2021

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Published Citation

Elliot, A. J., Weissman, D. L., Hangen, E. J., & Thorstenson, C. A. (2021). Social comparison information, performance expectancy, and performance goal adoption. Motivation Science, 7(1), 56-67. https://doi.org/10.1037/mot0000207

Social Comparison Information, Performance Expectancy, and Performance Goal Adoption

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Abstract

The present research comprised two experiments (*N*s = 792 and 1056) focused on linking social comparison information to performance goal adoption via performance expectancy. In Experiment 1, participants were randomly assigned to receive positive or negative information regarding how they had performed on a novel ability task compared to another person. They were then told that this other person would be their opponent during a subsequent performance period. Experiment 1 revealed that positive relative to negative social comparison information led to greater performance-approach goal adoption, and this effect was mediated by participants' performance expectancy. Social comparison information did not affect performance-avoidance goal adoption, but performance expectancy negatively predicted these goals. Experiment 2 extended Experiment 1 by including a no information control group. The findings represent a much needed integration of the upward-downward social comparison and approach-avoidance achievement goal literatures.

Keywords: upward and downward social comparison, performance expectancy, performance-approach, performance-avoidance, achievement goals

In academic, athletic, and vocational settings (and beyond), individuals are regularly exposed to information about the performance of others. Research has clearly shown that information about others' performance prompts social comparison – "the process of thinking about information about one or more people in relation to the self" (Wood, 1996, pp. 520-521; see also Festinger, 1954). In achievement settings, this social comparison process entails using information about the performance of others to evaluate one's own performance, which has many downstream consequences. Once such consequence is for goal adoption and pursuit (Muller & Fayant. 2010; Wheeler & Suls, 2005).

Achievement goals are the competence-relevant aims that individuals adopt and pursue in achievement settings (Elliot, 1999). The achievement goals that are most salient in the social comparison process are performance goals – those that use competence relative to others as the standard of evaluation (Dweck, 1986; Nicholls, 1984; see also Régner, Escribe, & Dupeyrat, 2007). Such goals vary by approach-avoidance: Performance-approach goals focus on doing well compared to others, whereas performance-avoidance goals focus on not doing poorly compared to others (Elliot, 1997). Performance-approach goals tend to have a positive influence on achievement outcomes, whereas performance-avoidance goals tend to have a negative influence (Brodish & Devine, 2009; Darnon, Butera, Mugny, Quiamzade, & Hulleman, 2009; Elliot, McGregor, & Gable, 1999; Sideridis, 2005).

Given the ubiquity of social comparison processes and the differential influence of these performance goals, two critical, yet heretofore overlooked, questions are: "In achievement settings, what type of social comparison information leads an individual to adopt a performance-approach goal?" and "In achievement settings, what type of social comparison information leads an individual to adopt a performance-avoidance goal?" In the present research, we conducted

two experiments designed to address these important questions. Both experiments focused on a specific type of achievement setting, a dyadic (i.e., one-on-one) competition; hence in reviewing the relevant literature we focus primarily on the competition context and in stating our predictions we focus precisely on the dyadic competition context.

Social comparison information, Performance Expectancy, and Performance Goals

When entering an achievement setting, individuals gather information about the context in order to understand it and create an action plan within it (Chan & Ybarra, 2002; Ruscher & Fiske, 1990). An important piece of contextual information is how one's own past performance on the focal task compares to that of another person or persons. Social comparison theorists distinguish between two types of comparisons: downward comparison entails comparing one's performance to that of an inferior other or others, whereas upward comparison entails comparing one's performance to that of a superior other or others (Thornton & Arrowood, 1966; Wheeler & Suls, 2020; Wills, 1981). Research on reactions to receiving social comparison information has shown that the typical, even default comparison tendency is contrast (focusing on differences between the self and the comparison other or others) rather than assimilation (focusing on similarities between the self and the comparison other or others; Gerber, Wheeler, & Suls, 2018; Gilbert, Giesler, & Morris, 1995). As such, it is not surprising that inducing downward comparison typically has positive, appetitive implications for self-evaluation and self-regulation (Gerber 2018; Luo, Eickhoff, Hétu, & Feng, 2018; Mendes, Blascovich, Major, & Seery, 2001), whereas inducing upward comparison tends to have negative, aversive implications (although findings here are more mixed; Chan & Briers, 2019; Dijstra, Kuyper, van der Werf, Buunk, & van der Zee, 2008; Garcia, Reese, & Tor, 2020; Gerber, 2108).

We posit that initial social comparison information about another person in an achievement setting such as a competition has implications for the type of performance goals that individuals adopt within that setting. Specifically, we predict that facing a seemingly inferior opponent (a downward comparison process) facilitates the performance-approach goal of trying to do better than one's opponent, whereas facing a seemingly superior opponent (an upward comparison process) facilitates the performance-avoidance goal of trying to avoid doing worse than one's opponent. Research has yet to be conducted on these relations (see Van Yperen & Leander, 2014, for the closest empirical work). Our predictions are grounded in the idea that social comparison information influences performance-approach and performance-avoidance goal adoption through the psychological mechanism of performance expectancy.

Social comparison information → performance expectancy. In a competition context, a performance expectancy represents whether one expects to do better or worse than one's opponent (Feltz & Lirgg, 2001). Self-efficacy theory contends that the most important source of an individual's performance expectancy is his or her past performance accomplishments on the focal task (Bandura, 1997; Short & Ross-Steward, 2008). A few researchers have tested the link between initial social comparison information and current performance expectancy in a competition context and found support for the self-efficacy theory predictions that (a) prior success relative to an opponent leads to a positive performance expectancy, and (b) prior failure relative to an opponent leads to a negative performance expectancy. These relations were initially documented with regard to a leg lift persistence task (Weinberg, Gould, & Jackson, 1979), and subsequently found with regard to a word formation game (Epstein & Hararckiewicz, 1992), racquet sports (Duquin, 2008), and math problems (Li, Murata, & Li, 2010). As intuitive as the self-efficacy theory predictions may seem, it is important to note that alternative

predictions are readily available. Specifically, in some instances, individuals who have outperformed an opponent may feel the added pressure of being the "favorite" moving forward, and may self-protect by setting a negative expectancy for a subsequent competition (Dai, Dietvorst, Tuckfield, Milkman, & Schweitzer, 2018; Gibson, Sachau, Doll, & Shumate, 2002); individuals who have been outperformed by an opponent may feel embarrassed by the loss, and may self-affirm by setting a positive expectancy for a subsequent competition (Berger & Pope, 2011; Steele, 1988).

In the present research we provided participants with information on how they had performed compared to another individual on a novel ability task (or, in a control condition, provided no social comparison information), and then told them that they would be competing against that individual (their opponent) in a subsequent performance period. We measured their performance expectancy and tested the self-efficacy theory predictions that (a) the receipt of positive social information would increase participants' performance expectancy, and (b) the receipt of negative social comparison information would decrease participants' performance expectancy.

Performance expectancy → performance goals (and mediation). Self-efficacy theory focuses on the relation between expectancies and goal level (Bandura, 1991; Maddux & Kleiman, 2018; Schunk, 1990), it does not focus on the relation between expectancies and goal valence. This relation *is* attended to in the hierarchical model of achievement motivation (Elliot & Church, 1997; see also Senko & Harackiewicz, 2005). From this perspective, a high expectancy makes the possibility of success particularly salient which facilitates the goal of trying to do better than others (a performance-approach goal), whereas a negative expectancy

makes the possibility of failure particularly salient which facilitates the goal of trying to avoid doing worse than others (a performance-avoidance goal).

Many extant studies have shown that expectancies (and related constructs such as perceived competence) positively predict performance-approach goals and negatively predict performance-avoidance goals, including a large meta-analysis of over 70 studies (Huang, 2016; see also Baranik, Bynum, Stanley, & Lance, 2010; Cellar et al., 2011; Payne, Youngcourt, & Beaubien, 2007). However, far fewer studies have focused on these links with regard to other-based (as opposed to task- or self-based) expectancies (Senko & Hulleman, 2013) that are most comparable to the performance expectancy construct focused on in the present research, and these studies have yielded mixed results (especially those conducted in the physical education or sport domain domain). Specifically, these studies have found performance expectancy to positively predict performance-approach goals, but they have only occasionally found it to negatively predict performance-avoidance goals (Cury, Da Fonsèca, Rufo, & Sarrazin, 2002; Ommundsen, 2004) and more often found performance expectancy and performance-avoidance goals to be unrelated (Jaakkola, Ntoumanis, & Liukkonen, 2015; Morris & Kavussanu, 2008; Nien & Duda, 2008) or even positively related (Wang, Biddle, & Elliot, 2007; Warburton & Spray, 2008; Zourbanos, Papaioannou, Argyropoulos, & Hatzigeorgiadis, 2013).

What is entirely missing from the literature is research that establishes a dyadic competitive context (i.e. a participant competing against an opponent) and assesses participants' performance expectancy and performance goals with the opponent as the evaluative standard. This is the focus of the present research. We anticipated findings in line with the hierarchical model of achievement motivation, namely that performance expectancy would positively predict performance-approach goals and negatively predict performance-avoidance goals. We also

anticipated that performance expectancy would mediate the relations between social comparison information and the two performance goals. In our research, we assessed performance-approach and performance-avoidance goals both separately and as a forced-choice preference; each of the aforementioned predictions regarding performance goals applies equally to both types of assessments.

Experiment 1

Experiment 1 received IRB approval (#1077) from [blinded for review]. It was designed to test the full model described above, social comparison information → performance expectancy → performance-approach and performance-avoidance goal adoption, in a dyadic competition context involving a novel ability task. In this and the following experiment, all manipulations, variables analyzed, and data exclusions are reported, and all data were collected before any analyses were conducted.

Methods

Participants. An *a priori* power analysis (G*Power; Faul, Erdfelder, Buchner, & Lang, 2009) was used to estimate the sample size required to detect a small effect (d = 0.20) with an independent-samples t-test in a two condition between-participants experiment with .80 power and two-tailed alpha = .05. The estimate was 788 participants. We slightly exceeded this by collecting data from 801 participants recruited through Amazon's TurkPrime, an internet-based data acquisition platform. Individuals were compensated 0.20 USD. Two participants were excluded *a priori* for failing to complete all tasks and measures, as were seven additional participants who did not consent to data use, leaving 792 participants to be included in analyses: 318 men, 471 women, and 3 unspecified; M_{age} = 36.17 years (SD = 11.62); 618 Caucasian/White,

66 Asian/Asian-American, 54 African/African-American/Black, 28 Hispanic/Latino, 21 mixed, and 5 unspecified.

Procedure and social comparison information manipulation. Participants entered the experiment via a web link and were informed that they would be completing a shape-finding task. They completed a consent form, and then proceeded to review an example problem and complete a practice round consisting of 6 shape-finding problems. Participants then read that they would be performing against another person, "the person who signed in just before or after you", in a real-time competition. A circle spun on the screen while participants were informed "Your score (ID **163**) and your opponent's score (ID **162**) are currently being calculated." After 10 seconds, information was provided that instantiated the experimental manipulation. Specifically, participants were shown a list of four possibilities regarding how they had performed compared to the other participant – *better by a lot, better by a little*, *worse by a little*, *worse by a lot* – and informed that they had performed "better by a lot" in the positive social comparison information condition (n = 373) or "worse by a lot" in the negative social comparison information condition (n = 419). Social comparison information condition was randomly assigned (i.e. independent of participants' actual performance).

Following the manipulation, participants were told that they would complete a few questions before the competition began. They were also informed that when the competition was over, they would be told whether they did better or worse than their opponent. Next, participants completed the performance expectancy, performance goal, and demographics measures. They were then notified that the experiment was now actually over and, subsequently, debriefed (i.e. informed that there was not actually another participant) and given a consent to data use form.

Materials and measures.

Achievement task. In order to manipulate social comparison information convincingly, a novel achievement task was designed to make accurate self-evaluation difficult. The task consisted of 6 shape-finding problems. Participants were asked to determine the number of squares (3 items) or triangles (3 items) within each diagram (see Figure 1) and to select the correct answer from 4 response options as quickly as possible. A time limit (25 seconds per problem) was included to ensure performance uncertainty and enhance feedback credibility. Participants were told that both accuracy and speed were important for task performance. If participants did not select a response before the allotted 25 seconds elapsed (a countdown timer was displayed at the bottom of the screen), the diagram disappeared, and participants were instructed to immediately select a response before moving on to the next problem. Performance on this task was not used in the experiment, only bogus performance information was used.

Performance expectancy. A face-valid item was used to measure how participants expected to do compared to their opponent in the upcoming competition. Participants responded by selecting *worse by a lot* (1), *worse by a little* (2), *better by a little* (3), or *better by a lot* (4).

Forced-choice performance goal. A forced-choice item was used to measure whether participants preferentially endorsed performance-approach or performance-avoidance goals for the upcoming competition. Participants responded by selecting either "*My goal is to do better than participant **162**"* (1) or "*My goal is to avoid doing worse than participant **162**"* (0) to indicate their preferential endorsement of performance-approach or performance-avoidance goals, respectively. This represents the "dominant achievement goal" approach (Van Yperen, 2006) to performance goal assessment.

Continuous performance goals. Elliot and Murayama's (2008) Achievement Goal Questionnaire-Revised (AGQ-R) was adapted-to-context to measure performance-approach

goals (3 items: “I am striving to do well compared to participant 162”; “My aim is to perform well relative to participant 162”; and “My goal is to perform better than participant 162”) and performance-avoidance goals (3 items: “I am striving to avoid performing worse than participant 162”; “My aim is to avoid doing worse than participant 162”; and “My goal is to avoid performing poorly compared to participant 162”) for the upcoming competition. Participants responded on a *strongly disagree* (1) to *strongly agree* (5) scale, and responses were averaged to form the performance-approach (α = .84) and performance-avoidance (α = .82) goal indexes. This represents the most common approach to performance goal assessment.

Results

Overview of analyses. Two types of multiple regression models were conducted to test the hypotheses: (a) a social comparison information model comprised of the social comparison information variable (positive information = 1, negative information = 0) and participant sex (0 male, 1 female), and (b) a performance expectancy model comprised of the performance expectancy variable, the social comparison information variable, and sex. Sex was included, *a priori*, as a control variable in all analyses, because it has been shown to be an important variable in the study of competition (Kesebir et al., 2019; Niederle & Vesterlund, 2011; Swab & Johnson, 2019). Linear and logistic multiple regression was used to test hypotheses involving the continuous and forced-choice dependent variables, respectively. Mediation was examined using 5,000 bootstrapped samples (Hayes, 2013) testing whether the indirect effect of social comparison information on the performance goal variables via performance expectancy (controlling for sex) significantly differed from 0. See Table 1 for means, standard deviations, and zero-order correlations for all variables.

Predicting performance expectancy.

Social comparison information model. Social comparison information was a significant predictor of performance expectancy, β = .61, 95% CI [.55, .66], $t(786) = 21.48$, $p < .001$; participants who received positive information ($M = 2.9$, $SD = 0.8$) reported a significantly higher expectancy than those who received negative information ($M = 1.6$, $SD = 0.8$). Sex was not a significant predictor, β = -.04, 95% CI [-.10, .01], $t(786) = -1.48$, $p = .141$.

Predicting forced-choice performance goal adoption.

Social comparison information model. Social comparison information was a significant predictor of forced-choice performance goals, $OR = 2.72$, 95% CI [2.02, 3.68], $p < .001$; participants who received positive information relative to negative information reported preferential adoption of performance-approach over performance-avoidance goals. Sex was also a significant predictor, $OR = 0.73$, 95% CI [0.54, 0.98], $p = .040$, with men relative to women showing a stronger preference for performance-approach over performance-avoidance goals.

Performance expectancy model. Performance expectancy was a significant positive predictor of performance-approach over performance-avoidance goals, $OR = 1.96$, 95% CI [1.61, 2.40], $p < .001$. Social comparison information was no longer significant, $OR = 1.25$, 95% CI [0.85, 1.82], $p = .256$; likewise, sex was no longer significant, $OR = 0.75$, 95% CI [0.55, 1.03], $p = .074$.

Mediation. The indirect effect was significant in the bootstrap analysis. Performance expectancy statistically mediated the effect of social comparison information on forced-choice performance goal adoption (indirect effect = 0.83, 95% CI [0.59, 1.11]). See Figure 2 for a summary.

Predicting continuous performance-approach goal adoption.

Social comparison information model. Social comparison information was a significant predictor of performance-approach goals, β = .13, 95% CI [.07, .20], $t(786) = 3.81$, $p < .001$; participants who received positive information ($M = 4.2$, $SD = 0.6$) reported higher performance-approach goals than those who received negative information ($M = 4.0$, $SD = 0.8$). Sex was not a significant predictor, β = .007, 95% CI [-.06, .08], $t(786) = 0.19$, $p = .848$.

Performance expectancy model. Performance expectancy was a significant positive predictor of performance-approach goals, β = .23, 95% CI [.14, .31], $t(785) = 5.13$, $p < .001$. Social comparison information was no longer significant, β = -.002, 95% CI [-.09, .08], $t(785) = -0.05$, $p = .958$, and sex was not a significant predictor, β = .02, 95% CI [-.05, .09], $t(785) = 0.46$, $p = .642$.

Mediation. The indirect effect was significant in the bootstrap analysis. Performance expectancy statistically mediated the effect of social comparison information on performance-approach goal adoption (indirect effect = 0.10, 95% CI [0.06, 0.13]). See Figure 2 for a summary.

Predicting continuous performance-avoidance goal adoption.

Social comparison information model. Social comparison information was not a significant predictor of performance-avoidance goals, β = -.05, 95% CI [-.12, .02], $t(786) = -1.49$, $p = .136$ (positive information $M = 3.9$, $SD = 0.8$; negative information $M = 4.0$, $SD = 0.8$). Sex was a significant predictor, β = .07, 95% CI [.002, .14], $t(786) = 2.01$, $p = .045$, with women ($M = 4.0$, $SD = 0.8$) adopting more performance-avoidance goals than men ($M = 3.9$, $SD = 0.9$). See Figure S1 in Supplementary Materials for results of an ancillary within-subjects analysis.

Performance expectancy model. Performance expectancy was a significant negative predictor of performance-avoidance goals, β = -.09, 95% CI [-.18, -.002], $t(785) = -2.01$, $p =$

.045. Social comparison information was not significant, β = .001, 95% CI [-.09, .09], $t(785) = 0.03$, $p = .974$, and sex was no longer significant, β = .07, 95% CI [-.002, .14], $t(785) = 1.91$, $p = .057$.

Mediation. The indirect effect was significant in the bootstrap analysis. Performance expectancy did not statistically mediate the effect of social comparison information on performance-avoidance goal adoption (indirect effect = -0.05, 95% CI [-0.09, 0.003]).

Brief Discussion

In sum, all hypotheses were supported for performance expectancy, forced choice performance-approach goals over performance-avoidance goals, and performance-approach goals per se, but few hypotheses were supported for performance-avoidance goals per se. A limitation of this experiment was that the use of two social comparison information conditions, positive and negative, did not allow conclusions to be drawn regarding which condition(s) was driving the observed effects. We attended to this issue in Experiment 2, anticipating that effects would be observed for both positive information relative to control and negative information relative to control.

Experiment 2

Experiment 2 received IRB approval (#584) from [blinded for review]. It had two primary aims. The first aim was to conduct a replication of Experiment 1. The second aim was to extend Experiment 1 by including a no social comparison information control condition.

Methods

Participants. An *a priori* power analysis was used to estimate the sample size required to detect a small effect ($d = 0.20$) with a one-way ANOVA in a three group between-participants experiment with .80 power and two-tailed alpha = .05. The estimate was 969 participants. We

exceeded this by collecting data from 1068 participants recruited through TurkPrime. Individuals were compensated 0.20 USD. Eight participants were excluded *a priori* for failing to complete all tasks and measures, as were four additional participants who did not consent to data use, leaving 1056 participants to be included in analyses: 425 men, 629 women, 2 unspecified; M_{age} = 35.51 (*SD* = 11.23); 817 Caucasian/White, 76 African/African-American/Black, 73 Asian/Asian-American, 52 Hispanic/Latino, 30 mixed, and 8 unspecified.

Procedure and social comparison information manipulation. The procedure and manipulation were the same as those used in Experiment 1 with one exception: A no information control condition was included. Participants were randomly assigned to receive positive (*n* = 385), negative (*n* = 334), or no (*n* = 337) information regarding their performance on the practice problems relative to their ostensible opponent. Those in the positive and negative information conditions received the same manipulations as in Experiment 1. For those in the control condition, after completing the practice task, they were simply informed that they were going to compete against another, randomly assigned participant; no social comparison information was provided. All participants were then asked to complete the performance expectancy, performance goal, and demographics measures, as in Experiment 1. After completing these measures, participants were notified that the experiment was now actually over and, subsequently, debriefed and given a consent to data use form.

Materials and measures.

Achievement task. The same shape-finding problems used in Experiment 1 were used.

Performance expectancy. The same measure used in Experiment 1 was used.

Forced-choice performance goal. The same measure used in Experiment 1 was used.

Performance goals. The same measure used in Experiment 1 was used. Responses were averaged to form the performance-approach (α = .81) and performance-avoidance (α = .83) goal indexes.

Results

Overview of analyses. The same types of regression analyses conducted in Experiment 1 were conducted for this experiment, although the regression models were revised to account for three (as opposed to two) conditions, and follow-up comparisons were utilized. As in Experiment 1 we use two types of regression analysis. The first type tested the omnibus effect of condition controlling for participant sex. Sex (0 male, 1 female) was entered in the first step of the analysis, and the overall condition effect (represented by two-dummy coded variables) was entered in the second step; the statistical significance of the overall condition effect was assessed using an F-test for the change in R^2 in the linear regressions and a chi-square test for the change in deviance in the logistic regressions. When a significant overall condition effect was present, we proceeded to conduct protected pairwise comparisons (i.e., Fisher's Least Significant Difference tests) testing the positive vs. negative, positive vs. control, and negative vs. control conditions; when a significant condition effect was not present, we conducted post-hoc pairwise comparisons with Bonferroni correction. The second type of regression analysis tested the influence of performance expectancy controlling for sex and the aforementioned comparisons. Mediation was tested with the same bootstrap sampling procedure used in Experiment 1. See Table 2 for means, standard deviations, and zero-order correlations for all variables.

Predicting performance expectancy.

Social comparison information models. There was a significant increase in variance accounted for when the dummy-coded variables were included in the equation, ΔR^2 = .30, F(2,

1050) = 228.86, $p < .001$, indicating an overall effect of condition. Therefore, we proceeded to examine the protected pairwise comparisons. Participants who received positive information ($M = 2.9$, $SD = 0.8$) reported significantly higher performance expectations than those who received negative information ($M = 1.7$, $SD = 0.8$), $\beta = .61$, 95% CI [.55, .67], $t(1050) = 20.42$, $p < .001$. Participants who received positive information also reported significantly higher expectations than those who received no information ($M = 2.0$, $SD = 0.8$), $\beta = .45$, 95% CI [.40, .51], $t(1050) = 15.16$, $p < .001$, and participants who received no information reported significantly higher expectations than those who received negative information, $\beta = .15$, 95% CI [.10, .21], $t(1050) = 5.13$, $p < .001$. Sex was also a significant predictor, $\beta = -.06$, 95% CI [-.11, -.01], $t(1050) = -2.31$, $p = .021$, with men ($M = 2.32$, $SD = .99$) having a higher expectancy than women ($M = 2.16$, $SD = .94$).

Predicting forced-choice performance goal adoption.

Social comparison information models. There was a significant increase in goodness of fit when the dummy-coded variables were included in the equation, $\chi^2(2) = 31.99$, $p < .001$, indicating an overall effect of condition. Therefore, we proceeded to examine the protected pairwise comparisons. Participants who received positive information relative to negative information reported preferential adoption of performance-approach over performance-avoidance goals, $OR = 2.40$, 95% CI [1.77, 3.27], $p < .001$. Participants who received positive information relative to no information also reported preferential adoption of performance-approach over performance-avoidance goals, $OR = 1.59$, 95% CI [1.17, 2.17], $p = .003$, and participants who received no information relative to negative information reported preferential adoption of performance-approach over performance-avoidance goals, $OR = 1.51$, 95% CI [1.11, 2.05], $p = .008$. Sex was also a significant predictor, $OR = 0.75$, 95% CI [0.58, 0.97], $p = .031$,

with men showing a stronger preference for performance-approach over performance-avoidance goals.

Performance expectancy models. Performance expectancy was a significant positive predictor of performance-approach over performance-avoidance goals in the performance expectancy models, *OR* = 2.72, 95% CI [2.26, 3.29], $p < .001$. The positive information vs. negative information comparison was no longer significant, *OR* = 0.74, 95% CI [0.50, 1.10], $p = .142$. The positive information vs. no information comparison was significant but in the opposite direction of that obtained when it was tested without performance expectancy in the equation, *OR* = 0.66, 95% CI [0.45, 0.95], $p = .026$. The no information vs. negative information comparison was no longer significant, *OR* = 1.13, 95% CI [0.81, 1.58], $p = .468$, and, likewise, sex, OR = 0.80, 95% CI [0.61, 1.05], $p = .115$, was no longer significant.

Mediation. Each of the indirect effects was significant in the bootstrap analyses. Performance expectancy statistically mediated the effects of positive vs. negative information (indirect effect = 1.23, 95% CI [0.97, 1.52]), positive vs. no information (indirect effect = 0.91, 95% CI [0.71, 1.14]), and no vs. negative information (indirect effect = 0.32, 95% CI [0.19, 0.47]) on forced choice performance goal adoption. See Figure 3 for summaries.

Predicting continuous performance-approach goal adoption.

Social comparison information models. There was a significant increase in variance accounted for when the dummy-coded variables were included in the equation, $\Delta R^2 = .03$, $F(2, 1050) = 15.58$, $p < .001$, indicating an overall effect of condition. Therefore, we proceeded to examine the protected pairwise comparisons. Participants who received positive information ($M = 4.2$, $SD = 0.6$) reported higher performance-approach goals than those who received negative information ($M = 3.9$, $SD = 0.7$), $\beta = .20$, 95% CI [.13, .27], $t(1050) = 5.56$, $p < .001$. Participants

who received positive information also reported higher performance-approach goals than those who received no information (*M* = 4.0, *SD* = 0.7), β = .11, 95% CI [.04, .18], *t*(1050) = 3.05, *p* = .002, and participants who received no information reported higher performance-approach goals than those who received negative information, β = .09, 95% CI [.02, .16], *t*(1050) = 2.44, *p* = .015. Sex was not a significant predictor, β = .03, 95% CI [-.03, .09], *t*(1050) = 0.90, *p* = .370.

Performance expectancy models. Performance expectancy was a significant positive predictor of performance-approach goals in the performance expectancy models, β = .25, 95% CI [.18, .32], *t*(1049) = 6.96, *p* < .001. The positive information vs. negative information comparison was no longer significant, β = .05, 95% CI [-.04, .13], *t*(1049) = 1.10, *p* = .273; likewise, neither the positive information vs. no information comparison, β = -.005, 95% CI [-.08, .07], *t*(1049) = -0.13, *p* = .900, nor the no information vs. negative information comparison, β = .05, 95% CI [-.02, .12], *t*(1049) = 1.37, *p* = .170, were significant. Sex, β = .04, 95% CI [-.02, .10], *t*(1049) = 1.41, *p* = .159, was not significant.

Mediation. Each of the indirect effects was significant in the bootstrap analyses. Performance expectancy statistically mediated the effects of positive vs. negative information (indirect effect = 0.21, 95% CI [0.15, 0.28]), positive vs. no information (indirect effect = 0.16, 95% CI [0.11, 0.21]), and no vs. negative information (indirect effect = 0.05, 95% CI [0.03, 0.08]), on performance-approach goal adoption. See Figure 3 for summaries.

Predicting continuous performance-avoidance goal adoption.

Social comparison information models. There was not a significant increase in variance accounted for when the dummy-coded variables were included in the equation, $\Delta R^2 = .001$, $F(2, 1050) = 0.64$, $p = .526$, indicating no overall effect of social comparison condition. Therefore, we proceeded to examine the post-hoc pairwise comparisons with Bonferroni correction.

Participants who received positive information (M = 4.0, SD = 0.84) did differ in their performance-avoidance goal reports relative those who received negative information (M = 4.0, SD = 0.8), β = -.002, 95% CI [-.15, .15], t(1050) = -0.04, p > .999. Participants who received positive information also did not differ in their performance-avoidance goal reports relative to those who received no information (M = 4.0, SD = 0.8), β = -.06, 95% CI [-.21, .08], t(1050) = -1.02, p = .922, and participants who received no information did not differ in their performance-avoidance goal reports relative to those who received negative information, β = .06, 95% CI [-.09, .21], t(1050) = 0.95, p > .999. Sex was a significant predictor, β = .09, 95% CI [.03, .15], t(1050) = 2.93, p = .003, with women (M = 4.03, SD = .79) reporting higher performance-avoidance goals than men (M = 3.88, SD = .86). See Figure S2 in Supplementary Materials for results of an ancillary within-subjects analysis.

Performance expectancy models. Performance expectancy was not a significant positive predictor of performance-avoidance goals in the performance expectancy models, β = -.07, 95% CI [-.14, .00], t(1049) = -1.84, p = .066. The positive information vs. negative information comparison was not significant, β = .07, 95% CI [-.11, .24], t(1049) = 0.95, p > .999; likewise, neither the positive information vs. no information comparison, β = -.01, 95% CI [-.17, .15], t(1049) = -0.15, p > .999, nor the no information vs. negative information comparison, β = .08, 95% CI [-.08, .23], t(1049) = 1.22, p = .663, were significant. Sex remained significant, β = .09, 95% CI [.03, .15], t(1049) = 2.79, p = .005.

Mediation. None of the indirect effects were significant in the bootstrap analyses. Performance expectancy did not statistically mediate the effects of positive vs. negative information (indirect effect = -0.07, 95% CI [-0.16, 0.01]), positive vs. no information (indirect

effect = -0.03, 95% CI [-0.12, 0.01]), and no vs. negative information (indirect effect = -0.02, 95% CI [-0.04, 0.00]), on performance-avoidance goal adoption.

General Discussion

The findings from our two experiments provided consistent support for most but not all of our hypotheses. All hypotheses were supported for performance expectancy, forced choice performance-approach goals over performance-avoidance goals, and performance-approach goals per se; however, few hypotheses were supported for performance-avoidance goals per se. Most of the findings that we observed were small or small-to-medium in magnitude. In the following, we overview and situate our findings within the context of the broader literature, consider future directions for and limitations of our research, and offer concluding remarks.

Main findings in context of broader literature

First, we found that competing against a seemingly inferior, relative to a seemingly superior or control (no social comparison information), opponent led to a preference for performance-approach over performance-avoidance goals and greater performance-approach goal adoption per se. However, contrary to predictions, competing against a seemingly superior, relative to a seemingly inferior or control, opponent did not lead to greater performance-avoidance goal adoption per se. The findings for performance-approach goals suggest a logical, straightforward use of these goals in self-regulation – if one has done better than an opponent (i.e., engages in downward social comparison), one strives to continue outperforming that opponent. The findings for performance-avoidance goals suggest that the use of these goals is more complex – if one has done worse than an opponent (i.e., engages in upward social comparison), one is no more or less likely to subsequently strive to avoid underperforming that opponent. Overall, these findings indicate an interesting approach-avoidance asymmetry: When

facing an inferior opponent, one is more likely to adopt a performance-approach than a performance-avoidance goal, but when facing a superior opponent, one is equally likely to adopt a performance-approach or a performance-avoidance goal. These findings are also consistent with findings in the social comparison literature indicating that reactions, included self-regulatory responses, to upward comparison are more complex than reactions to downward comparison (Chan & Briers, 2019; Garcia et al., 2020; Muller & Fayant, 2010). Thus, when an upward comparison process indicates that one will subsequently face a superior opponent (i.e., one is an "underdog"), it is possible that some people in this position focus straightforwardly on not losing (pursuing performance-avoidance goals), while others in this position feel that they have "nothing to lose" and focus on "shooting for the stars" (pursuing performance-approach goals; Lount, Pettit, & Doyle, 2017). It would be valuable in future empirical work to more deeply probe the processes responsible for these upward-downward comparison and approach-avoidance goal asymmetries.

Second, we found that competing against a seemingly inferior opponent led to a higher performance expectancy than competing against a seemingly superior or control opponent, and competing against a seemingly superior opponent led to a lower performance expectancy than competing against a control opponent. These findings were obtained with a single piece of norm-referenced performance information, highlighting the power of past experience in creating future expectancies (Bandura, 1997). These findings supported self-efficacy theory predictions over alternative predictions from a self-protection or self-affirmation perspective (Dai et al., 2018; Nurmohamed, in press). It is possible that in a competition context in which performance information is more public or more widely disseminated, findings consistent with self-protection (declaring low expectations after prior success) or self-affirmation (declaring high expectations

after prior failure) may emerge. Future research would do well to investigate the boundary conditions for self-efficacy theory effects, and to seek an integrative understanding of self-efficacy, self-protection, and self-affirmation processes in competition contexts.

Third, we found that participants' performance expectancy for the competition positively predicted a preference for performance-approach over performance-avoidance goals and performance-approach goals per se, and negatively predicted performance-avoidance goals per se (albeit not quite reaching significance in Experiment 2). The positive link between performance expectancy and performance-approach goals is consistent with large body of work on expectancies of all types, including norm-referenced expectancies (Cury et al., 2002; Huang, 2016; Ommundsen, 2004). The negative link between performance expectancy and performance-avoidance goals is of particular interest, given that prior empirical work on norm-referenced expectancies and performance-avoidance goals has often yielded nonsignificant (Jaakkola et al., 2015; Morris & Kavussanu, 2008) or even positive (Warburton & Spray, 2008; Zourbanos et al., 2013) relations. Close inspection of these prior studies reveals that nearly all focused on others in general in the expectancy and goal measures, and they were conducted with regard to a physical education class or a sport activity. In our studies, the expectancy and goal measures focused on a specific opponent in the context of an actual competition, thus maximizing the specificity and immediacy of the expectancy and goal assessments (Zell, Alicke, & Strickhouse, 2015). Nevertheless, it should be noted that the relation between performance expectancy and performance-avoidance goals was descriptively smaller in magnitude than that for performance-approach goals. It remains possible that performance-avoidance goals are less closely tied to performance expectancies than are performance-approach goals, and that other variables are more powerful predictors of performance-avoidance goals than are performance expectancies.

Finally, we found that participants' performance expectancy mediated the effect of social comparison information on performance-approach goal adoption. The reason that competing against an inferior, relative to a superior or control, opponent led to greater performance-approach goals is that it raised the performance expectation which, in turn, facilitated the adoption of a performance-approach goal. Although performance expectancy was negatively related to performance-avoidance goal adoption, this variable did not serve as a mediator of the effect of social comparison information on performance-avoidance goals – there was neither a direct relation between social comparison information and performance-avoidance goals nor an indirect relation via performance expectancy. Thus, a clear take home message from our research is that performance-avoidance goal adoption is more complex than performance-approach goal adoption; this was documented with regard to social comparison information and performance expectancy herein, but we suspect that this statement holds more broadly as well.

Future research and limitations

Given our results for performance-avoidance goals, a clear direction for future research is to explore other possible antecedents of these goals in competition settings and social comparison situations more generally. A candidate related to the present research is the certainty afforded by social comparison information. We simply provided one piece of initial social comparison information in the present work, and it is likely that this left participants with considerable uncertainty about whether they could or could not outperform the target other. A single piece of positive normative information may be sufficient to compel individuals toward performance-approach goals, but it may take several pieces of consistently negative normative feedback before individuals resign themselves to adopt a performance-avoidance goal. Thus, certainty may moderate the link between social comparison information and performance-

avoidance goals, with negative information only leading to performance-avoidance goals when certainty is relatively high. An important caveat here is that if certainty becomes complete such that performing poorly seems inevitable, individuals may self-protectively divest from competence valuation entirely (Bandura & Cervone, 1986; Rogers & Feller, 2016), which would lead to a low level of performance-approach and performance-avoidance goals alike.

A limitation of the present research is that all conditions in our experiments involved a competition context; a no competition comparison group was not included. As such, it is not possible to determine whether our performance expectancy and achievement goal findings are unique to competition contexts or generalize to social comparison situations involving competence and goals more broadly. Future work would do well to test this important question. Another limitation of our research is that we investigated the effect of a single instance of initial performance information on goal adoption, rather than multiple rounds of performance information. Recent research has shown that competence-relevant processes can vary over the course of an achievement task (Huang, Etkin, & Jin, 2017), and future work would do well to take this into account. A third limitation is that we examined reactions to induced social comparison information only, without considering the proactive selection of social comparison information (see Gerber, 2018, on the reaction vs. selection distinction). Subsequent work is needed to broaden the ideas examined herein to social comparison selection processes.

A strength of the present research is that we were able to create an engaging online social comparison manipulation, as our online data collection enabled us to acquire large sample sizes that afforded a powerful test of our hypotheses. A related limitation, however, is that the stakes for the social comparison were relatively low in that it was not face-to-face, results were private rather than public, and no award or monetary prize was promised to the best performer. It

remains unknown whether our findings apply to social comparison situations with these other characteristics. Another strength of our research is our *experimental* documentation of relations between social comparison information and both performance expectancies and achievement goals; a limitation of our research is our *correlational* documentation of relations between performance expectancy and goals. Causal inferences are warranted regarding the former, but not the latter, relations.

Conclusions

In 2005, Wheeler and Suls stated "It is strange that social comparison has not been better integrated into the achievement motivation literature" (p. 567). Early theoretical and empirical work on achievement goals laid a firm foundation for the integration of social comparison and achievement goal concepts (Ames, 1992; Butler, 1993; Dweck, 1986; Nicholls, 1984), but it is only recently that researchers have begun to build on this foundation (see Chatzisarantis et al., 2016; Darnon, Dompnier, Gilliéron, & Butera, 2010; Régner et al., 2007; Shin, Lee, Ahn, & Sohn, 2020; Van Yperen & Leander, 2014). Thus, although there is clear conceptual overlap among the social comparison and achievement goal literatures – both focus on competence and evaluative standards (Bounoua et al., 2012) – most research has been and continues to be conducted in isolation. The research that we have presented herein focuses on an area of integration that we think promises to be particularly generative and mutually beneficial moving forward – the upward-downward direction of social comparison and approach-avoidance achievement goals.

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Table 1. Experiment 1: Descriptive statistics and zero-order correlations

Variables	*M*	*SD*	1	2	3	4	5
1. Performance expectancy	2.22	1.01	–				
2. Forced-choice performance goals	0.22	0.98	0.33***	–			
3. Performance-approach goals	4.05	0.69	0.22***	0.45***	–		
4. Performance-avoidance goals	3.95	0.83	-0.09*	-0.16***	0.27***	–	
5. Participant sex	0.19	0.98	-0.01	-0.06	0.01	0.07	–

Note: The tabled values represent Pearson Product Moment correlation coefficients with listwise deletion. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$. The .27 correlation between performance-approach and performance-avoidance goals is somewhat smaller than that often observed; interestingly, this may be due to the concrete other (one's opponent) focused on in the performance goal items.

Table 2. Experiment 2: Descriptive statistics and zero-order correlations

Variables	*M*	*SD*	1	2	3	4	5
1. Performance expectancy	2.22	0.96	–				
2. Forced-choice performance goals	0.21	0.98	0.38***	–			
3. Performance-approach goals	4.02	0.67	0.26***	0.36***	–		
4. Performance-avoidance goals	3.97	0.82	-0.06	-0.18***	0.36***	–	
5. Participant sex	0.19	0.98	-0.08*	-0.07*	0.02	0.09**	–

Note: The tabled values represent Pearson Product Moment correlation coefficients with listwise deletion. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$. As in Experiment 2, the correlation between performance-approach and performance-avoidance goals (.36) is somewhat smaller than that often observed, and this may be due to the concrete other (one's opponent) focused on in the performance goal items.

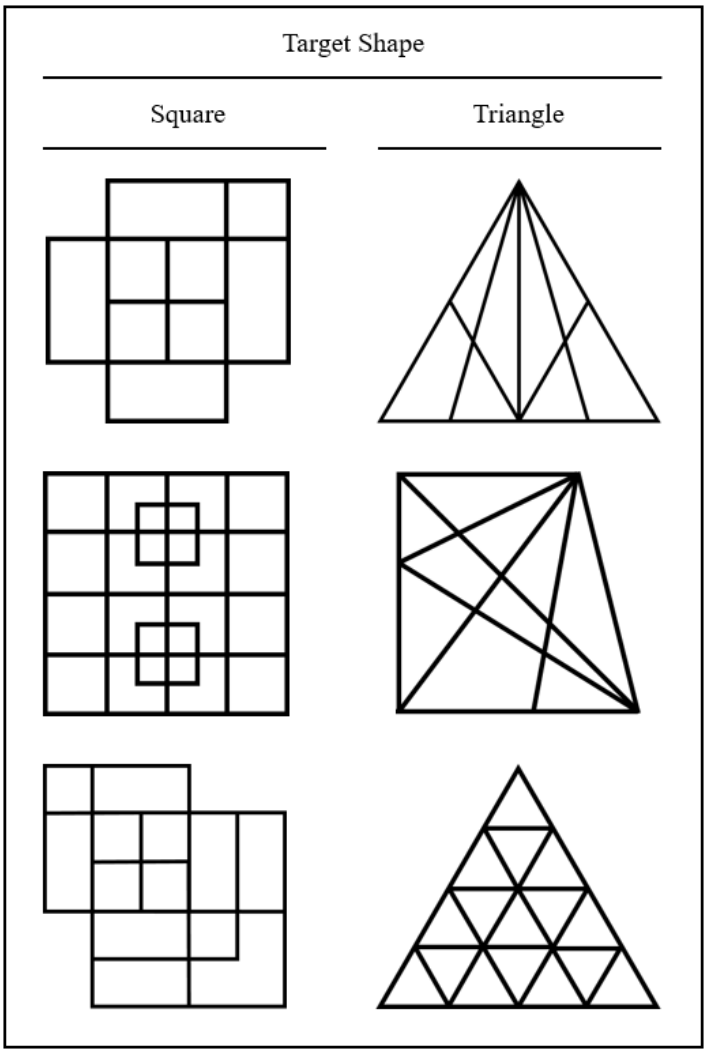

Figure 1. Shape-finding problems used for the achievement task.

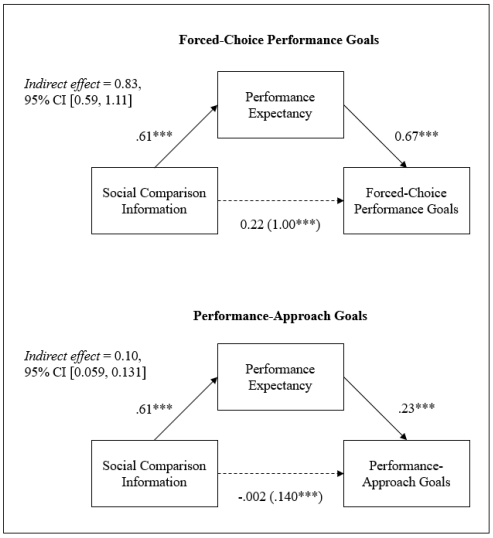

Figure 2. Experiment 1: The effect of social comparison information on forced-choice performance goals (top) and performance-approach performance goals (bottom) mediated by performance expectancy (controlling for sex). All paths to the forced-choice performance goals variable represent unstandardized logistic regression coefficients (in log-odds units); all other paths represent unstandardized linear regression coefficient. *$p < .05$, **$p < .01$, ***$p < .001$; dashed lines indicate nonsignificance.

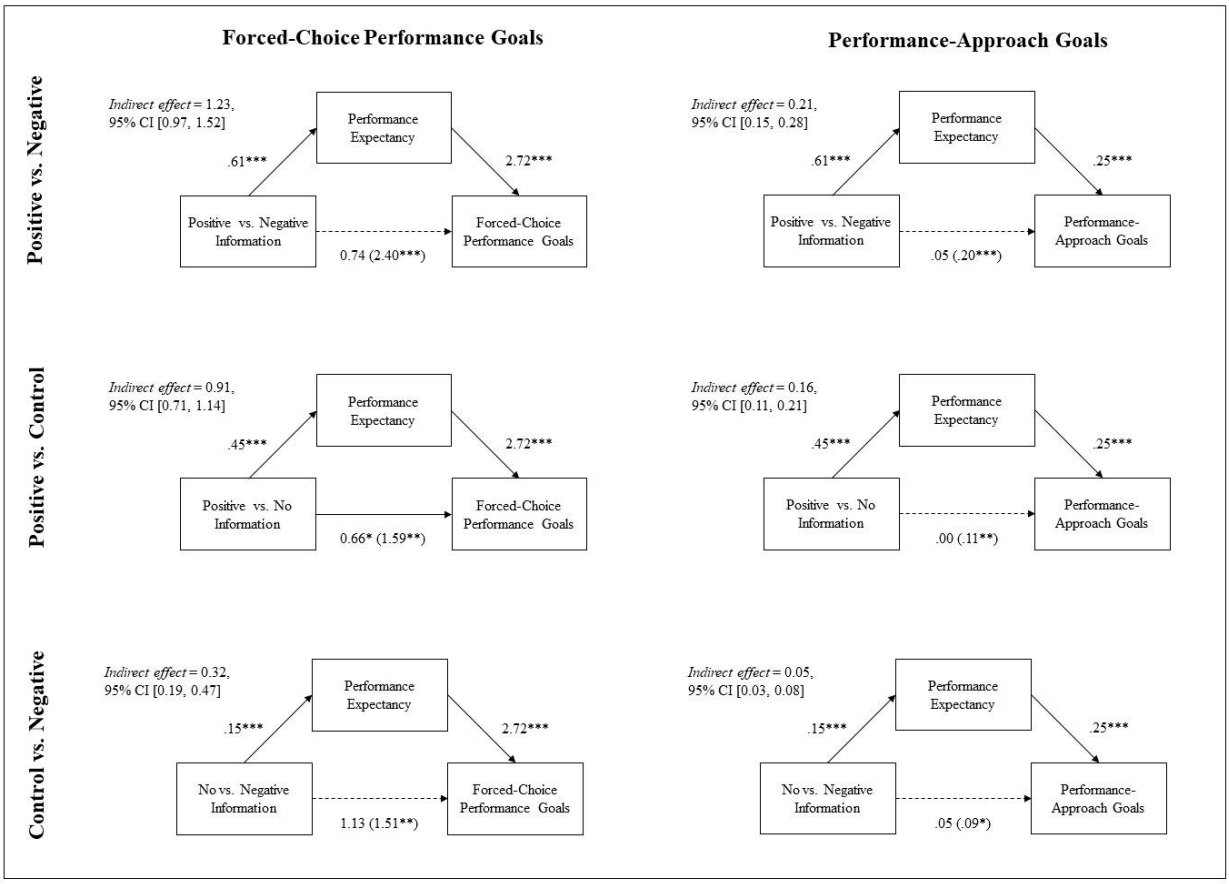

Figure 3. Experiment 2: The effect of social comparison information on forced-choice performance goals (left) and performance-approach performance goals (right) mediated by performance expectancy (controlling for sex). All paths to the forced-choice performance goals variable represent odds ratios; all indirect effects for forced-choice performance goals represent unstandardized logistic regression coefficients (in log-odds units); all indirect effects for performance-approach goal models represent unstandardized linear regression coefficients; all other paths represent standardized linear regression coefficient. *$p < .05$, **$p < .01$, ***$p < .001$; dashed lines indicate nonsignificance.