Personality and Individual Differences 171 (2021) 110451

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Social comparison orientation and trait competitiveness: Their interrelation and utility in predicting overall and domain-specific risk-taking

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ARTICLE INFO

Keywords:
Social comparison
Trait competitiveness
Risk-taking
Domain-specific

ABSTRACT

In accord with Festinger (1954) and Garcia et al. (2013), we investigate the understudied link between social comparison and competition. Specifically, in two correlational studies using university undergraduate (N = 298) and adult worker (N = 645) samples, we used path models to test relations between two types of social comparison orientation (SCO-ability and SCO-opinion), trait competitiveness (TC), and both overall and domain-specific risk-taking. The findings were largely consistent across studies, with some variation within risk-taking domain. SCO-ability positively predicted TC, but the reciprocal relation was not observed. SCO-ability positively predicted overall risk-taking and risk-taking in the ethical, gambling, and health/safety domains across studies (and social-investment risk-taking for adult workers). TC was also an independent positive predictor of overall risk-taking and ethical risk-taking (and social-investment, gambling, and health/safety risk-taking for adult workers). Mediation analyses showed that TC partially mediated the relation between SCO-ability and both overall risk-taking and ethical risk-taking across studies (and social, gambling, and health/safety risk-taking for adult workers). SCO-opinion exhibited few consistent links to risk-taking. This research furthers integration of the social comparison and competition literatures, and expands the literature on antecedents of risk-taking behavior.

1. Introduction

In his classic social comparison theory, Festinger (1954) contended that people have a fundamental propensity to evaluate their abilities and opinions through comparison with others. Festinger (1954) further posited that *comparison* with others facilitates *competition* with others. The social comparison literature has become voluminous over the years (Gerber et al., 2018; Suls et al., 2020), but the link between social comparison and competition is understudied (Garcia et al., 2013). Responding to this oversight, Garcia et al. (2013) proffered a theoretical model delineating various factors that prompt social comparison (e.g., relational closeness, audience presence) and, accordingly, evoke competitive attitudes and behaviors.

Like Garcia and colleagues, we seek to attend to the understudied link between social comparison and competition, however, we seek to do so by empirically investigating the relation between individual differences in these two constructs. Social comparison orientation (SCO) represents a dispositional tendency to compare oneself to others (Gibbons & Buunk, 1999). Trait competitiveness (TC) represents a dispositional desire to do better than others (Elliot et al., 2018). Both the SCO and TC constructs are grounded in a focus on others, and explicitly (SCO) or implicitly (TC) involve a comparison of the self versus another person or persons. Given this clear conceptual overlap, it seems sensible to predict that these variables will be positively related; this relation has been surprisingly overlooked to date (see Chae, 2015; Piko et al., 2010).

SCO has two distinct foci: Ability (comparing skills and performance with an eye toward relative rank) and opinion (comparing thoughts, values, and beliefs with an eye toward consensual accuracy; Gibbons & Buunk, 1999). It is SCO-ability, not SCO-opinion, that is the close conceptual match to TC, and that is expected to manifest the positive relation, accordingly (Yang and Robinson (2018) even refer to SCO-ability and SCO-opinion as "competition-based" and "non-competitive", respectively, p. 49). Thus, the first aim of our research was to examine the presence of a relation between SCO-ability and TC.

The second aim of our research was to test the directionality of the predicted relation between SCO-ability and TC, albeit in a preliminary fashion (with structural equation modeling in a correlational design).

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https://doi.org/10.1016/j.paid.2020.110451
Received 6 August 2020; Received in revised form 6 October 2020; Accepted 11 October 2020
Available online 02 November 2020

Research has yet to be conducted on this directionality question. Both Festinger (1954) and Garcia et al. (2013), emphasized the role of social comparison in prompting competition – comparing oneself to others commonly leads to wanting to do better than others. However, the reciprocal relation is also sensible – wanting to do better than others can lead to a high frequency of social comparison – and the two variables may be reciprocally related to each other (Garcia et al., 2020). We tested the reciprocal relation herein, but made no a priori hypothesis regarding directionality.

The final aim of our research was to test SCO and TC as predictors of risk-taking. Risk-taking represents one's behavioral propensity along a risk-averse to risk-seeking continuum (Weber et al., 2002), and has been widely studied across a diversity of disciplines (e.g., biology, economics, psychology; Mishra, 2014). Risk-taking is commonly assessed within domains – specifically the social-investment, recreational, ethical, gambling, and health/safety domains (Hu & Xie, 2012; Weber et al., 2002) – although overall risk-taking is also studied (Highhouse et al., 2017). Risk-sensitivity theory posits that individuals may engage in higher risk-taking behavior when they are less likely to succeed via "safe", low-risk means in achievement situations (Mishra, 2014). Strategic risk-taking can contribute to both goal progress (Eriksen & Kvaløy, 2017) and avoiding getting behind (Gärling et al., 2019). Gärling et al. (2019) have proposed that SCO and TC facilitate implementation of this strategic risk-taking (Gärling et al., 2019). Existing work on SCO and risk-taking is sparse, has focused almost exclusively on health/safety, and has yielded mixed results (see Fiedler et al., 2013; Piko et al., 2010). For example, an early study found that SCO positively predicted health risk-taking behavior, such as reckless driving (Gibbons & Gerrard, 1995), while a more recent study found that SCO negatively predicted substance use (Piko et al., 2010). Existing work on TC and risk-taking is likewise sparse, has focused largely on gambling, and has yielded a positive relation (Harris et al., 2015). So, research on the predictive utility of SCO and TC is clearly needed, especially research that attends to risk-taking across multiple domains. We seek to fill this void in the present work. Individuals high in SCO have a strong other-focus, a desire to please others, and are more readily influenced by others' expectations and actions (Gibbons & Buunk, 1999); as such we expected SCO to positively predict risk-taking. Individuals high in TC have an appetitive focus, a strong tendency toward positive self-evaluation (i.e. self-serving bias), and a penchant for overconfidence (Gärling et al., 2019); as such, we expected TC to positively predict risk-taking as well. We tested SCO and TC as simultaneous predictors of risk-taking, and expected the two variables to account for unique risk-taking variance. We made no a priori predictions regarding the two SCO dimensions nor the five risk-taking domains.

The present research comprises two studies. Study 1 focused on the relation between SCO(-ability and -opinion), TC, and both overall and domain-specific risk-taking among university students. Study 2 sought to replicate Study 1 with adult workers, as research with university students does not always generalize beyond that population (Henrich et al., 2010).

2. Study 1

2.1. Method

2.1.1. Participants and procedure

Participants were 298 university students (151 female) recruited via Wenjuanxing (WJX) online marketplace (similar to Amazon's MTurk). WJX allows the targeting of specific populations (e.g., university students) in recruitment. Participants ranged in age from 18 to 26 (M = 20.70, SD = 1.52). The target sample size was determined a priori, based on the guideline that the ratio of variables to participants be between 1:10 and 1:15, at minimum (Thompson, 2000). In this and the subsequent study, data collection was stopped when our sample size exceeded this guideline. Data exclusion occurred through system and manual control. In system control, the WJX platform automatically excludes respondents with the same IP, the same device, or a wrong answer to trap/lie questions (e.g., What is the capital of China?). In manual control, the WJX staff excludes those with an abnormal completion time (i.e. extremely long or short), inconsistent responding (e.g., the opposite response to two items with the same content), or inattentive responding (e.g., all responses identical on a measure). The aforementioned sample size represents the final number of participants recruited and retained by WJX. In this and the subsequent study, no manipulations were used, all analyzed variables are reported,[1] and all data were collected and data exclusions completed before data analysis was conducted. All participants completed an online survey containing the measures – in the order listed below – in return for 13 RMB (about $2). Informed consent was obtained from all participants.

2.1.2. Measures (see Table 1 for descriptive statistics and Cronbach's alphas)

2.1.2.1. SCO. The Chinese version of the SCO scale (Wang et al., 2006), adapted from Gibbons and Buunk (1999), was used to measure individuals' tendency to engage in social comparison. This measure consisted of 11 items, 7 assessing SCO-ability (e.g., "I always pay a lot of attention to how I do things compared with how others do things") and 4 assessing SCO-opinion (e.g., "I often like to talk with others about mutual opinions and experiences"). Response options were 1 (*strongly disagree*) to 5 (*strongly agree*).

2.1.2.2. TC. The competitive orientation scale developed by Chen et al. (2011) in China, was used to assess individuals' competitive disposition. This measure consists of 6 items (e.g., "My value can only be demonstrated when I perform better than others"). Response options were 1 (*strongly disagree*) to 5 (*strongly agree*).

2.1.2.3. Risk-taking. Risk-taking was assessed using the Chinese version of the domain-specific risk-taking scale (Hu & Xie, 2012), adapted from (Weber et al., 2002). Participants rated the likelihood that they would participate in 5 domains of 35 different risky behaviors on a 1 (*very unlikely*) to 5 (*very likely*) scale. The domains were social-investment (e.g., "Admitting that your tastes are different from those of your friends"), recreational (g., "Going camping in the wilderness, beyond the civilization of a campground"), ethical (e.g., "Forging somebody's signature"), gambling (e.g., "Betting a day's income at a high stakes poker game"), and health/safety (e.g., "Not wearing a helmet when riding a motorcycle"). An overall risk-taking scale was created by summing across domains.

2.2. Results

The bivariate correlations among the variables are shown in Table 1. We tested six hypothesized models using path analysis with observed variables. In each of the models, SCO-ability and SCO-opinion were correlated, SCO-ability and TC were reciprocally related, and SCO-ability, SCO-opinion, and TC predicted a risking-taking variable (see Fig. 1). Sex was entered as a control variable in all models.

Each of the six models showed a good fit to the data and the fit was highly similar across models (e.g., for overall risk-taking: $\chi^2(1) = 0.35$, $p = 0.557$, CFI = 1.00, SRMR = 0.01, RMSEA = 0.00). The results indicated that SCO-ability positively predicted TC (B = 0.70, SE = 0.24, t = 2.96, p = 0.003, 95%CI = [0.297, 1.226]), but the

[1] We also measured the motives to achieve success and avoid failure, and included them in initial analyses. The findings with these variables were straightforward, but unnecessarily complicated the main focus herein which was on trait competitiveness per se (the subset of the motive to achieve success most relevant to social comparison). For details on findings for the motives to achieve success and avoid failure, please contact the lead author.

Table 1
Study 1: Means, standard deviations, Cronbach's alpha coefficients, and the bivariate relations among the variables (N = 298).

	1	2	3	4	5	6	7	8	9
1. SCO-ability	1								
2. SCO-opinion	0.25***	1							
3. TC	0.50***	0.17**	1						
4. Overall RT	0.25***	0.05	0.25***	1					
5. Social-investment RT	0.11	−0.06	0.11	−0.02	1				
6. Recreational RT	0.01	0.01	0.1	0.69***	−0.16**	1			
7. Ethical RT	0.21***	0.00	0.22***	0.56***	0.02	0.12*	1		
8. Gambling RT	0.17**	0.07	0.11	0.59***	−0.05	0.26***	0.24***	1	
9. Health/Safety RT	0.18**	−0.02	0.17**	0.50***	0.11	0.17**	0.28***	0.05	1
M(SD)	3.62(0.60)	3.80(0.67)	3.34(0.63)	2.82(0.37)	2.69(0.45)	2.53(0.65)	1.89(0.62)	1.93(0.91)	2.96(0.72)
α	0.78	0.61	0.66	0.80	0.64	0.72	0.71	0.86	0.58

Note: SCO = Social comparison orientation; TC = Trait competitiveness; RT = Risk-taking.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

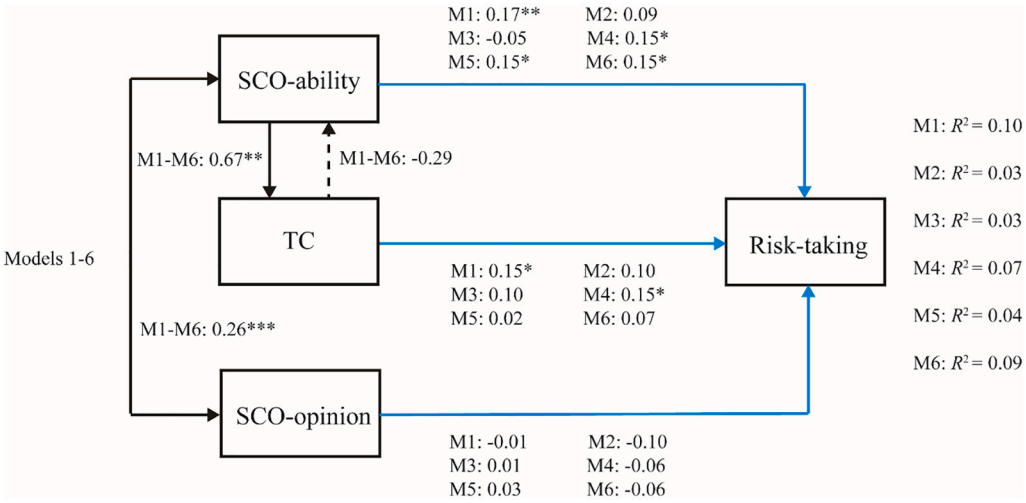

Fig. 1. Study 1: Path diagram with standardized path coefficients. The paths are shown for models 1–6 (M1-M6). The black paths represent results that are the same across all types of risk-taking measure; the blue paths represent results that vary according to the type of risk-taking measure: overall (M1), social-investment (M2), recreational (M3), ethical (M4), gambling (M5), and health/safety (M6). R^2 represents the proportion of the variance for each type of risk-taking that is explained by all independent variables in each model. Sex was included but is not shown for presentation clarity. Full lines indicate significant paths (*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$); dashed lines indicate nonsignificant paths. Note: SCO = Social comparison orientation; TC = Trait competitiveness. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

reciprocal relation was not significant[2] ($B = -0.28$, $SE = 0.63$, $t = -0.44$, $p = 0.659$, 95%CI = [−1.561, 0.230]). SCO-ability positively predicted overall risk-taking ($B = 0.10$, $SE = 0.04$, $t = 2.53$, $p = 0.011$, 95%CI = [0.025, 0.183]), as well as risk-taking in the ethical ($B = 0.15$, $SE = 0.07$, $t = 2.29$, $p = 0.022$, 95%CI = [0.022, 0.276]), gambling ($B = 0.22$, $SE = 0.09$, $t = 2.48$, $p = 0.013$, 95%CI = [0.047, 0.404]), and health/safety ($B = 0.17$, $SE = 0.08$, $t = 2.12$, $p = 0.034$, 95%CI = [0.019, 0.337]) domains. None of the paths from SCO-opinion were significant. TC positively predicted overall risk-taking ($B = 0.09$, $SE = 0.04$, $t = 2.23$, $p = 0.026$, 95%CI = [0.013, 0.164]) and ethical risking-taking ($B = 0.15$, $SE = 0.07$, $t = 2.11$, $p = 0.035$, 95%CI = [0.012, 0.285]). Standardized path coefficients are shown in Fig. 1.

The bias-corrected bootstrap method was used to test the indirect effects of SCO-ability on risk-taking via TC on 10,000 samples. If the 95% confidence interval for the average of these indirect effect estimates does not include zero, the indirect effect is statistically significant ($p < 0.05$). The results indicated that the indirect effects of SCO-ability on overall risk-taking ($B = 0.06$, $SE = 0.03$, 95%CI = [0.011, 0.148]) and ethical risk-taking ($B = 0.10$, $SE = 0.06$, 95%CI = [0.014, 0.247]) via TC were significant.

[2] This coefficient is nonsignificant for each risk-taking measure; the values provided are for overall risk-taking.

3. Study 2

Study 2 examined the generalizability of the results from the university student sample to an adult worker sample.

3.1. Method

3.1.1. Participants and procedure

Participants were 645 adult workers (333 female) recruited via WJX. Participants ranged in age from 21 to 50 ($M = 34.63$, $SD = 6.77$). The procedures were the same as those in Study 1.

3.1.2. Measures (see Table 2 for descriptive statistics and Cronbach's alphas)

All measures were the same as those in Study 1.

3.2. Results

The bivariate correlations among the variables are shown in Table 2. As described in Study 1, six path analyses were conducted to examine the hypothesized relations between the variables.

Each of the six models was a good fit to the data and the fit was highly similar across models (e.g., for overall risk-taking: $\chi^2(1) = 1.13$, $p = 0.289$, CFI = 1.00, SRMR = 0.01, RMSEA = 0.01). The results indicated that SCO-ability positively predicted TC ($B = 0.49$, $SE = 0.05$, $t = 10.87$, $p < 0.001$, 95%CI = [0.397, 0.573]), but the

Table 2
Study 2: Means, standard deviations, Cronbach's alpha coefficients, and the bivariate relations among the variables (N = 645).

	1	2	3	4	5	6	7	8	9
1. SCO-ability	1								
2. SCO-opinion	0.57***	1							
3. TC	0.60***	0.37***	1						
4. Overall RT	0.28***	0.13**	0.28***	1					
5. Social-investment RT	0.27***	0.21***	0.24***	0.72***	1				
6. Recreational RT	0.17***	0.16***	0.12**	0.74***	0.44***	1			
7. Ethical RT	0.17***	−0.07	0.25***	0.74***	0.17***	0.12**	1		
8. Gambling RT	0.19***	0.10*	0.18***	0.70***	0.40***	0.45***	0.24***	1	
9. Health/Safety RT	0.13**	−0.02	0.19***	0.63***	0.27***	0.29***	0.42***	0.23***	1
M(SD)	3.22(0.96)	3.72(0.78)	3.26(0.72)	2.77(0.43)	3.61(0.41)	2.53(0.69)	1.82(0.62)	2.23(1.04)	2.71(0.81)
α	0.93	0.76	0.77	0.86	0.64	0.78	0.78	0.89	0.73

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

reciprocal relation was not significant ($B = -0.10$, $SE = 0.12$, $t = -0.85$, $p = 0.398$, 95%CI = [−0.356, 0.102]). SCO-ability positively predicted overall risk-taking ($B = 0.09$, $SE = 0.02$, $t = 3.76$, $p < 0.001$, 95%CI = [0.041, 0.131]), as well as risk-taking in the social-investment ($B = 0.06$, $SE = 0.02$, $t = 2.66$, $p = 0.008$, 95%CI = [0.016, 0.107]), ethical ($B = 0.12$, $SE = 0.03$, $t = 3.52$, $p < 0.001$, 95%CI = [0.050, 0.179]), gambling ($B = 0.15$, $SE = 0.06$, $t = 2.53$, $p = 0.011$, 95%CI = [0.034, 0.262]), and health/safety ($B = 0.09$, $SE = 0.05$, $t = 1.97$, $p = 0.049$, 95%CI = [0.003, 0.178]) domains. SCO-opinion positively predicted risk-taking in the recreational ($B = 0.80$, $SE = 0.04$, $t = 1.96$, $p = 0.050$, 95%CI = [0.000, 0.160]), ethical ($B = -0.21$, $SE = 0.04$, $t = -5.85$, $p < 0.001$, 95%CI = [−0.284, −0.141]), and health/safety ($B = -0.15$, $SE = 0.05$, $t = -3.30$, $p = 0.001$, 95%CI = [−0.245, −0.064]) domains. TC positively predicted overall risk-taking ($B = 0.11$, $SE = 0.03$, $t = 3.86$, $p < 0.001$, 95%CI = [0.052, 0.163]), as well as risk-taking in the social-investment ($B = 0.07$, $SE = 0.03$, $t = 2.39$, $p = 0.017$, 95%CI = [0.013, 0.121]), ethical ($B = 0.20$, $SE = 0.04$, $t = 5.02$, $p < 0.001$, 95%CI = [0.125, 0.284]), gambling ($B = 0.15$, $SE = 0.07$, $t = 2.22$, $p = 0.026$, 95%CI = [0.015, 0.277]), and health/safety ($B = 0.19$, $SE = 0.06$, $t = 3.36$, $p = 0.001$, 95%CI = [0.080, 0.302]) domains. Standardized path coefficients are shown in Fig. 2.

Indirect effects of SCO-ability on risk-taking via TC were tested with the bias-corrected bootstrap method. Results indicated that the indirect effects of SCO-ability on overall risk-taking ($B = 0.05$, $SE = 0.01$, 95%CI = [0.026, 0.082]), and risk-taking in the social-investment ($B = 0.03$, $SE = 0.01$, 95%CI = [0.007, 0.060]), ethical ($B = 0.10$, $SE = 0.02$, 95%CI = [0.060, 0.145]), gambling ($B = 0.07$, $SE = 0.03$, 95%CI = [0.009, 0.138]), and health/safety ($B = 0.09$, $SE = 0.03$, 95%CI = [0.039, 0.153]) domains via TC were significant.

4. Discussion

The SCO and TC constructs have deep conceptual overlap and both variables have been shown to have important influences on psychological functioning. Nevertheless, research on the link between SCO and TC remains sparse. The findings from the present research shed light on this surprisingly understudied link, and on the predictive utility of these variables for risk-taking. The findings were largely consistent across undergraduate student and adult worker samples, with some variation emerging for the domain-specific risk-taking variables. We found that SCO-ability and TC were positively correlated; SCO-opinion and TC also exhibited a positive correlation, albeit descriptively smaller in magnitude. Path models revealed that SCO-ability predicted TC, but TC did

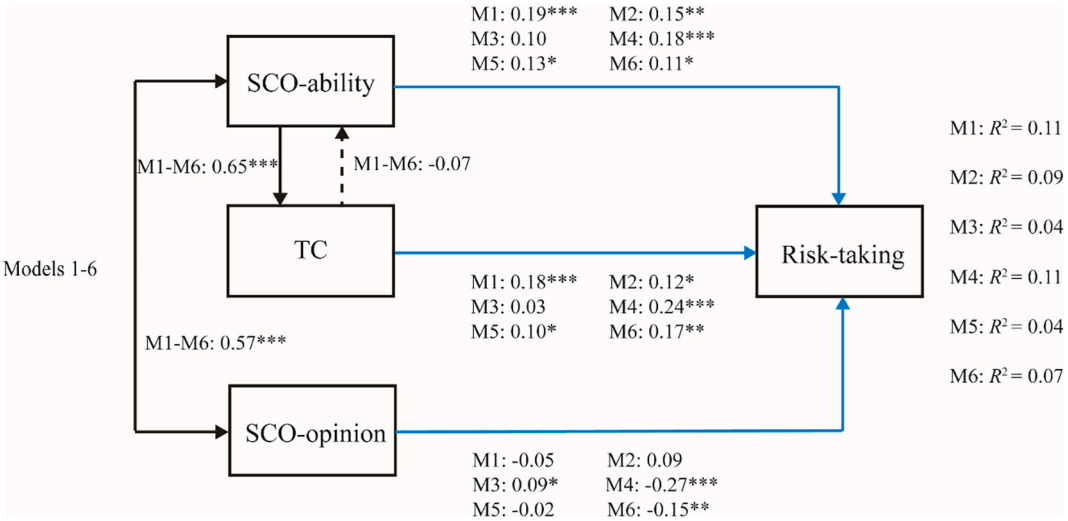

Fig. 2. Study 2: Path diagram with standardized path coefficients. The paths are shown for models 1–6 (M1-M6). The black paths represent results that are the same across all types of risk-taking measure; the blue paths represent results that vary according to the type of risk-taking measure: overall (M1), social-investment (M2), recreational (M3), ethical (M4), gambling (M5), and health/safety (M6). R^2 represents the proportion of the variance for each type of risk-taking that is explained by all independent variables in each model. Sex was included but is not shown for presentation clarity. Full lines indicate significant paths (*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$); dashed lines indicate nonsignificant paths. Note: SCO = Social comparison orientation; TC = Trait competitiveness. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

not predict SCO-ability; the link between SCO-opinion and TC was not expected, so reciprocality was not examined.

The results for SCO and risk-taking indicated descriptively stronger relations for SCO-ability than SCO-opinion. SCO-ability was positively correlated with overall risk-taking and risk-taking in the ethical, gambling, and health/safety domains in both studies (and in the social and recreational domains in Study 2 alone). SCO-opinion, on the other hand, was not consistently correlated with any of the risk-taking indicators across studies (but did show some positive correlations in Study 2 alone). TC showed the same positive relations with overall and domain-specific risk-taking as described above for SCO-ability. Path analyses testing SCO and TC as simultaneous predictors of risk-taking indicated that SCO-ability and TC accounted for unique variance in risk-taking for many of the aforementioned relations. The SCO-opinion results remained similarly inconsistent with TC included across studies. Mediation analyses showed that TC mediated the relation between SCO-ability and both overall risk-taking and risk-taking in the ethical domain in both studies (and social, gambling, and health/safety risk-taking for Study 2 alone).

Our finding that SCO-ability predicts TC but not vice versa is consistent with Festinger's (1954) proposal and Garcia et al.'s (2013) recent theorizing. It seems that a tendency toward using others as a comparative standard facilitates the desire to do or be better than others. Social comparison *can* entail the simple cognitive evaluation of an attribute for diagnostic reasons (to understand where one stands), but these results indicate that cognition, perhaps especially self-oriented comparison, often begets motivation (Nuttin, 1984). Of course it is important to note the limitation that our studies were correlational in nature, and lay the groundwork for a more rigorous longitudinal investigation of the directionality of this relation.

Risk-taking is commonly viewed as an appetitive strategy to promote one's chances of success (Hangen et al., 2016) and, accordingly, our finding that an enduring desire to do or be better than others (TC) facilitates this strategy is sensible, which adds to a growing body of literature emphasizing the existence of a strong nexus between competition and risk-taking (Filippin & Gioia, 2018; Gärling et al., 2019; Zhu et al., 2016). Additional clarity on this relation may be gleaned in future work through use of a differentiated measure of TC, much as we used differentiated measures of SCO and risk-taking herein. Theorists have distinguished between hypercompetitiveness, personal development competitiveness, enjoyment of competition, fear of competition, and rivalry (Keresztes et al., 2015; Newby & Klein, 2014; Orosz et al., 2018), for example, and some of these variants of competitiveness (e.g., hypercompetitivenes) may be more strongly linked to risk-taking than others (see Harris et al., 2015 for an example with problematic gambling).

SCO-ability not only predicted risk-taking through TC, but also independently of TC; that is, TC was a partial rather than full mediator of the relation between SCO-ability and risk-taking. This suggests that other mediator variables such as performance-approach goals (Elliot et al., 2018) or challenge appraisals (Hangen et al., 2016) may also be operative, or additional variance may be accounted for by using multiple variants of TC (as discussed above). Future work is needed to examine these possibilities. On a related note, social comparison, competitiveness, and risk-taking may be related at the environmental emphasis, state, or behavioral level, as well as the dispositional level (Gärling et al., 2019), and it would be interesting to see if these variables have the same or different relations (or account for the same or different amounts of variance) across levels of analysis. Furthermore, the models examined herein accounted for relatatively modest amounts of variance, and including these additional variables may attend to this issue. Future work might also do well to focus on the role of SCO-opinion in predicting variables more conceptually relevant to this construct, such as conformity or cooperative behavior (Gärling et al., 2019; Gärling et al., 2020). Finally, a strength of our work is that we tested our hypothesized relations in two distinct types of samples – university students and adult workers. However, both studies were conducted in China, and it remains to be seen if the findings generalize to other countries, including those in the West (and non-WEIRD countries more generally; Henrich et al., 2010).

The present research furthers integration of the social comparison and competition literatures that Festinger (1954) encouraged and Garcia et al. (2013) revived and advanced. Social comparison and competiveness are both deeply rooted in evaluation and social context, but each brings different emphases (a cognitive emphasis for social comparison and a motivational emphasis for competitiveness). Together, they provide a more nuanced and complete portrait of personality processes than either in isolation. Furthermore, connecting social comparison and competitiveness to risk-taking both extends the integrative scope and expands the literature on antecedents of risk-taking behavior (see Mishra, 2014, for a review). Social comparison, competition, and risk-taking feature prominently in daily life, and acquiring a deeper understanding of their interrelation promises to shed light on a host of important processes such as those involved in health and coping, academic and occupational striving, financial decision-making, and beyond.

Open practices statements

The data and materials for the present research are available upon request and this research was not preregistered.

CRediT authorship contribution statement

Zhenliang Liu: Conceptualization, Methodology, Software, Formal analysis, Investigation, Writing - original draft, Visualization. **Andrew J. Elliot:** Methodology, Writing - review & editing, Supervision. **Yansong Li:** Conceptualization, Methodology, Investigation, Resources, Data curation, Writing - review & editing, Supervision, Project administration, Funding acquisition.

Declaration of competing interest

None.

Acknowledgements

This work was supported by the The Project of Philosophy and Social Science Research in Colleges and Universities of Jiangsu Province (Project name: The effects of competition on individuals' risk and cooperation, grant number: 2020SJA0017) and a grant from Society for Social Psychology of Jiangsu Province (Grant Number 20SSXGH006).

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