10	0.00
Father's mental health score			0.06	0.01
Observations	2131		1970	
Individuals	1122		1068	

33 **Table 8**
34 **Estimated effect of parent working non-standard hours on youths' mental health scores: sensitivity**
35 **of estimates to definition of 'non-standard hours'**

	Works non-standard hours or on weekends ^a	Works non-standard hours ^b	Works shift work ^c	Works night shifts only
All families				
Estimated coefficient	-0.79	-0.66	-0.68	0.07
Pr > t	0.03	0.08	0.20	0.95
Sole parent families				
Estimated coefficient	-1.90	-2.00	-1.76	-1.66
Pr > t	0.03	0.03	0.15	0.58
Two parent families				
Estimated coefficient	-0.61	-0.42	-0.54	0.43
Pr > t	0.13	0.30	0.37	0.72

49 Notes: a. includes anything other than a 'regular daytime schedule' plus usually working regular daytime hours on
50 weekends; b. includes anything other than a 'regular daytime schedule'; c. includes night shifts, evening shifts or rotating
51 shifts between daytime, night and evening shifts.

Appendix Table A1

Youth's mental health summary score – multilevel regression results: All families.

Variable	Model 5.1		Model 5.2	
	Estimate	Pr > t	Estimate	Pr > t
Intercept	51.53	0.00	51.86	0.00
Wave 1 (2001)	—		—	
Wave 2 (2002)	0.69	0.05	0.71	0.05
Wave 3 (2003)	0.92	0.01	0.88	0.02
Wave 4 (2004)	0.81	0.04	0.83	0.04
Male	3.29	0.00	3.32	0.00
Aged 15	—		—	
Aged 16	-0.81	0.03	-0.94	0.02
Aged 17	-1.99	0.00	-2.10	0.00
Aged 18	-1.47	0.00	-1.56	0.00
Aged 19	-1.22	0.02	-1.49	0.01
Aged 20	-1.12	0.05	-1.27	0.04
Aboriginal or TSI	1.30	0.26	1.70	0.15
English is 1 st language	—		—	
English not 1 st language and:				
English good	-0.51	0.44	-0.88	0.20
English poor	-4.26	0.35	-4.31	0.34
Has long-term disability	-3.38	0.00	-3.54	0.00
Financial situation ^a				
Prosperous/well off	-0.32	0.48	-0.35	0.47
Comfortable	—		—	
Just getting by	-0.61	0.10	-0.44	0.26
Poor or very poor	-0.54	0.52	-0.62	0.47
Parental employment:				
Couple, both working	—		—	
Couple, one works	-0.01	0.99	0.00	0.99
Couple, neither works	-1.59	0.08	-1.52	0.12
Sole parent working	-1.59	0.01	-1.79	0.00
Sole parent not working	-2.05	0.01	-2.30	0.00
Parent has non-std hours	-0.79	0.03	-0.75	0.04
Parental time spent with children (hrs/week) ^b			-0.03	0.33
Hours with children squared ^b			0.00	0.30
Wald Chi -sq	174	0.00	175	0.00
LR Test v. linear regression (Chi-sq)	429	0.00	371	0.00
Observations	2853		2643	
Households	1075		1032	
Average obs per household	2.7		2.6	
Individuals	1522		1456	
Average obs per individual	1.9		1.8	

Notes: a. based on mother's response when available, father's response otherwise; b. Hours spent with children are calculated as the sum of hours reported by the mother and the father for couple families.

Appendix Table A2

Youth's mental health summary score – multilevel regression results: Sole parent families

Variable	Model 6.1		Model 6.2	
	Estimate	Pr > t	Estimate	Pr > t
Intercept	50.70	0.00	48.42	0.00
Male	5.34	0.00	5.18	0.00
Aged 15	—		—	
Aged 16	-1.85	0.02	-2.00	0.02
Aged 17	-2.07	0.01	-2.49	0.00
Aged 18	-1.60	0.09	-2.06	0.04
Aged 19	-1.25	0.23	-1.72	0.13
Aged 20	-0.82	0.47	-0.85	0.48
Aboriginal or TSI	2.36	0.14	3.46	0.04
English is 1 st language	—		—	
English not 1 st language and:				
English good	0.12	0.92	0.08	0.95
English poor	-5.53	0.31	-4.61	0.40
Has long-term disability	-6.21	0.00	-6.73	0.00
Financial situation:				
Prosperous/well off	-0.28	0.84	-0.83	0.55
Comfortable	—		—	
Just getting by	-1.26	0.10	-1.46	0.07
Poor or very poor	-0.27	0.84	-0.31	0.82
Parent's highest qualification				
University degree or higher	0.74	0.52	0.80	0.51
Trade certificate/diploma	-0.07	0.95	0.21	0.86
Completed high school/certificate	-0.04	0.97	-0.27	0.83
Did not complete high school	—		—	
Parent is the father	-1.20	0.28	-1.36	0.25
Parent is not working	-0.92	0.32	-0.65	0.52
Parent has non-std hours	-1.90	0.03	-1.89	0.04
Parent's mental health score			0.06	0.08
Parental time spent with children (hrs/week)			-0.01	0.79
Hours with children squared			0.00	0.90
Wald Chi -sq	109	0.00	113	0.00
LR Test v. linear regression (Chi-sq)	89	0.00	79	0.00
Observations	724		671	
Households	315		297	
Average obs per household	2.3		2.3	
Individuals	402		379	
Average obs per individual	1.8		1.8	

Appendix Table A3
 Youth's mental health summary score – multilevel regression results: Two parent families

Variable	Model 7.1		Model 7.2	
	Estimate	Pr > t	Estimate	Pr > t
Intercept	51.75	0.00	43.15	0.00
Wave 1 (2001)	—		—	
Wave 2 (2002)	2.66	0.00	2.78	0.00
Wave 3 (2003)	1.16	0.00	1.22	0.00
Wave 4 (2004)	0.99	0.02	0.90	0.04
Male	1.06	0.02	1.12	0.01
Aged 15	—		—	
Aged 16	-0.44	0.30	-0.58	0.19
Aged 17	-1.98	0.00	-1.85	0.00
Aged 18	-1.36	0.01	-1.29	0.02
Aged 19	-1.22	0.04	-1.25	0.04
Aged 20	-1.03	0.12	-0.87	0.21
Aboriginal or TSI	0.11	0.95	-0.24	0.89
English is 1 st language	—		—	
English not 1 st language and:				
English good	-0.59	0.46	-0.90	0.28
English poor	-0.87	0.92	-1.95	0.81
Has long-term disability	-2.32	0.00	-2.37	0.00
Financial situation ^a				
Prosperous/well off	-0.19	0.70	-0.36	0.47
Comfortable	—		—	
Just getting by	-0.38	0.39	0.31	0.49
Poor or very poor	-1.25	0.29	-0.42	0.73
Mother's highest qualification				
University degree or higher	-0.29	0.68	-0.37	0.60
Trade certificate/diploma	0.86	0.18	0.76	0.23
Completed high school/certificate	0.15	0.83	0.15	0.83
Did not complete high school	—		—	
Father's highest qualification				
University degree or higher	-1.13	0.12	-1.13	0.12
Trade certificate/diploma	-0.43	0.48	-0.74	0.22
Completed high school/certificate	-1.16	0.20	-1.29	0.15
Did not complete high school	—		—	
Parental employment:				
Couple, both working				
Couple, one works	0.03	0.95	0.29	0.56
Couple, neither works	-1.70	0.07	-0.86	0.38
Parent has non-std hours	-0.61	0.13	-0.73	0.07
Mother's mental health score			0.10	0.00
Father's mental health score			0.06	0.01
Wald Chi -sq	97	0.00	130	0.00
LR Test v. linear regression (Chi-sq)	341	0.00	290	0.00
Observations	2131		1970	
Households	760		728	
Average obs per household	2.8		2.7	
Individuals	1122		1068	
Average obs per individual	1.9		1.8	

Notes: a. based on mother's response when available, father's response otherwise.

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Dr Stephen Birch
Senior Editor – Health Economics
Social Science & Medicine

Dear Dr Birch,

Thank you for the further feedback on our paper ‘Parents’ work patterns and adolescent mental health’. The outstanding issue was the length of the paper. In the revised submission, the main manuscript contains the text and tables, and has a word count of 7,949 words.

We hope to follow your suggestion of reconfiguring the tables and presenting tables of the full modelling results as appendices on the Journal’s website. These tables are contained in the ‘tables’ document now submitted on-line. Some minor editing may be required to reflect the Journal’s preferences for how these appendices should be referred to within the main article.

Please let me know if anything further is required.

Yours sincerely

Dr Mike Dockery
Corresponding Author