

Effects of Achievement Goals on Perceptions of Competence in Conditions of Unfavourable
Social Comparisons: The Mastery Goal Advantage Effect

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Abstract

Background. Previous prospective studies have documented that mastery-approach goals are adaptive because they facilitate less negative psychological responses to unfavourable social comparisons than performance-approach goals.

Aims. This study aimed to confirm this so-called “mastery goal advantage” effect experimentally.

Methods. A 2x3 design was adopted where achievement goals (mastery vs. performance) and normative information (favourable vs. no-normative information vs. unfavourable) were manipulated as between participant factors.

Sample. Participants were 201 undergraduates, 57 males and 144 females, ranging in age from 17 to 55 years ($M_{\text{age}} = 22.53$, $SD = 6.51$).

Results. Regression analyses pointed out that experimentally-induced mastery-approach goals facilitated higher levels of competence and happiness with task performance than experimentally-induced performance-approach goals in conditions of unfavourable social comparisons. In contrast, although performance-approach goals yielded the highest levels of happiness with task performance in conditions of favourable social comparisons, this positive effect of performance-approach goals did not extend to perceptions of competence.

Conclusion. Current findings broaden understanding of the adaptive nature of mastery-approach goals and suggest that it is possible to modulate aversive responses to unfavourable social comparisons by focusing attention on mastery-approach goals.

Keywords: achievement goals, social comparisons, perceptions of competence, equality in educational outcomes

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Introduction

There is general agreement among theories of human motivation that content of goals determines levels of happiness and psychological well-being of individuals (Kahneman, Diener, & Schwarz, 1999). Accordingly, early research on achievement goals has suggested that students pursue two main types of achievement goals in classroom settings: mastery (or learning) goals and performance goals (Dweck, 1986; Nicholls, 1989). Mastery goals refer to tendencies to learn and improve one's own abilities, whereas performance goals correspond to tendencies to outperform others.

More recent conceptualisations of achievement goals extended Nicholls (1989) theory into 2×2 and 3×2 hierarchical models (Elliot & Church, 1997; Elliot, Murayama, & Pekrun, 2011). In the 2×2 model, Elliot and colleagues differentiated mastery goals into mastery-approach goals (i.e., improve performance on a task) and mastery-avoidance goals (i.e., avoid mistakes). Likewise, performance goals were differentiated into performance-approach goals (i.e., try to outperform others) and performance-avoidance goals (i.e., avoid losing to others) (e.g., Elliot & McGregor, 2001; Murayama, Elliot, & Yamagata, 2011).

In the 3×2 model, the mastery-approach goals were also differentiated into task-related goals and self-related goals. As a consequence, this model proposes that students may pursue task-approach goals (i.e., do the task correctly), task-avoidance goals (i.e., avoid doing the task incorrectly), self-approach goals (i.e., do better than before) and self-avoidance goals (avoid doing worse than before) (Elliot et al., 2011). Additionally, studies stemming from Deci and Ryan's (1985) self-determination theory have developed models (goal complex models) that aim to capture the reasons for which students endorse performance goals.

According to these models, performance-approach goals can be pursued for autonomous (intrinsic) reasons (i.e., trying to outperform others is fun or personally important) or controlling reasons (i.e., self-presentation reasons pertaining to tendencies to impress others) (i.e., Vansteenkiste, Smeets, et al., 2010).

To date, research has shown that performance-avoidance or mastery-avoidance goals are maladaptive because they are correlated with undesirable educational outcomes such as low academic achievement and course interest, fear of failure and anxiety (Elliot & McGregor, 2001; Harackiewicz et al., 2008; Senko, Hulleman, & Harackiewicz, 2011). There is also general agreement, among researchers who are involved in this area of research, that mastery-approach goals are adaptive because they are correlated with positive educational outcomes (Harackiewicz, Barron, & Elliot, 1998; Senko & Tropiano, 2016). Performance-approach goals, on the other hand, are more likely to instigate adaptive educational outcomes when (i) they are engaged with a tendency to outperform others rather than tendencies to demonstrate ability to others (Hulleman, Schragar, Bodmann, & Harackiewicz, 2010) and (ii) they are pursued for autonomous rather than controlling reasons (Gaudreau, 2012; Gillet et al., 2014; Senko & Tropiano, 2016; Vansteenkiste, Lens, et al., 2014; Vansteenkiste, Smeets, et al., 2010).

Clarifying the Link between Mastery-Approach Goals and Social Comparisons

An assumption underpinning achievement goal theories is that goals determine the standards that individuals adopt during the process of evaluating personal competence. Accordingly, individuals who endorse performance goals are assumed to engage in social comparisons and base perceptions of competence on *normatively-referenced* standards such as performance exhibited by others (Nicholls, 1989). In contrast, individuals with mastery goals are assumed to not engage in social comparisons but base perceptions of competence on

standards related to past or present performance, known as *self-referenced* standards of comparison. However, more recently, the assumption that mastery-orientated students are oblivious to normative standards and social comparisons has been challenged. Replete evidence shows that students who were instructed to adopt mastery-approach goals were interested in and based their perceptions of competence on normative information pertaining to other students' performance levels (Butler, 1992; Darnon, Dompnier, Gillieron, & Buttera, 2010; Regner, Escribe, & Duperyat, 2007). Most critical, a number of studies demonstrated that unfavourable normative information had deleterious effects on perceptions of competence of participants who were instructed to endorse mastery-approach goals at a much higher level than performance-approach goals (Butler, 1993; Van Yperen & Leander, 2014; Study 2).

On a first glance, the link between mastery-approach goals and social comparisons seems to suggest that social comparison processes determine the effects of mastery-approach goals on perceptions of competence. However, empirical evidence stemming from Dweck's (1986) theory that addresses beliefs about intelligence has also pointed out that achievement goals influence direction of social comparison effects, particularly effects associated with unfavourable social comparisons with more capable peers (Lockwood & Kunda, 1997; Van de Ven, Zeelenberg, & Pieters, 2011). In particular, according to Dweck and Leggett (1998), people differ in their beliefs about the nature of intelligence. Whereas some individuals view intelligence as a hereditary or fixed trait others view it as malleable trait that can be improved through hard work and practise. In a study conducted by Lockwood and Kunda (1997), it was demonstrated that individuals who construed ability as a malleable trait were less likely to be discouraged by comparisons with more capable individuals than individuals who viewed academic ability as stable and fixed trait. This is because the belief that ability is a malleable trait is more likely to lead individuals to believe they are able to reach the higher performance

levels achieved by more capable students than the belief that ability is a hereditary trait.

Although these findings do not necessarily mean that mastery-approach goals will instigate an adaptive psychological response to unfavourable normative information, they do point towards that direction. This is because in a correlational study conducted in real-life classroom settings, Chatzisarantis et al. (2016) demonstrated that in comparison to students who endorsed performance-approach goals, students who endorsed mastery-approach goals at a much higher level that mastery-approach goals responded with enhanced levels of competence to unfavourable social comparisons with more capable classmates.

The positive effects of mastery-approach goals on perceptions of competence in conditions of unfavourable social comparison is very similar to a mastery goal advantage effect observed in studies that examined students' responses to feedback. Specifically, a number of studies have documented that whereas performance orientated-students report higher perceptions of competence than mastery-orientated students in conditions of positive feedback, it is the mastery orientated students who report higher perceptions of competence in conditions of negative feedback (Lee & Kim, 2014; Neff, Hsieh, & Desitterat, 2005; Sideridis & Kaplan, 2011; Urdan & Midgley, 2001). However, these studies show that mastery-orientated students respond in an adaptive way to negative self-referenced rather than normative feedback. This is because in those studies, performance feedback informed participants about how much they improved on a task and not how much they performed relative to others. In contrast, the effects observed for mastery-approach goals in conditions of unfavourable social comparisons reflect a kind of mastery goal advantage effect that predicts that mastery-oriented students respond more positively to normative feedback pertaining to classmates' performance levels. The present study adds to the literature linking mastery goals to social comparison because it will test whether the mastery goal advantage effect extends to normative information pertaining to other students' performance' levels. In

addition, the current study will examine whether it is possible to induce the mastery goal advantage effect experimentally. This investigation is novel because previous experimental and prospective studies did not manipulate achievement goals (i.e., Lockwood & Kunda, 1997).

Overview of the Study and Hypotheses

The purpose of the current study was to re-examine the mastery goal advantage effect experimentally. Based on previous research (Chatzisarantis et al., 2016), we predicted that mastery-approach goals would yield higher perceptions of competence than performance-approach goals among participants who received unfavourable normative information for their performance on a task. At operational level, the mastery goal advantage effect is confirmed if (i) in a hierarchical regression analysis the interaction between normative information and experimentally-induced achievement goals is statistically significant and (ii) probing of the interaction reveals that experimentally-induced mastery-approach goals yield higher levels of competence than experimentally-induced performance-approach goals in conditions of unfavourable normative information.

Additionally, in the current study, we controlled for a number of variables in order to clarify social comparison effects further. Specifically, in accordance with previous research (Van Yperen & Leander, 2014), we measured happiness with task performance in order to examine whether our hypothesised effects generalised to performance measures that encompass an affective component. We also statistically controlled for the effects of age and gender on perceptions of competence because male students tend to be less receptive to unfavourable normative information than female students (Butler, 1993). Previous research has also indicated that individuals with relatively high self-esteem experience positive educational outcomes (Huang, 2011) as well as they respond less negatively to unfavourable

social comparisons as a means of defending their self-worth (Aspinwall & Taylor, 1993; Vohs & Heatherton, 2004; Wood, 1996). Hence, we included a measure of self-esteem in our analysis in order to rule out the possibility that the mastery goal advantage effect reflected a defensive psychological response that is due to self-esteem¹.

Method

Participants and Design

Participants were 201 undergraduates (males, $n = 57$; females, $n = 144$; $M_{age} = 22.53$, $SD = 6.51$) who participated in the experiment for a course credit. We adopted a 2x3 design with achievement goals (mastery vs. performance) and normative information (favourable vs. no-normative information vs. unfavourable) as between participant factors. We used a table of random numbers to randomly allocate participants to conditions.

Procedure and Manipulations

Upon arrival, participants entered experimental cubicles and signed consent forms. The experimental task was a divergent thinking task that aimed to assess creative thinking (Butler, 1992, 1993; Torrance & Templeton, 1963). The task was introduced to research participants verbally by an instructor. After introducing the task to research participants, all participants were explicitly told that they would be required to engage in the divergent thinking task twice and that they would be provided with feedback indicating their

¹ We also measured intrinsic motivation (i.e., interest and persistence on a task) by incorporating a free-choice period during which participants could freely choose to re-engage in a task. However, results revealed that over 65% of participants chose to not re-engage in the task. Although previous studies have reported similar levels of disengagement (Ryan, Koester, & Deci, 1991), we do not report results related to intrinsic motivation because we consider them to be too high to draw reliable predictions. Nevertheless, a preliminary analysis showed participants in the mastery goal condition exhibited higher levels of intrinsic motivation than participants in the performance goal condition.

performance. Immediately after, all participants received messages aimed to induce achievement goals.

In the mastery-approach condition, the instructor read the following message that aimed to focus participants' attention on self-improvement and learning: "The circle creativity task is a reliable and valid task that develops creative skills. It is very important that you actually understand the aim of the experiment. You are here to acquire new knowledge and extend your creative skills. To improve your creative skills you need to work on the circle creativity task twice and then we will let you know whether you personally improved on this task. Thus, your goal should be to progress along the experiment. More specifically, you should try to acquire new knowledge that could be useful for you. In other words, what we ask here is for you to learn". Following Van Yperen and Leander's (2014; Study 2) procedure, we controlled for performance-approach goals by providing participants with the following message that aimed to direct their attention away from performance goals: "This challenge is not about your actual performance relative to your peers".

In the performance-approach goal condition, the instructor read the following message that aimed to focus participants' attention on outperforming others: "The circle creativity task is a valid and reliable measure of creativity. Previous research has shown that people differ in their ability to create novel or unique solutions. Students who did well on the circle creativity task were more creative than ones who did poorly. After you complete the task twice, your creativity will be evaluated. Note, this is a competition, and your performance is good if your best score is higher than the score that is achieved by other undergraduate students who are of the same age, gender, and attendance year at University as you. It is very important for you to actually understand the aim of this experiment. You are here to be a performer and to demonstrate that you are a creative individual. More specifically, you should try to perform better than the majority of other undergraduates who are of the same age, gender, and

attendance year as you. In other words, what we ask you here is to demonstrate that you are the most creative person.” In addition, participants were provided with the following message that aimed to direct their attention away from mastery-approach goals: “This competition is not about improving your creativity skills or learning” (see also Van Yperen & Leander, 2014; Study 2).

Following the manipulation of achievement goals, participants completed a measure of achievement goals. Immediately after, all participants engaged in the divergent thinking task twice. Upon completion of the divergent thinking task, the experimenter asked the research participants to wait for a couple of minutes while s/he was calculating their test results. Subsequently, participants, who were instructed to focus on ‘mastery-approach’ goals, were told that they improved considerably because their performances were equivalent to 81 and 104 in the first and second trials respectively. This procedure ensured that participants would endorse the mastery goals because evidence suggests that individuals are more likely to endorse mastery goals when they receive positive rather than negative self-referenced feedback (Erturan-Ilier, 2014; Pekrun, Aisling, Murayama, Elliot, & Thomas, 2014; Viciano, Cervello, & Ramirez-Lechuga, 2007). In contrast, participants who were instructed to focus on performance-approach goals were told their best score on the divergent thinking task was 104 and a score of 104 was one of the best scores.

Immediately afterwards, we manipulated normative information by providing normative feedback. Specifically, in the favourable normative information conditions, participants were told that they outperformed others because their test score was in the top 25th percentile of students with the same age, gender, and attendance year in the University. In the unfavourable normative information conditions, participants were told they had performed worse than others because their test score was in the bottom 25th percentile. We also provided participants with a diagram of a distribution indicating their performance

relative to others. In addition, we emphasized that comparison others had similar age and gender because evidence suggest that individuals are more likely to compare themselves to others of similar age and gender (Huguet, Dumas, Monteil, & Genestoux, 2001; Lubbers, Kuyper, & Van der Werf, 2009). In the no-normative information condition, participants were not provided with normative feedback.

Measures

Experimentally-induced achievement goals. We used a contrast code to model effects associated with experientially-induced goals. We assigned the value of one (1) to participants who were allocated to the mastery-approach goal condition and the value of minus one (-1) to participants who were allocated to the performance-approach goal condition (Davis, 2010).

Normative information. We used a contrast-coded variable to model effects associated with normative information by assigning the value of one (1) to participants who were allocated to the favourable normative information conditions and the value of zero (0) to participants who were allocated to the no normative information conditions. Participants who were allocated to the unfavourable normative information conditions were assigned the value of minus one (-1) (Davis, 2010).

Achievement goals. Following Chatzisarantis et al. (2016), achievement goals were measured through Duda and Nicholls' (1992) 13-item questionnaire. The items that aimed to capture performance goals were phrased specifically to orient respondents' attention to comparisons with others who had the same age and gender as the respondents. This ensured that the performance goal items captured the content of experimental instructions that aimed to induce performance goals. An example item for performance orientation was: "I will feel most successful at the creativity task if I score more points relative to other students who are

of the same age, gender and attendance year as me.” An example item for mastery orientation was: “I will feel most successful at the creativity task if I learn something fun while I am engaging in the circle creative task”. Responses were measured on five-point scales ranging from *strongly disagree* (1) to *strongly agree* (5). The reliabilities for the mastery ($\alpha = .85$) and performance orientation ($\alpha = .92$) scales were satisfactory.

Happiness with performance. This construct was measured through two items on nineteen-point semantic differential scale ranging from *very unhappy* (-9) to *very happy* (+9) (e.g., How happy are you with your performance at the circle creativity task?) (Hsee & Zhang, 2004). The correlation between the two items was satisfactory ($r = .81, p < .001$).

Perceived competence. Five items from McAuley, Duncan and Tammen’s (1989) intrinsic motivation scale were used to measure perceived competence on seven-point scales ranging from *strongly disagree* (1) to *strongly agree* (7) (e.g., I think I was pretty good at the circle creativity task). The alpha reliability for perceived competence was satisfactory ($\alpha = .90$).

Self-esteem. This variable was assessed through Rosenberg’s (1965) measure of self-esteem. The instrument comprises 10 items and it measures self-esteem on a nine-point scale ranging from 1 (*strongly disagree*) to 9 (*strongly agree*). An example item was: “I feel I am a person of worth, at least on an equal plane with others”. The alpha reliability of this scale was satisfactory ($\alpha = .90$).

Results

Preliminary Analysis

Table 1 presents means, standard deviations, and zero-order correlations among study variables. The correlations indicated that our manipulations of achievement goals were

successful in inducing adoption of mastery or performance goals. The positive correlation between experimentally-induced goals and self-reported mastery goals indicated that participants who were instructed to adopt mastery-approach goals endorsed those goals to a greater extent than participants who were prompted to endorse performance-approach goals ($M = 3.84, SD = .65$ vs. $3.37, SD = .79$). In addition, the negative correlation between induced goals and self-reported performance goals supported the notion that participants who were prompted to adopt performance-approach goals endorsed those goals to a greater extent than participants who were prompted to adopt mastery-approach goals ($M = 3.71, SD = .88$ vs. $2.70, SD = .92$). Additionally the positive correlation between normative information with perceptions of competence or happiness with task performance suggests that provision of unfavourable normative information undermined perceptions of competence or happiness with task performance than provision of favourable normative information (Van Yperen & Leander, 2014).

Main Analysis

Table 2 presents results of two hierarchical regression analyses that examined effects of achievement goals and normative information on the dependent variables. Following Aiken and West (1991), self-esteem and age were standardised. As it is shown, the interaction between experimentally-induced achievement goals and normative information improved predictive validity of the model in the second step of the regression analyses. Probing of the interaction indicated that the two simple effects of experimentally-induced goals on perceptions of competence and happiness with task performance were positive and statistically significant in conditions of unfavourable normative information (see Table 3). In accordance with our hypothesis, the positive sign of those simple effects supported the notion that experimentally-induced mastery-approach goals yielded higher levels of competence and happiness with task performance than experimentally-induced performance-approach goals

(Figures 1 and 2). In addition, the simple effects of experimentally-induced achievement goals on perceptions of competence were not statistically significant in conditions of favourable normative information. However, instructions to adopt performance-approach goals did yield the highest levels of happiness with task performance in conditions of favourable normative information (see Table 3 and Figures 1 and 2).

Additionally, the regression analysis did not detect a tendency to dismiss or ignore unfavourable normative information among participants who were instructed to adopt mastery-approach goals. This is because the simple effects of normative information on perceptions of competence and happiness with task performance were positive and statistically significant among participants who were instructed to adopt mastery-approach goals (see Table 3). The positive sign of those simple effects supported the notion that unfavourable normative information yielded lower level of competence and happiness with task performance than favourable normative information among participants who were instructed to adopt mastery-approach goals (see Figures 1 and 2). Finally, in accordance with previous prospective studies (Chatzisarantis et al., 2016), the effects of normative information on perceptions of competence or measures of happiness were much greater among participants who were instructed to adopt performance-approach goals than among participants who were asked to adopt mastery-approach goals (see Table 3 and Figures 1 and 2).

Supplementary Analysis

Although the regression analysis supported a mastery goal advantage effect in conditions of unfavourable normative information, it can still be argued that this effect is not due to mastery-approach goals. This is because the regression analysis did not estimate effects associated with self-report measures of achievement goals but effects associated with

experimental instructions. For this reason, we conducted two additional regression analyses in which we estimated effects of interactions between normative information with mastery-approach or performance-approach goals on perceptions of competence and happiness with task performance.

In addition, following Cohen, Nahum-Shani, and Doveh (2010) and Edwards and Parry (2003) procedures, we used unstandardized regression coefficients from those two regression analyses to estimate conditional effects of mastery-approach goals and performance approach goal in conditions of unfavourable and favourable normative information (see also Edwards & Lambert, 2007). Based on Edwards and Parry (2003), we reasoned that if the mastery goal advantage effect was due to mastery-approach goals then the conditional effects of mastery-approach goals on perceptions of competence and happiness with task performance should be positive, statistically significant and stronger than corresponding conditional effects of performance-approach goals in conditions of unfavourable normative information. We formally examined differences in conditional effects by employing *t*-tests that examined differences between regression coefficients (Neter, Wasserman, & Kutner, 1989).

As it is shown in Table 4, the interactive effects between performance-approach goals and normative information were statistically significant in the two regression analyses that aimed to predict competence or happiness with task performance. Most critical, the conditional effects of mastery-approach goals were positive, statistically significant and stronger than the conditional effects of performance-approach goals on perceptions of competence ($t(197) = 2.61, p = .009$) and happiness with task performance ($t(197) = 4.38, p < .001$) in the unfavourable normative information conditions. Hence, in accordance with our expectations, this analysis showed that there is a mastery goal advantage effect that is predominantly due to mastery-approach goals rather than performance-approach goals. In

contrast, there is no evidence for an analogous performance goal advantage effect in conditions of favourable normative information. This is because the two approach goals yielded equivalent levels of competence ($t(197) = .69, p = .49$) or happiness with task performance ($t(197) = .93, p = .35$) in conditions of favourable normative information, although the conditional effects of performance-approach goals were statistically significant in conditions of favourable normative information.

Discussion

The purpose of the present study was to examine the mastery goal advantage effect through an experiment that manipulated normative information and achievement goals independently. In accordance with our hypothesis, results provided evidence in favour of a mastery goal advantage effect in conditions of unfavourable normative information. Our findings suggest that provision of negative normative information had a less negative effect on perceptions of competence or happiness with performance among students who were instructed to adopt mastery-approach goals than students who were instructed to adopt performance-approach goals. Hence, at an empirical level, the current study replicates previous cross-sectional or prospective studies that also demonstrated utility of mastery-approach goals in facilitating adaptive responses to unfavourable social comparisons (Chatzisarantis et al., 2016). However, the present study adds to the achievement goal literature because it actually induced a focus on mastery-approach and performance-approach goals experimentally. As a consequence, the current study shows that it is possible to actually change the way students respond to negative normative information by encouraging a focus on mastery-approach goals.

The mastery goal advantage effect observed in the present study implies that mastery-approach goals “protect” students from the otherwise negative effects that unfavourable

social comparisons exert on perceptions of competence. This function of mastery-approach goals is similar to other protective functions and mastery goal advantage effects observed in previous studies (Lee & Kim, 2014; Neff et al., 2005; Ryan et al., 1991; Sideridis & Kaplan, 2011; Urdan & Midgley, 2001). However, as we have already mentioned in the introduction, in all previous studies students who adopted mastery-approach goals were provided with self-referenced rather than normative feedback. As a consequence, these studies pointed out that mastery goals protected students against negative self-referenced feedback. Hence, the current findings broaden our understanding of the mastery goal advantage effect because they show that this effect is more general than it was previously thought as it extends to situations that provide negative normative feedback pertaining to other students' performance levels.

Additionally, the current study provides insights into the nature of the mastery goal advantage effect and corresponding protective function of mastery-approach goals. In particular, our analysis rules out the possibility that the protective function, ascribed to mastery-approach goals, is driven by defensive reasons related to self-esteem (Wood, 1996). Self-esteem does not explain the mastery goal advantage effect because the regression analysis controlled for self-esteem. In addition, the current study rules out the possibility that the mastery goal advantage effect is due to compliance to experimental inductions that instructed participants to not pay attention to social comparison and normative information. If students who were instructed to adopt mastery-approach goals dismissed normative information altogether, unfavourable normative information would not have yielded lower levels of competence and happiness with task performance than favourable normative information among students who endorsed mastery-approach goals (Wood, 1996). Rather, the effects observed for unfavourable normative information in mastery-approach conditions suggest that students who endorsed mastery-approach goals responded to unfavourable normative information but mastery-approach goals protected students against aversive

consequences of unfavourable normative information by modulating their psychological responses to that information.

In addition to clarifying the ‘mastery goal advantage’ effect, the current study also has implication for practise. In particular, earlier formulations of achievement goal theory suggested that mastery goals were desirable because they were thought to promote greater degree of equality in educational outcomes than performance-approach goals (Nicholls, 1989). Findings of the present study are consistent with Nicholls’ (1989) suggestions because the regression analysis shows that the impact of normative information on perceptions of competence is much smaller among students who were instructed to adopt mastery-approach goals than among students who were instructed to adopt performance-approach goals (see Figures 1 and 2). However, contrary to Nicholls (1989) the current study also shows that this smaller effect of social comparisons on perceptions of competence is not due to the fact that mastery-oriented students do not engage in social comparisons. The regression analysis rules out this alternative hypothesis because it supported a statistically significant effect of normative information on perceptions of competence among students who adopted mastery-approach goals (see Figures 1 and 2). Rather, current findings suggest that mastery-approach goals promote greater equality in educational outcomes because they lead students to respond to negative normative information in an adaptive way.

Finally, it will be remiss to not mention limitations of the current study and provide directions for future research. It may be important to examine whether the mastery goal advantage effect extends to other important educational outcomes such as academic achievement. In addition, the design of the current study did not incorporate a control condition in which achievement goals were not induced through experimental instructions. As a consequence, the present study does not examine whether the mastery goal advantage effect is instigated by naturally occurring achievement goals. Relatedly, our experimental

inductions of performance-approach goals discouraged adoption of mastery-approach goals. This procedure might have undermined ecological validity of the current experiment because teachers may not always discourage adoption of mastery-approach goals in classroom settings. A more appropriate experimental procedure should have encouraged adoption of performance-approach goals without actually dissuading adoption of mastery-approach goals. Hence, we think that it may be important to examine whether naturally occurring achievement goals instigate the mastery goal advantage effect in real-life classroom settings.

Additionally, the current study did not measure reasons for pursuing achievement goals (Senko & Tropicano, 2016). Viewing results of the current study in light of goal complex models it is possible the mastery goal advantage effect to be much stronger when performance-approach goals are pursued for extrinsic reasons rather than intrinsic reasons. The current study does not also explain some inconsistent findings, namely, why performance-approach goals yielded highest level of happiness, but not competence, in conditions of favourable normative information. Inconsistent findings may be due to the fact that experiments do not always replicate beneficial effects found for performance-approach goals in field studies (see Hulleman et al., 2010; Van Yperen, Blaga, & Postmes, 2015). Nevertheless, the positive effects of performance-approach goals on measures of happiness imply that there may be a “performance goal advantage” effect in conditions of favourable social comparisons. It is possible that just as mastery-approach goals reduce the negative effects of unfavourable normative information on perceptions of competence, performance-approach goal may mitigate negative effects of unfavourable self-referenced information on perceptions of competence.

In conclusion, the present study showed that it is possible to induce a mastery goal advantage effect by focusing students’ attention on mastery goals. Broadly speaking, current findings suggest that relative to students who were instructed to adopt performance-approach

goals, students who were instructed to adopt mastery-approach goals reported higher levels of competence and happiness with task performance in conditions of unfavourable normative information. At a theoretical level, the present study broadens our understanding of the mastery goal advantage effect because it shows that this effect extends to situations that provide negative normative feedback pertaining to other students' performance levels. Furthermore, current findings suggest that mastery-approach goals promote greater equality in educational outcomes not because they direct students' attention away from social comparisons but because they lead students to respond to unfavourable social comparisons in an adaptive way.

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Table 1

Means, Standard Deviations, and Correlations Among Study Variables

	M	SD	1	2	3	4	5	6	7
1. Induced goals (dummy-coded)	–	–	1.0						
2. Mastery-approach goals (self-report)	3.61	.76	.36*	1.0					
3. Performance-approach goals (self-report)	3.21	1.04	-.49*	-.35*	1.				
4. Normative information (contrast-coded)	–	–	.00	.06	-.03	1.0			
5. Perceived competence	4.18	1.31	.01	.22*	.01	.45*	1.0		
6. Happiness with performance	3.09	4.05	.02	.15*	-.09	.63*	.69*	1.0	
7. General self-esteem	6.55	1.35	-.09	-.01	.04	-.12	.14*	.11	1.0

Note. Correlations with an asterisk are statistically significant at $p < .05$ level.

Table 2

Hierarchical Regression Analysis Describing Effects of Achievement Goals and Normative Information on Dependent Variables

Variable	Competence		Happiness with performance	
	Step 1	Step 2	Step 1	Step 2
Intercept	4.35	4.35	3.51	3.52
Induced goals	.06	.06	.12	.11
Normative information	.77*	.78*	3.28*	3.28*
Age	-.06	-.05	.28	.30
Gender	-.23	-.23	-.57	-.57
Self-esteem	.28*	.28*	.78*	.79*
Induced goals x normative information		-.30*		-.80*
ΔF	12.96*	8.93*	30.65*	9.28*
R^2	.25	.29	.44	.47

Note. The term ΔF indicates the value from the incremental F -test. Parameters with an asterisk are statistically significant at $p < .01$ level.

Table 3

Simple Slope Analysis of the Interaction Between Induced-Goals and Normative Information

Slope of...	Dependent variables	Simple effects	<i>t</i>	<i>p</i>
	Competence			
Achievement goals in unfavourable normative information condition		.35*	2.76	.006
Achievement goals in favourable normative information condition		-.24	1.86	.064
Normative information in mastery goal condition		.48*	3.43	.001
Normative information in performance goal condition		1.07*	7.59	.001
	Happiness			
Achievement goals in unfavourable normative information condition		.92*	2.70	.008
Achievement goals in favourable normative information condition		-.69*	2.01	.046
Normative information in mastery goal condition		2.48*	6.64	.001
Normative information in performance goal condition		4.09*	10.86	.001

Note. Parameters with an asterisk are statistically significant at $p < .05$ level.

Table 4

Regression Analyses that Estimate Conditional Effects Associated With Self-Report Measures of Achievement Goals

Dependent variables	Model	b ₀	M	P	NI	Age	Gender	Self-esteem	MxNI	PxNI	R ²	F
Competence	Overall	4.38	.28*	.11	.76*	.01	-.25	.25*	-.08	.23*	.29*	10.99*
	Unfavourable Information	3.62	.36*	-.11	-	-	-	-	-	-	-	-
	Favourable Information	5.14	.21	.34*	-	-	-	-	-	-	-	-
Happiness with task performance	Overall	3.61	.76*	-.01	3.24*	.44*	-.64	.71*	-.10	1.14*	.52*	27.40*
	Unfavourable information	.36	.86*	-1.15*	-	-	-	-	-	-	-	-
	Favourable information	6.85	.66	1.13*	-	-	-	-	-	-	-	-

Note. Parameters are unstandardized regression coefficients. The b₀ coefficient represents intercepts of regression equations. The terms M and P represent participants' responses to measures of performance-approach goals (P) and mastery-approach goals (M). The term NI is the contrast-coded variable that represents membership in the unfavourable (NI = -1) or favourable normative information conditions (NI = 1). The term F is the F value of the regression equation. Parameters with an asterisk are statistically significant at $p < .05$.

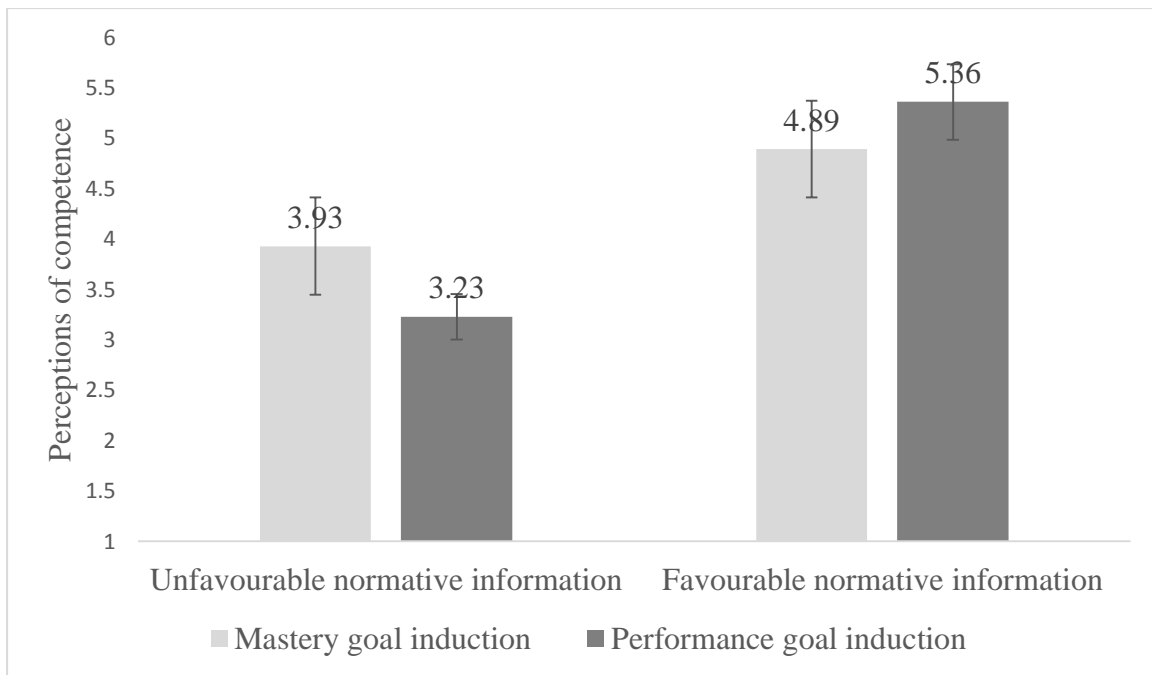


Figure 1. Predicted levels of competence of participants who were instructed to adopt mastery-approach or performance-approach goals

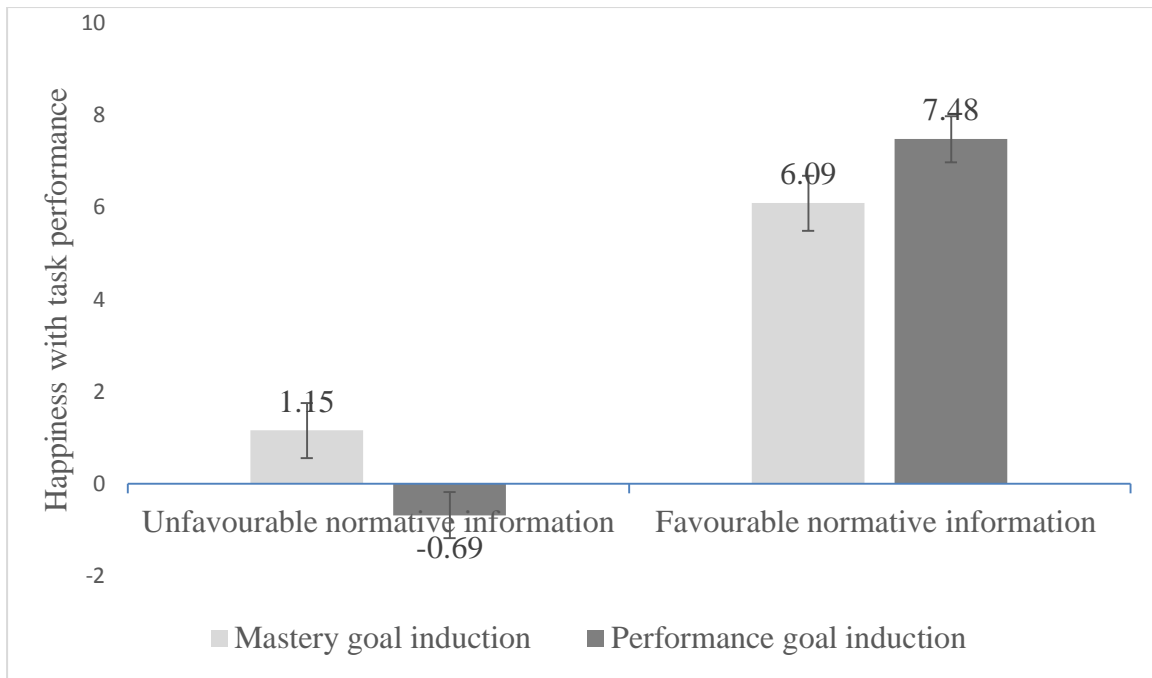


Figure 2. Predicted levels of happiness of participants who were instructed to adopt mastery-approach or performance-approach goals