

11-2013

The Psychology of Competition: A Social Comparison Perspective

Stephen M. Garcia

Avishalom Tor

Notre Dame Law School, ator@nd.edu

Tyrone M. Schiff

Follow this and additional works at: https://scholarship.law.nd.edu/law_faculty_scholarship



Part of the [Behavior and Behavior Mechanisms Commons](#), and the [Law and Society Commons](#)

Recommended Citation

Stephen M. Garcia, Avishalom Tor & Tyrone M. Schiff, *The Psychology of Competition: A Social Comparison Perspective*, 8 *Persp on Psych Sci* 634 (2013).

Available at: https://scholarship.law.nd.edu/law_faculty_scholarship/941

This Article is brought to you for free and open access by the Publications at NDLScholarship. It has been accepted for inclusion in Journal Articles by an authorized administrator of NDLScholarship. For more information, please contact lawdr@nd.edu.

The Psychology of Competition: A Social Comparison Perspective

Stephen M. Garcia¹, Avishalom Tor², and Tyrone M. Schiff¹

¹University of Michigan and ²University of Notre Dame

Abstract

Social comparison—the tendency to self-evaluate by comparing ourselves to others—is an important source of competitive behavior. We propose a new model that distinguishes between individual and situational factors that increase social comparison and thus lead to a range of competitive attitudes and behavior. Individual factors are those that vary from person to person: the relevance of the performance dimension, the similarity of rivals, and their relationship closeness to the individual, as well as the various individual differences variables relating to social comparison more generally. Situational factors, conversely, are those factors on the social comparison landscape that affect similarly situated individuals: proximity to a standard (i.e., near the number 1 ranking vs. far away), the number of competitors (i.e., few vs. many), social category fault lines (i.e., disputes across vs. within social categories), and more. The distinction between individual and situational factors also helps chart future directions for social comparison research and generates new vistas across psychology and related disciplines.

Keywords

social comparison, competition, competitive behavior, cooperation

Competitions are ubiquitous. At work, we vie for a promotion, seek to increase a company's market share, or try to win the race to patent a new invention. In the social domain, we may try to increase our number of Facebook "friends," run faster than another at the gym, or strive to outdo the Joneses. Indeed, people commonly seek to achieve a superior position vis-à-vis others in a variety of contexts, from daily social situations to organizational settings and market transactions (De Botton, 2004; Festinger, 1954; Frank, 1985; Podolny, 2005; Porter, 1979). Although past psychological research valued the study of competition (Deutsch, 1949; Gardner, 1939; Hastorf & Cantril, 1954; Triplett, 1898; Vaughn & Diserens, 1938; Whittemore, 1924, 1925), social comparison scholarship has paid relatively little attention to this important social dynamic in recent decades. Instead, much of the study of competition has been relinquished to other disciplines—most notably economics and business but also sociology, political science, and more (e.g., Axelrod, 1984, 1997; Carlton & Perloff, 2005; Podolny, 2005; Porter, 1979; Spence, 1973). This state of affairs might appear perplexing, given Festinger's (1954) prominent linking of the social comparison process to competitive behavior. That early linkage, however, was followed by much research that

primarily studied the self-evaluation process—that is, how people evaluate their present state relative to others (e.g., Beach & Tesser, 2000; Tesser, 1988)—rather than its consequences for competitive behavior per se. The present framework therefore synthesizes early developments in social comparison theory with more recent ones into a coherent account of the key psychological forces that increase social comparison and, in turn, competitiveness.

We draw not only on research that has directly examined competition but also on studies in social comparison and related fields that have significant implications for its analysis. Moreover, although our framework emphasizes the role of social comparison in increasing competitiveness, we recognize that competition—like other complex behavioral phenomena—is multiply determined. This review focuses on the role of individual and situational factors that increase social comparison concerns and thus competitiveness. In developing the framework of the model, we link social comparison and

Corresponding Author:

Stephen M. Garcia, University of Michigan, 4126 Weill Hall, Ann Arbor, MI 48109
E-mail: smgarcia@umich.edu

competitiveness, organize the extant literature to account for both individual and situational factors, highlight the interactions within and between these factors, and, finally, suggest future directions and lessons for fields within psychology and related disciplines.

Social Comparison and Competitiveness

According to social comparison theory, individuals (“actors”) are propelled by a basic drive—the “unidirectional drive upward”—to improve their performance and simultaneously minimize or preempt discrepancies between their and other persons’ (“targets”) level of performance. This “action to reduce discrepancies interacts with the unidirectional push to do better and better” (Festinger, 1954, p. 125) and generates “competitive behavior to protect one’s superiority” (Festinger, 1954, p. 126). Thus, competitiveness is one manifestation of the social comparison process.

The direction of social comparison has been studied extensively. For example, upward comparison—when actors compare their performance, say, at racquetball with targets who are somewhat better—leads to competitive behavior (Hoffman, Festinger, & Lawrence, 1954; Seta, 1982; Tesser, 1988). Actors may be competitive also toward targets that presently offer a downward comparison—say, targets who perform somewhat worse at racquetball but threaten a potential upward comparison (Festinger, 1954; Garcia, Tor, & Gonzalez, 2006). We thus define the term *comparison concerns* as the desire to achieve or maintain a superior relative position. Our model also defines *competitiveness* broadly. In many of the studies we reference, social comparison or competitiveness was not explicitly measured. We therefore draw on a number of behavioral and attitudinal indicators associated with competitiveness, noting that we cannot conclude that comparison concerns always drive these

indicators. Such behaviors and attitudes include competitive behavior (C. Johnson, 2012), competitive motivation (Tauer & Harackiewicz, 1999), the desire to win (Malhotra, 2010), positional concerns (Graf, Konig, Enders, & Hungenber, 2012; Solnick & Hemenway, 1998), unwillingness to maximize joint gains (Armstrong & Collopy, 1996), duplicitous behavior (Moran & Schweitzer, 2008), lying (Argo, White, & Dahl, 2006), harmful behavior (Poortvliet, 2012), other enhancement (Shepperd & Arkin, 1991), hostile attitudes (White, Schmitt, & Langer, 2006), biased recommendations (Garcia, Song, & Tesser, 2010), and more. The basic dynamic highlighted by the social comparison model of competition is that two basic sets of factors—namely, individual and situational factors—are capable of increasing competitiveness, across the various indicators, by raising social comparison concerns (see Fig. 1).

The Model: Individual Versus Situational Factors

Historically, the literature focused on three variables that increase comparison concerns (Festinger, 1954; Goethals & Darley, 1977; J. Suls & Wheeler, 2000; Tesser, 1988). First, these concerns intensify with the *relevance* of a performance dimension (“dimension”) to the actor (Hoffman et al., 1954; Tesser, 1988), such as performance in sports, income, or academics. Second is the degree of the actor’s *similarity* to the target (Goethals & Darley, 1977; Kilduff, Elfenbein, & Staw, 2010), meaning that similar rivals exhibit greater comparison concerns than those less similar. The third variable is the degree of the actor’s relationship *closeness* to the target (Pleban & Tesser, 1981; Tesser, 1988; Tesser & Smith, 1980), where comparison concerns are stronger when the target is interpersonally close (e.g., a friend or sibling).

It is important to note that one common feature of relevance, similarity, and closeness is their highly

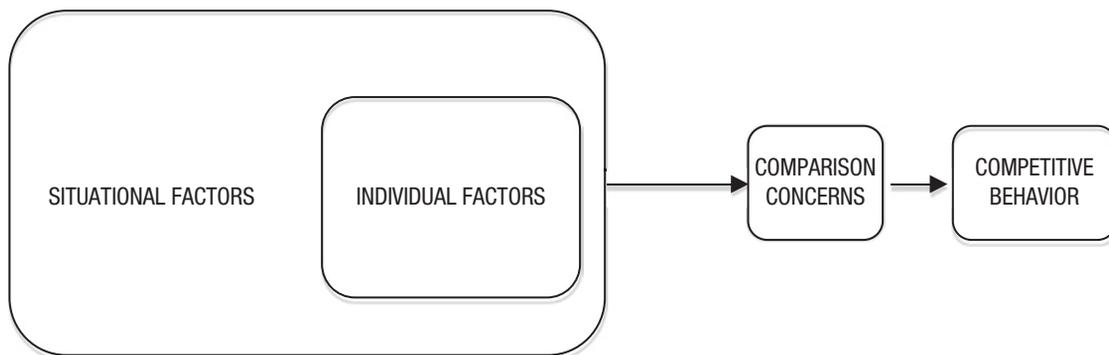


Fig. 1. The social comparison model of competition: The basic building blocks. Individual factors, encompassed by situational factors, together influence the degree of comparison concerns and thus competitive behavior.

individualized nature. Their impact naturally varies even among comparably situated people, as these three variables all reflect actors' special relationship to either dimension or target. For instance, the relevance of a potential social comparison—say, regarding math knowledge or tennis skills—can differ greatly among comparably situated actors. Such actors are also likely to hold divergent personal perceptions of the similarity of a potential target or its relationship closeness. More recently, researchers also began exploring the role of individual differences in variables that affect actors' general tendency to engage in social comparison (Gibbons & Buunk, 1999). The triangle at the center of Figure 2 illustrates the different types of individual factors, distinguishing between personal factors (e.g., individual differences and relevance) that concern actors' general propensity to engage in social comparison and their perceptions of the dimension and relational factors (e.g., similarity, relationship closeness, and, provisionally, personal history) that refer to the actors' perceptions of their relationship to the target.

However, notwithstanding the importance of individual factors, which traditionally dominated social comparison research, more recent findings have revealed the significant contribution of a new set of background situational factors to social comparison processes. Unlike their individual counterparts, situational factors concern

actors' perceptions of the surrounding social environment and therefore can exert a more universal effect on comparably situated actors. Figure 2 illustrates how these situational factors form the backdrop for the actor's perception of both dimension and target.

Incentive structures, for one, are a common set of situational variables that can influence the social comparison process. "Zero-sum" situations, for example, where one party's gain is another's loss, may naturally and rationally increase actors' concerns about their relative position. Yet beyond the likely effects of incentive structures, the literature recently has identified three additional situational factors that affect social comparison and competitiveness: proximity to a standard (e.g., Garcia et al., 2006; Poortvliet, Janssen, Van Yperen, & Van de Vliert, 2009; Poortvliet, 2012), number of competitors (e.g., Garcia & Tor, 2009; Tor & Garcia, 2010), and social category fault lines (e.g., Bornstein, Gneezy, & Nagel, 2002; Garcia, Tor, Bazerman, & Miller, 2005; Hogg, 2000; Lount & Phillips, 2007). Comparison concerns and competitiveness increase, first, in the proximity of a meaningful standard for comparison, such as the number one ranking or another qualitative performance threshold; second, as the number of competitors decreases; and third, when actors compare themselves with targets across social categories (e.g., Americans vs. the French) as opposed to intracategory targets (e.g., Americans vs. other Americans). What is

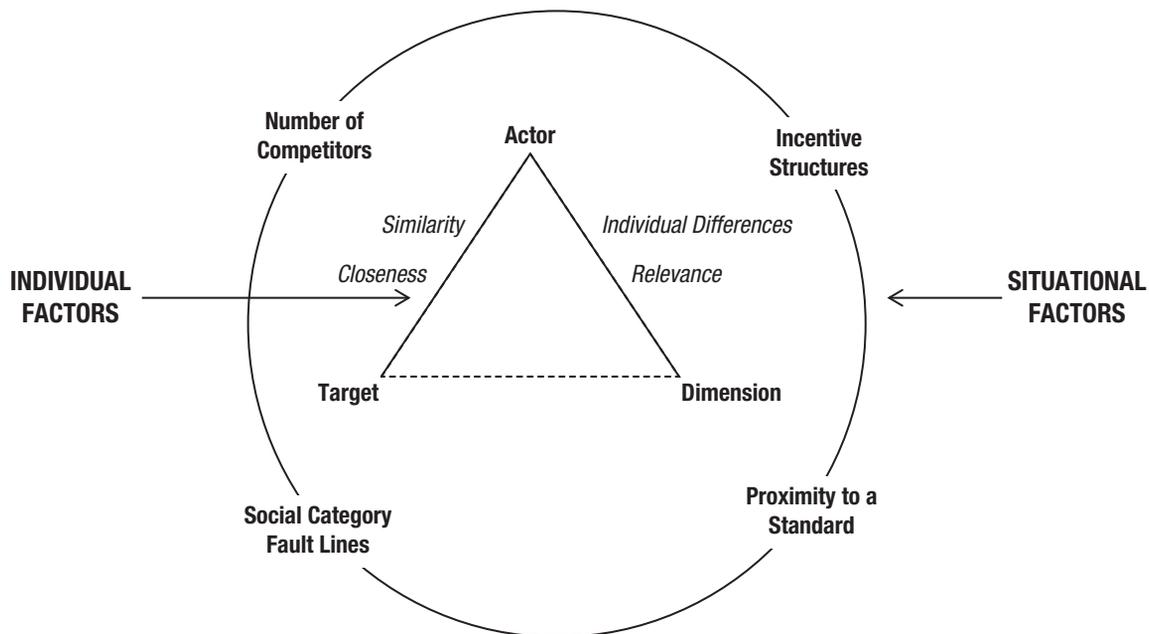


Fig. 2. The social comparison model of competition: Relationships between and within individual and situational factors. Individual factors, both personal and relational, are represented on the triangle. The personal factors are listed on the line connecting actor and dimension; the relational factors are listed on the line connecting actor to target. The dashed lined connecting target and dimension would reflect the target's personal factors. The situational factors (number of competitors, incentive structures, social category fault lines, proximity to a standard) encircle the triangle.

important about these more recent findings is that they also suggest that additional situational factors similarly may influence competitiveness via the social comparison processes, as we illustrate below with respect to the variables of audience and uncertainty.

Our focus on situational factors—which comprise more stable features of the competitive landscape and thus tend to exert a more uniform impact on comparably situated actors—helps address the long-standing criticism that social comparison “theory lacks the predictive power necessary for it to play the central role it perhaps deserves” (D. M. Taylor, Moghaddam, & Bellerose, 1989, p. 500; see also Arrowood, 1978). To wit, the identified effects of situational factors make it easier to predict circumstances that increase comparison concerns and competitiveness, beyond the idiosyncratic effects of those long familiar individual factors. We do not suggest, however, that situational changes cannot influence individual factors or that situational factors do not operate through the actor’s subjective perceptions. For example, individual factors can be shaped indirectly by the surrounding social environment, as where the situation leads actors (e.g., students) to consider relevant a given dimension (e.g., test performance). Yet even in these cases, individual factors remain distinctly individual—concerning direct perceptions of the actor–target or actor–dimension relationship rather than the surrounding social situation itself. Likewise, situational factors remain situational—concerning the actor’s perceptions of the social situation—although inevitably they are subjectively construed (e.g., Tor & Garcia, 2010).

Individual Factors of Competitiveness

The individual variables that affect competitiveness can be divided into personal factors, such as individual differences and the relevance of the performance dimension versus relational factors, namely, actors’ perceptions of their similarity, relationship closeness, and personal history with their targets.

Personal factors

Individual differences. A host of personality variables influence one’s tendency toward exhibiting comparison concerns and competitiveness, most notably social comparison orientation (Gibbons & Buunk, 1999) and competitive dispositions (Houston, McIntire, Kinnie, & Terry, 2002). This category also includes individuals’ orientation toward performance goals (Darnon, Dompnier, & Poortvliet, 2012; Poortvliet, Janssen, Van Yperen, & Van de Vliert, 2009) and away from mastery goals (Summers, Schallert, & Ritter, 2003), as well as other individual differences relating to social comparison tendencies and competitiveness.

Dimension relevance. People compete on dimensions that are relevant or important to the self. For example, recreational tennis is relevant to most recreational tennis players, return on investment is relevant to most investment bankers, and academic performance is relevant to most students. An early study manipulated dimension relevance by giving participants the impression that an initial verbal test score was or was not highly relevant to their intelligence (Hoffman et al., 1954). Results showed that participants who believed that the initial verbal task was relevant to their intelligence behaved significantly more competitively in a subsequent bargaining task toward a slightly better performing confederate than participants who believed the initial task irrelevant to intelligence. Similarly, another experiment found that participants were less likely to provide helpful clues to their friends in a “Password” game that supposedly was a measure of intelligence (Tesser & Smith, 1980). Other results showed participants to provide more hostile evaluations of rivals when these rivals outperformed them on self-relevant dimensions (Salovey & Rodin, 1984).

Related research has recently taken an interesting turn under the banner of identity-based motivation (Britt, 2005; Destin & Oyserman, 2009; Oyserman & Destin, 2010). These studies illustrate that merely implanting or evoking an identity can lead to increased motivation and better performance on dimensions relevant to that identity. For example, children from predominantly low-income African American households who were primed with “education-dependent adult identities” (i.e., given a graph of median wage information by level of education: no high school degree through graduate school), relative to those primed with “non-education-dependent adult identities” (i.e., wages of entertainers or athletes), were eight times more likely to do extra-credit work (Destin & Oyserman, 2010).

Relational factors

Similarity. As the perceived similarity of target to actor increases, so do comparison concerns and thus competitiveness. Similarity refers both to similarity in terms of ability or performance on the comparison dimension (Festinger, 1954, p. 120). For instance, two golfers are similar to the extent that their performance is similar. Yet similarity can also refer to similarity of personal characteristics or attributes more generally, beyond the specific comparison dimension. Experiments in this vein (Goethals & Darley, 1977) showed that people tend to compare themselves with others who are most similar to them along a number of different attributes that are not necessarily relevant to the specific comparison context (e.g., “dot estimation ability” that was determined by false feedback; D. T. Miller, Turnbull, & McFarland, 1988). Thus, two

academics who are both persons of color, from the same university, from a similar PhD vintage, and working in the same field are highly similar in terms of personal characteristics and are more likely prone toward mutual social comparison.

The inclination to compare with similar others—whether in terms of performance or characteristics—begets competitive behavior toward them. To illustrate, one experiment found that competitive performance—measured by reaction time to a geometric-shape recognition task—increased with the degree of performance similarity with a rival in competitive situations (Dakin & Arrowood, 1981). To the extent that hostility is related to competitiveness, “horizontal hostility” research (White & Langer, 1999; White et al., 2006) has showed that comparison concerns increase among similar minority groups, who strive to see their own group as superior to another, similar group. Among similar minority groups, the one that is further removed from the mainstream harbors greater hostility to its less extreme minority counterparts. Examples include vegans’ greater hostility attitudes toward vegetarians (White et al., 2006) or punks’ more hostile attitudes toward gothics (White et al., 2006). However, comparison concerns brought about by similarity among groups also generate competitive rivalry. For example, an analysis of a data set on National Collegiate Athletic Association basketball teams found that a greater similarity among teams—in terms of geographic proximity, performance histories, and academic quality—led to more intense experiences of rivalry and competitiveness for their players (Kilduff et al., 2010).

Relationship closeness. Intuition suggests that people promote friends over strangers; yet research has showed that this is not necessarily true on relevant comparison dimensions, because relationship closeness amplifies comparison concerns and thus competitiveness (Tesser, 1988; Tesser & Campbell, 1982). For example, studies have found that participants provided fewer helpful clues to friends than to strangers on competitive tasks that were self-relevant (Tesser, 1988; Tesser & Smith, 1980). Further studies found that people feel more threatened by the success of their friends than by that of strangers (Zuckerman & Jost, 2001). Finally, in the naturally occurring setting of a triathlon race, contestants who maintained a personalized comparison—defined in part as “a close or emotional relationship with the target” (Locke, 2007, p. 213)—had better finishing times than those who made more abstract, generalized comparisons (Locke, 2007).

Prospective outlook

These findings illustrate how personal and relational individual factors that naturally vary among comparably

situated actors can shape comparison concerns and, consequently, competitiveness. Our list, of course, is not exclusive, and future research will likely identify additional individual factors that exert comparable effects. For example, consider personal history.

Personal history is another potential individual, relational factor (e.g., Weiss & Rupp, 2011). Kilduff et al. (2010), for instance, predicted that “rivalry will be positively related to the ‘competitiveness’ of prior contests” (p. 948) and found that the unique history of paired teams was a better predictor of the intensity of the rivalry between them than their most recent matchup. Political science research (Stinnett & Diehl, 2001) has also suggested that longer-term rivalries can be a product of “a joint history. . . . [T]he initial interactions in a rivalry often set the tone for future confrontations” (J. P. Klein, Goertz, & Diehl, 2006, p. 335). These observations, however, have yet to be linked directly to comparison concerns.

Situational Factors of Competitiveness

The mostly recent identification of situational factors of social comparison, including incentive structures, proximity to a standard, number of competitors, social category fault lines, audience, and uncertainty, sheds new light on social comparison research.

Incentive structures

Various factors associated with the structure of the specific competition, including the direct incentives it offers actors to engage in comparison, influence the level of comparison concerns and thus competitiveness. For example, higher expected values (Cole, Bergin, & Whittaker, 2008) can increase comparison concerns and competitiveness. Similarly, “zero-sum” situations, where one party’s gain is another’s loss, naturally increase actors’ comparison concerns and competitiveness (Bazerman, Baron, & Shonk, 2001; Lawler, 2003; Mittone & Savadori, 2009). A common example that emerges in the classroom is whether the course is graded on a curve or absolute scale, with the former producing more competitiveness than the latter. The following paragraphs, however, examine in greater detail those situational factors that shape comparison concerns even in the absence of direct incentives for social comparison.

Proximity to a standard

Rankings permeate many facets of society—from *U.S. News & World Report’s* rankings of colleges, through the Fortune 500 and Billboard charts to the “Best in Group” rankings of the Westminster Kennel Club. Yet rankings differentially increase competition. Studies found that

comparison concerns and competitiveness intensify in the proximity to a standard, whether the number one ranking or another meaningful, qualitative threshold, such as being in the last place or proximate to some cut-off point on a scale, but not away from a standard (e.g., Garcia et al., 2006; Poortvliet et al., 2009; Vandegrift & Holaday, 2012; Zink et al., 2008). An analysis of player trades in Major League Baseball, for example, found that highly ranked teams (in the proximity of the standard of the number one ranking) were less willing than intermediately ranked teams to trade with each other “high threat players” (whose baseball statistics were outstanding), suggesting that competitiveness was stronger between highly ranked teams than between intermediately ranked ones (Garcia & Tor, 2007).

Similarly, participants indicated that they would behave more competitively—preferring an equal but less profitable payoff (i.e., \$500 to self vs. \$500 to rival) over a more profitable payoff that paid their rival more (\$600 to self vs. \$800 to rival)—when both parties were highly ranked than when they were intermediately ranked (Garcia & Tor, 2007; Garcia et al., 2006). Further analysis showed that this between-subjects’ difference was driven largely by an increase in comparison concerns (Garcia et al., 2006). The same effect was replicated in a payoff choice in which the profit-maximizing option required additional effort (Vandegrift & Holaday, 2012). Recent research (P. Chen, Myers, Kopelman, & Garcia, 2012) further found that facial expressions of highly ranked individuals appear more competitive than those of intermediately ranked ones.

Competitiveness also can intensify near other thresholds, such as bottom rankings (Garcia et al., 2006; Poortvliet, 2012; Poortvliet, Janssen, Van Yperen, & Van de Vliet, 2009). In one study (Poortvliet et al., 2009), participants were given false feedback about their ranking on a winter survival task (D. W. Johnson & Johnson, 2000)—4th, 51st, or 96th position of the top 100 (high, intermediate, or bottom rank)—and then interacted with another participant who scored the 5th, 52nd, or 97th position on the top 100, respectively. Results showed that participants with performance goals (seeking to outperform others) had fewer intentions to exchange information when they and their counterpart were ranked highly or near the bottom than when they were intermediately ranked. What is remarkable is that this same pattern emerged when individuals were allowed to harm another’s task performance (Poortvliet, 2012). It is interesting to note, however, that participants with mastery goals (seeking to improve one’s performance) may be less competitive with bottom rankings but remain competitive near the top, like their performance-oriented peers (Poortvliet, 2012; Poortvliet et al., 2009).

Number of competitors

One ubiquitous feature of competitions is the number of competitors. Yet how exactly does our competitiveness change as the number of competitors changes? Are we more motivated to compete on exams, in a sales office, or on the treadmill at the gym as the number of competitors decreases? Research has showed the number of competitors (N) to be an important situational factor of social comparison. Previously, a number of studies found that the intensity of competitive behavior increases as N decreases, but these studies generally confounded expected payoff with the number of competitors: as N decreased, expected value increased. For example, auction bidders have a greater tendency to exceed their bidding limits when vying against a few versus many bidders for one object (Ku et al., 2005). A study of the game show *Weakest Link* (Pillutla & Ronson, 2005) found that contestants behaved more competitively toward other contestants as the number of players decreased in subsequent rounds. And research on tournaments (Ehrenberg & Bognanno, 1990) has found the same pattern (see also Boudreau, Lacetera, & Lakhani, 2011; Casas-Arce & Martínez-Jerez, 2009). However, in all these settings, the diminished N changes the payoff structure of the competition (Vandegrift & Holaday, 2012) and leaves open the possibility that the increased competitiveness observed is caused by the higher expected payoffs with decreased N s—that is, by the incentive structure of the competition.

Research on the N effect (Garcia & Tor, 2009; Tor & Garcia, 2010), however, found that comparison concerns intensify and competitiveness increases as the number of competitors decreases, even when controlling for overall expected payoffs. For instance, in an analysis of SAT data at the state level for all 50 U.S. states, researchers tested the prediction that the lower the average number of test takers per venue in a state, the higher that state’s average SAT score. By dividing the total number of test takers per state by the total number of test-taking opportunities in that state, a “test-taking density” variable was created. As predicted, when controlling for various demographic factors, a significant inverse relationship between test-taking density and state-level average SAT scores emerged (Garcia & Tor, 2009).

To examine the N effect in a controlled setting, one study recruited undergraduates to complete a short, easy quiz in an aggregated pool of 10 or 100 competitors, with a monetary incentive for speed without compromising accuracy (Garcia & Tor, 2009). As predicted, participants finished the quiz significantly faster in the 10-competitors than in the 100-competitors condition, without a significant difference in accuracy. One reason for the effect of N on the competitiveness is that comparison concerns

decrease with N . Indeed, people harbor fewer comparison concerns and lose interest in comparison information as N increases (Garcia & Tor, 2009; Tor & Garcia, 2010). Therefore, notwithstanding the potential contribution of additional mechanisms (see Mukherjee & Hogarth, 2010; Tor & Garcia, 2010), comparison concerns significantly drive the N effect.

Other research findings also suggest that comparison concerns decrease with N . For example, personalized comparisons to a specific individual lead to greater increases in the motivation to compete than do comparisons to people more generally (Buckingham & Alicke, 2002; W. M. P. Klein, 2003; Locke, 2007). W. M. P. Klein (2003) found that people behaved more competitively and were less willing to provide helpful hints on a feedback task when their performance was compared with a “single other” versus the “average other.” Dubbed the *local dominance effect* (Zell & Alicke, 2010), this work likewise describes how local social comparison information is likely to carry more weight than global comparison information and may contribute to the stronger social comparison concerns one finds in smaller- N settings.

Social category fault lines

Much like other situational factors, comparisons across social category fault lines (such as gender: female vs. male; university: Michigan vs. Ohio State University; or companies: Wells Fargo vs. Bank of America) increase comparison concerns and competitiveness, relative to comparisons made within social category fault lines (i.e., female vs. female, Michigan vs. Michigan, Wells Fargo vs. Wells Fargo).¹ Social category fault lines initially may seem like a relational factor because they concern actors' perceptions of their relationship with targets and social category memberships vary among individuals (e.g., gender, ethnicity, profession, and so on). Further analysis makes clear, however, that this factor belongs among the situational variables of social comparison. Each individual simultaneously belongs to a multitude of nonexclusive social categories (e.g., a female, an African American, a lawyer, a Catholic, a New Yorker, an American, and so on), to which they self-categorize depending on the situation (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). The same actor–target–dimension triangle depicted in Figure 2 therefore may generate very different social comparison outcomes depending on the particular social category fault line made salient by the specific background environment in which the comparison takes place. For example, an actor may self-categorize as being from “Michigan” versus a target from “Ohio State” and thus behave competitively when in the United States, yet categorize himself and the target both as “Americans” and consequently behave less competitively toward the target if the same interaction were to take place, say, in Europe.

In other words, the situation highlights social category fault lines, which in turn shape the actor's perceptions of the relationship with the target.

Self-categorization necessarily requires social comparison (Hogg, 2000; Tajfel, 1972; Turner, 1975). Foundational research in this area (Tajfel, Billig, Bundy, & Flament, 1971; Turner, Brown, & Tajfel, 1979) focused on payoffs across social-category lines and implicated comparison concerns as predictors of competitive behavior. Examining mixed motives in intergroup settings (Tajfel et al., 1971; Turner et al., 1979), for instance, researchers found that maximizing difference in group payoffs—rather than maximizing either the joint profits of all groups or one's in-group profit—characterized these intergroup settings, even when entailing both personal and group sacrifice (Tajfel et al., 1971; Turner et al., 1979). More generally, although intergroup transactions do not always lead to competitive behavior (Brewer, 1999; Halevy, Bornstein, & Sagiv, 2008), comparison concerns, which strongly manifest across social-category lines, tend to increase competitiveness in these settings (Garcia & Miller, 2007; Munkes & Diehl, 2003).

Earlier research in this area, however, exclusively focused on allocations across social-category lines, without controlling for the baseline competitiveness of allocations within a social category. To this end, University of Michigan (UM) students read about a hotel vacancy dilemma in which UM and Harvard students were traveling together (Garcia et al., 2005; see also Garcia, Bazerman, Kopelman, Tor, & Miller, 2010). Participants were asked to recommend one of two solutions: (Option A) UM and Harvard students stay at a one-star motel or (Option B) UM students stay at a two-star hotel and Harvard students stay at a four-star hotel. Results showed that UM students tended to choose Option A and were less likely to maximize hotel quality in the across-social-category-lines condition compared with those in the control condition (involving two UM groups).

Other studies found that an in-group member is more motivated to compete when outperformed by an out-group competitor than by another in-group member and that social comparison is a necessary precondition for this effect (Lount & Phillips, 2007). Moreover, the organizational literature suggests that adding a reference out-group helps eliminate free riding within a group, as in-group members' competitiveness increases, leading them to perform better (Bornstein & Erev, 1994; Bornstein, Erev, & Rosen, 1990; Erev, Bornstein, & Galili, 1993) and coordinate more effectively (Bornstein et al., 2002) once social category fault lines become salient.

Prospective outlook

The preceding findings illustrate how some established situational factors can amplify comparison concerns and

competitiveness. Two additional factors we believe merit further consideration in this category are audience and uncertainty.

Audience. Suppose that a handful of professionals are contending in, say, a pogo stick competition. Would the competitors experience an increase in comparison concerns and thus exhibit even more competitiveness with an audience present? The social facilitation literature has showed that audiences increase competitive pressure, enhancing performance on well-learned tasks (Cottrell, Wack, Sekerak, & Rittle, 1968) and undermining performance on difficult tasks (Zajonc & Sales, 1966; see also Beilock, 2011). Although the dominant view was that an audience increased evaluation apprehension (Cottrell et al., 1968), later research implicated social comparison processes among the mediators of facilitation (C. F. Bond & Titus, 1983; Geen, 1989; Muller, Atzeni, & Butera, 2004; Sanders, Baron, & Moore, 1978). Thus, we can infer that an audience increases comparison concerns and thus competitive behavior.

For example, in a weight-lifting competition among recreationally trained lifters, competitors lifted significantly more weight in the presence of an audience than otherwise (Rhea, Landers, Alvar, & Arent, 2003). Moreover, in online auctions, competing bidders that were visible to a virtual audience tended to improve their results and stay in the auction longer than did those bidders in the control condition (Rafaeli & Noy, 2002). However, besides these two examples, extant research has focused on individuals performing alone, with or without an audience in a noncompetitive setting. Further research, however, could establish more generally an audience–comparison–competitiveness link in competitive settings as well.

Uncertainty. Uncertainty in the environment—such as when the quantity or future of a resource is uncertain, when the identity of one’s competitors is unknown, and so on—is another situational factor that may increase competitiveness via comparison concerns. In many competitions we enter, uncertainty in the environment abounds. For instance, CEOs in the marketplace might not know when a competitor will launch a new product, or students applying for a summer internship might not know the caliber of the other students with whom they are competing. Uncertainty prompts social comparison (Festinger, 1954; Gerard, 1963; S. E. Taylor, Buunk, & Aspinwall, 1990; Suls & Wills, 1991; Wood, 1996), as “periods of stress, novelty, or change should temporarily increase the amount of comparison” (Gibbons & Buunk, 1999, p. 130; see also Aspinwall & Taylor, 1997; B. P. Buunk, 1994; Molleman, Pruyn, & van Knippenberg, 1986). Evidence linking uncertainty to competitiveness through comparison concerns is limited, however. One

exception from social dilemmas research suggests that when environmental uncertainty is high, people cooperate less with others than when environmental uncertainty is low (Wit & Wilke, 1999). Additional support for the likely impact of uncertainty can be gleaned from research that found that comparison concerns and competitiveness—which are generally high in the proximity of a standard like the top rank—decrease dramatically when uncertainty about one’s ranking relative to a rival is removed (Garcia & Tor, 2007). Thus, further study of this potential situational factor is merited.

Avenues for Future Research

By distinguishing between individual and situational social comparison factors in competitiveness, our model both reinterprets a significant portion of the extant literature on social comparison and related phenomena and highlights promising new research directions.

Interaction within individual and situational factors

An important set of questions concerns the interaction among the variables within each of the respective categories of individual and situational variables. Regarding individual factors, one indication of the possible interaction among different individual variables comes from the self-evaluation maintenance model (Tesser, 1988), which focuses on the “hydraulic” nature of relevance and closeness. Suppose your chess performance is a relevant dimension and that you and a close friend begin to play chess together but your friend consistently outperforms you. The self-evaluation maintenance model predicts two possible outcomes: (a) Playing chess will become less relevant for you, or (b) you will become less close to your friend (Tesser, 1988). Otherwise, your chess games with your friend will remain highly competitive, or you will no longer play with your friend.² This hydraulic process also applies to similarity, suggesting that being consistently outperformed by a similar counterpart will likely lead you (a) to perceive the task at hand as being less relevant or (b) to reassess your counterpart’s similarity. When neither outcome occurs, the game will remain highly competitive, or you will exit.

Figure 2, however, highlights a further potential interaction between target and dimension that Tesser (1988) does not directly address, raising the question of whether it is possible for a dimension to become relevant to the actor simply because it is relevant to a close or similar target. Although there is no direct research on this question, perhaps we witness this effect in real life. Regarding closeness, for example, certain recreational games that are important to a close friend may become

more relevant to us, and we may even become more competitive when playing them with that friend. When playing these games with a stranger, in contrast, we might not be motivated to compete if performance would remain irrelevant. Thus, targets perhaps have the potential to influence the relevance of the dimension.

Other psychological processes, such as cognitive accessibility or salience (Andersen, Moskowitz, Blair, & Nosak, 2007; Bargh, 1996), may better describe the likely interaction among situational factors. The specifics of a given situation determine the relative salience—and consequently the impact—of different situational variables. For example, if an actor is tied with two rivals at rank number four, there will likely be fierce competition, as the three rivals are also proximate to a standard. We cannot specify the intensity of the competition among them, however, because we do not know the respective contribution of proximity to a standard versus N or even whether their effects are additive and whether their addition exhibits diminishing returns (Hodges, 1973). If, for example, proximity to a standard trumps N , and if an actor ranked 24th is tied with two other rivals at this rank, then competition for the number 23 rank would not be fierce; if N trumps proximity to a standard, then competition would still be fierce. More generally, the salience of environmental cues (Ross & Nisbett, 1991) will likely govern the influence of these contextual, situational variables, but further research is needed to examine whether these factors generate additive or interactive effects.

Interaction between situational and individual factors

Our model helps identify further open questions regarding the nature of the process by which situational factors shape comparison concerns and competitiveness. The extant research reviewed here implicitly assumes that situational factors directly shape comparison concerns and, consequently, competitiveness. However, Figure 2 highlights the possibility that situational factors influence comparison concerns and competitiveness indirectly, via the individual factors. For example, perhaps the situational variables of proximity to a standard or N operate by affecting the individual variable of dimension relevance; as distance from a standard or N increases, perhaps the relevance of the dimension itself decreases, thereby diminishing comparison concerns and competitiveness. To illustrate, suppose a highly ranked golfer considers golf ability as a self-relevant performance dimension. However, if he falls in the rankings (or is surrounded by an increasing number of golfers of similar ability), golf ability may become less relevant to him, thereby decreasing his competitiveness. The opposite may obtain when a recreational golfer rises up the

ranking (or starts playing with fewer competitors), with golf performance becoming self-relevant, increasing competitiveness. In either case, dimension relevance might prove a necessary precondition for competitiveness.

Another question concerns the interplay between social category fault lines, a situational factor, and similarity, an individual factor. Under some circumstances, members of the same social category might become more competitive toward each other because of their similarity despite the salience of social category fault lines. This can occur, for example, when social category lines, such as gender or race, form the basis of the incentive structure (e.g., Garcia & Ybarra, 2007). If the finalists for the “employee of the month” award always include one male and one female, competition will likely be fierce among contenders from the same focal social category (i.e., females among females and males among males), despite the salience of such fault lines. Moreover, in this example, whether fault lines (which diminish in-group competition) or similarity (which increases it) dominate can depend on the incentive structure.

Apart from the more static interaction between and within situational and individual factors in a single time period, the potential role of dynamic changes over time in the factors shaping social comparison processes merits consideration. A given level of a situational factor that ordinarily increases competitive behavior—say, a small number of competitors—may exert a diminished impact over time, as a result of adaptation (Brickman & Campbell, 1971). The individual factors of social comparison are likely to change over time as well, as people develop and change for a variety of reasons, from age to life events and more.

Limitations

The research we draw on to build the present framework principally used participants from Western, more individualistic cultures, raising the possibility that this framework is culture specific and may not apply to Eastern cultures that construe the self as part of a larger network (Markus & Kitayama, 1991). We think it plausible, however, that some dynamics underlying competitiveness may be common across cultures (Tang, 1999; Toda, Shinotsuka, McClintock, & Stech, 1978), though both the base rates of social comparison and competitiveness and the impact of certain variables we identify may be culture dependent (A. P. Buunk, Carmona, Peiró, Dijkstra, & Dijkstra, 2011). For example, Chinese precollege students use competitive strategies, whereas American precollege students use cooperative strategies in the realm of test taking (Tang, 1999). Yet this difference is not cultural per se, rather resulting from different institutional structures of testing: college entrance exams are a onetime event in

China but repeatable in the United States. Accordingly, a study comparing the strategies used by students in the two cultures found that the psychological predictors of “competitive types” and “cooperative types” did not vary by culture or origin (Tang, 1999).

The same may hold for the impact of individual and situational factors, which can remain influential despite significant differences in their concrete cross-cultural manifestations. To illustrate, a common Japanese maxim states that “the nail that sticks out gets hammered,” suggesting it may be more important for Japanese relative to American populations to avoid falling behind the competition than to break ahead of the competition. Indeed, findings indicate that the Japanese may be slightly more motivated than Americans by being ranked near the bottom, whereas Americans may be slightly more motivated near the top rank (Heine et al., 2001). In this case, therefore, the situational factor of proximity to a standard matters but manifests differently across cultures.

A New Social Comparison Lens

The present framework contributes to social psychology in particular by synthesizing the early postulated yet underdeveloped connection between social comparison and competitiveness (Festinger, 1954). It reorganizes both early and more recent research of this realm into the distinct categories of individual and situational factors and examines the relationships among them. No less important, our model also offers new lessons and generates important research questions across other subfields of psychology and even for disciplines beyond psychology that intersect with the study of competition, from political science and economics, through business and strategy, to law and public policy.

Across psychology

Personality psychology. One important personality variable that merits further consideration in competition is gender. Males reveal a stronger preference than females for tournament-based incentives over noncompetitive piece-rate incentives (Niederle & Vesterlund, 2007). Females also exhibit greater discomfort than males in competition in same-sex dyads and tetrads (Benenson et al., 2002). Yet extant research does not tell us whether gender operates directly as a personal factor on social comparison processes and competitiveness. Moreover, research also needs to explore the specific effects, if any, that gender has on these processes. For instance, does gender influence self-selection into competitions or self-selection out of competitions besides influencing behavior within a competition? If males were shown to prefer larger competitions than females do and females

generally to be less competitive than males, selection into and competitive behavior in naturally occurring competitions could generate an overrepresentation of males in larger competitions.

Organizational psychology. The framework’s situational factors particularly illuminate employee motivation (Latham, 2011). For example, although individual-based feedback (Williams, Harkins, & Latané, 1981) can curb social loafing on collective tasks (Latané, Williams, & Harkins, 1979), our model reveals that motivational deficits still occur even on individual-based tasks, as the number of employees increases. Thus, commission-based sales agents and other workers doing the same task individually would likely exhibit better performance if they were based in relatively small branch offices (or another smaller-*N* environment) instead of, say, a single large warehouse.

The framework also suggests that common calls for ranking employees to boost productivity (Grote, 2005; Hazels & Sasse, 2008) should recognize that ranking’s effect on productivity depends on whether the workers’ tasks require cooperation and information exchange. Highly ranked individuals could become less likely to collaborate for the benefit of the organization, instead focusing on maintaining their rank. But rankings indeed might generate positive effects when individuals work autonomously (Cherry & Ellis, 2005). A similar analysis applies to social category fault lines. If collaboration across groups is required, social category fault lines can be detrimental to organizational success, but if collaboration is not required, employees from different departments, for example, could be motivated to outdo each other in myriad ways (i.e., greater effort, volunteering, or conservation) to the benefit of the organization overall (Lount & Phillips, 2007).

Consumer psychology. Conspicuous consumption easily becomes a race (Frank, 2010; Lee & Shrum, 2012; Ordabayeva & Chandon, 2011; Podolny, 2005), especially as people often consume high-status goods to compensate for personal deficiencies (i.e., self-threat: Pettit & Sivanathan, 2011; little power: Rucker & Galinsky, 2009; minority status: Charles, Hurst, & Roussanov, 2009). Given the link between self-threat and social comparison (Tesser, 1988), our framework can offer predictions regarding conspicuous consumption. For example, whereas low-power individuals seek high-status goods in the abstract, they may experience decreased comparison concerns among many “competing” consumers, with a concomitant decrease in conspicuous consumption. Similarly, proximity to a standard suggests that highly ranked individuals in terms of wealth may be more vulnerable to comparison concerns in that domain, tending more to

compete in a conspicuous consumption race with similarly high-ranked peers.

Educational psychology. One prevailing approach to student achievement is based on expectancy value models (Ajzen, 1988; Wigfield & Eccles, 2000) that view motivation as a function of one's expectancies and the perceived goal value. However, the present framework suggests that situational factors may influence achievement motivation, even controlling for expected values. For instance, the *N*-effect findings revealed a situational variable that decreases achievement motivation even in ad hoc test-taking sessions. In the same vein, although norm referencing (i.e., ranking systems) is more likely than criterion referencing to boost overall student motivation (Cherry & Ellis, 2005), it may have a hidden cost as well. Our model suggests that intermediately ranked students—possibly the majority of all students—may become less motivated than those at the extremes. Fostering competitiveness in the classroom writ large can be detrimental to learning (Kohn, 1992), however, so increasing competitiveness may be better suited for test-taking and similar situations, once the material already has been learned and individual effort is of paramount importance.

Evolutionary psychology. Our framework potentially speaks to the role of evolutionary processes in social comparison and competition. For instance, situational factors might have evolved early. Nonhuman primates appear susceptible to the dynamics of being in the proximity to a standard, expressing sensitivity to rankings and hierarchies (e.g., Beehner, Bergman, Cheney, Seyfarth, & Whitten, 2006; Bergman, Beehner, Cheney, & Seyfarth, 2003; Sapolsky, 2005) as well as to social category fault lines, distinguishing between the in-group and out-groups (Bergman et al., 2003). Even more primitive species, such as beetle larvae (Smiseth & Moore, 2004) and cockroaches (Zajonc, Heingartner, & Herman, 1969), appear sensitive to the number of competitors. Thus, situational factors may have evolved before individual factors, which require a relatively more sophisticated level of theory of mind (Ruys & Aarts, 2010).

Beyond psychology

Economics. Experimental economics (Camerer, 2003; Kagel & Roth, 1995; Plott & Smith, 2008) pays great attention to the study of key interpersonal preferences (i.e., fairness, reciprocity, altruism, or inequity aversion) that traditionally have been deemed irrational and outside standard economic models (e.g., Charness & Rabin, 2002; Fehr & Fischbacher, 2002; Fehr & Schmidt, 2003; Levitt & List, 2007). Yet experimental economists have mostly ignored the contribution of the social comparison

processes to these preferences beyond noting their possible role (Frey & Meier, 2004). Our framework highlights the need for further study in this area, particularly with respect to the systematic effects of the situational factors of social comparison on social preferences. After all, the findings we reviewed with respect to these determinants of competitiveness—such as proximity to a standard or the number of competitors—are likely to exert similar effects through the social comparison process on individuals' tendency to cooperate, reciprocate, tolerate inequitable outcomes, and more.

Business and strategy. Competitive strategy is concerned with the ways companies compete and seek to gain an advantage in the market vis-à-vis their competitors. The framework we offer gives social comparison research an opportunity to inform the strategy field by providing insight into the operation of rivalry and supplementing areas of strategy that focus on the role of positional concerns in competitive dynamics (e.g., Deephouse, 1999; D. Miller & Chen, 1994). In some cases, our model provides further support, for instance, to the five-forces model that predicts "rivalry among existing competitors" (Porter, 1980, 2008) and suggests that competition intensifies when rivals are similar in size or when they compete on the same dimension (Porter, 2008)—both of which predictions echo the relational, individual factor of similarity and the personal, individual factor of relevance. In other cases, however, our model helps identify limits to the accepted wisdom in business strategy, which believes rivalry is most intense if competitors are numerous (Porter, 1980, 2008), by pointing out the diminished competitiveness in large-*N* settings. Our model also complements prevailing microperspectives on strategy, such as the awareness-motivation-capability framework (M. J. Chen, Su, & Tsai, 2007), which predicts the likelihood of a competitor responding to another competitor (i.e., aware of the action, motivated to react, and capable of responding). Here, our model helps better predict the motivation to react to specific competitors. It also helps fill a void documented in the strategy literature where the study of "competitive dynamics remains notably underdeveloped in several key respects" (M. J. Chen & Miller, 2012, p. 136), including the "potential to bridge micro and macro perspectives within the discipline" and make "fruitful links to other disciplines in the management field" (M. J. Chen & Miller, 2012, p. 136).

Political science. Elections—an important type of competition—are a key area of study. Political scientists are interested, for one, in the competitive dynamics of primary elections (e.g., Ansolabehere, Hansen, Hirano, & Snyder, 2010; Snyder & Ting, 2011). Applying some

situational factors of our framework to primary elections, we would predict that competitiveness among candidates decreases when the number of primary candidates is high versus low. Our framework also predicts that candidates who are highly ranked, say, in terms of weekly polls will be more likely to spar with each other than those who are not. Moreover, individual factors also apply. For instance, candidates who perceive themselves as similar to each other will be more likely to spar than those who believe they are dissimilar.

Law. Our model offers lessons for many legal areas that need to account for social preferences and concerns regarding one's relative position or outcomes (e.g., Davidson, 2009; Frank & Sunstein, 2001; Hovenkamp, 1994; McAdams, 1992). To illustrate, property law scholarship has emphasized the role of property in communicating one's relative position in social settings (Davidson, 2009); yet the status function of property can skew individuals' incentives to trade and invest in property, leading to social welfare losses. The situational factors of social comparison suggest, however, that this status function may be particularly harmful in small-*N* settings, among particularly high- or low-ranked individuals, across social category fault lines, and so on. Similar analysis can inform other legal areas (i.e., tax law: McAdams, 1992; antidiscrimination law: Donohue, 1986, 1989; Posner, 1987, 1989) where the intensity of concerns over relative position versus superior overall outcomes is of great interest, as well as advance the more recent scholarship that draw on behavioral insights for legal analysis (Jolls, Sunstein, & Thaler, 1998; Korobkin & Ulen, 2000; Tor, 2008; Tor, Gazal-Ayal, & Garcia, 2010).

Public policy. The framework's focus on situational factors suggests how policy makers could be both attuned to the impact of these variables and ready to use them to improve policy. One issue pertains to the fairness and efficacy of standard testing practices (e.g., L. Bond, 1995) on important standardized exams, such as the SAT. Drawing on the *N* effect, for instance, one overlooked factor is the number of test takers showing up to take a standardized exam. As the number of test takers reporting to any given test-taking venue increases, test takers may feel less motivated to do well on the exam and therefore exhibit inferior performance. Modified testing practices can take this and other situational variables into account and standardize the size and other neglected features of test-taking venues, ensuring greater fairness and efficacy of important tests. Moreover, in light of the No Child Left Behind Act (Linn, Baker, & Betebenner, 2001), the situational factors of social comparison bear implications for the measurement of teacher effectiveness (and sometimes pay) as well as for evaluations at the school, district, or state levels.

Conclusion

In sum, the social comparison model of competition distinguishes individual from situational factors of social comparison that influence competitive behavior. We hope that the present review will join other programs of psychological research in helping invigorate the development of a unique psychological perspective in the interdisciplinary study of competition. Ideally, the new framework developed here will also offer a broad foundation, allowing those many subfields of psychology as well as other, related disciplines more effectively and extensively to draw on the rich and important findings from the social comparison perspective.

Acknowledgments

We thank Cecile Cho, Marie-Pierre Fayant, Michael Heaney, Camille Johnson, Mel Manis, Hazel Markus, Richard Price, and Oscar Ybarra for helpful feedback on the ideas presented in this article.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Notes

1. Note that the situational factor of social category fault lines is qualitatively different from the individual factor of similarity. For example, being within social category fault lines—where the actor shares a “similar” social category with a target—decreases social comparison concerns. Conversely, the individual factor of similarity—in the absence of salient social category fault line in the environment—has the opposite effect of increasing social comparison concerns. The same analysis could apply to relationship closeness, as in-group members are likely to feel “close” to one another. The theory of optimal distinctiveness (Brewer, 2003), which explains a contrasting desire for individual distinctiveness and social identification with a group, offers additional insight on this dynamic.
2. Incidentally, if Outcome A happens, then you can actually begin to bask in the glory of your friend's success at chess.

References

- Ajzen, I. (1988). *Attitudes, personality, and behavior*. Chicago, IL: Dorsey Press.
- Andersen, S. M., Moskowitz, G. B., Blair, I. V., & Nosek, B. A. (2007). Automatic thought. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (2nd ed., pp. 133–172). New York, NY: Guilford Press.
- Ansolahehere, S., Hansen, J. M., Hirano, S., & Snyder, J. M. (2010). More democracy: The direct primary and competition in U.S. elections. *Studies in American Political Development*, *24*, 190–205.
- Argo, J., White, K., & Dahl, D. W. (2006). Social comparison theory and deception in the interpersonal exchange of consumption information. *Journal of Consumer Research*, *33*, 99–108.

- Armstrong, J. S., & Collopy, F. (1996). Competitor orientation: Effects of objectives and information on managerial decisions and profitability. *Journal of Marketing Research*, 33, 188–199.
- Arrowood, A. J. (1978). Social comparison theory: Retrieved from neglect. *Contemporary Psychology*, 23, 490–491.
- Aspinwall, L. G., & Taylor, S. E. (1997). A stitch in time: Self-regulation and proactive coping. *Psychological Bulletin*, 121, 417–436.
- Axelrod, R. (1984). *The evolution of cooperation*. New York, NY: Basic Books.
- Axelrod, R. (1997). *The complexity of cooperation: Agent-based models of competition and collaboration*. Princeton, NJ: Princeton University Press.
- Bargh, J. A. (1996). Automaticity in social psychology. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 169–183). New York, NY: Guilford Press.
- Bazerman, M. H., Baron, J., & Shonk, K. (2001). *You can't enlarge the pie: The psychology of ineffective government*. New York, NY: Basic Books.
- Beach, S. R. H., & Tesser, A. (2000). Self-evaluation maintenance and evolution: Some speculative notes. In J. Suls & L. Wheeler (Eds.), *Handbook of social comparison: Theory and research* (pp. 123–140). New York, NY: Plenum Publishing.
- Beehner, J. C., Bergman, T. J., Cheney, D. L., Seyfarth, R. M., & Whitten, P. L. (2006). Testosterone predicts future dominance rank and mating activity among male chacma baboons. *Behavioral Ecology and Sociobiology*, 59, 469–479.
- Beilock, S. (2011). *Choke: What the secrets of the brain reveal about getting it right when you have to*. New York, NY: Free Press.
- Benenson, J. F., Roy, R., Waite, A., Goldbaum, S., Linders, L., & Simpson, A. (2002). Greater discomfort as a proximate cause of sex differences in competition. *Merrill-Palmer Quarterly*, 48, 225–247.
- Bergman, T. J., Beehner, J. C., Cheney, D. L., & Seyfarth, R. M. (2003). Hierarchical classification by rank and kinship in baboons. *Science*, 302, 1234–1236.
- Bond, C. F., & Titus, L. J. (1983). Social facilitation: A meta-analysis of 241 studies. *Psychological Bulletin*, 94, 265–292.
- Bond, L. (1995). Unintended consequences of performance assessment: Issues of bias and fairness. *Educational Measurement: Issues and Practice*, 14(4), 21–24.
- Bornstein, G., & Erev, I. (1994). The enhancing effect of intergroup competition on group performance. *International Journal of Conflict Management*, 5, 271–284.
- Bornstein, G., Erev, I., & Rosen, O. (1990). Intergroup competition as a structural solution to social dilemmas. *Social Behaviour*, 5, 247–260.
- Bornstein, G., Gneezy, U., & Nagel, R. (2002). The effect of intergroup competition on group coordination: An experimental study. *Games and Economic Behavior*, 41, 1–25.
- Boudreau, K. J., Lacetera, N., & Lakhani, K. R. (2011). Incentives and problem uncertainty in innovation contests: An empirical analysis. *Management Science*, 57, 843–863.
- Brewer, M. B. (1999). The psychology of prejudice: Ingroup love or outgroup hate? *Journal of Social Issues*, 55, 429–444.
- Brewer, M. B. (2003). Optimal distinctiveness, social identity, and the self. In M. Leary & J. Tangney (Eds.), *Handbook of self and identity* (pp. 480–491). New York, NY: Guilford Press.
- Brickman, P., & Campbell, D. T. (1971). Hedonic relativism and planning the good society. In M. H. Appley (Ed.), *Adaptation-level theory: A symposium* (pp. 287–302). New York, NY: Academic Press.
- Britt, T. W. (2005). The effects of identity-relevance and task difficulty on task motivation, stress, and performance. *Motivation & Emotion*, 29, 189–202.
- Buckingham, J. T., & Alicke, M. D. (2002). The influence of individual versus aggregate social comparison and the presence of others on self-evaluations. *Journal of Personality and Social Psychology*, 83, 1117–1130.
- Buunk, A. P., Carmona, C., Peiró, J. M., Dijkstra, A., & Dijkstra, P. (2011). Social comparison at work: The role of culture, type of organization and gender. *Cross-Cultural Communication*, 7, 22–34.
- Buunk, B. P. (1994). Social comparison processes under stress: Towards an integration of classic and recent perspectives. *European review of social psychology*, 5, 211–241.
- Camerer, C. F. (2003). *Behavioral game theory: Experiments in strategic interaction*. Princeton, NJ: Princeton University Press.
- Carlton, D., & Perloff, J. (2005). *Modern industrial organization* (4th ed.). Boston, MA: Pearson.
- Casas-Arce, P., & Martínez-Jerez, F. A. (2009). Relative performance compensation, contests, and dynamic incentives. *Management Science*, 55, 1306–1320.
- Charles, K. K., Hurst, E., & Roussanov, N. (2009). Conspicuous consumption and race. *Quarterly Journal of Economics*, 124, 425–467.
- Charness, G., & Rabin, M. (2002). Understanding social preferences with simple tests. *Quarterly Journal of Economics*, 117, 817–869.
- Chen, M. J., & Miller, D. (2012). Competitive dynamics: Themes, trends, and a prospective research platform. *Academy of Management Annals*, 6, 135–210.
- Chen, M. J., Su, K. H., & Tsai, W. (2007). Competitive tension: The awareness-motivation-capability perspective. *Academy of Management Journal*, 50, 101–108.
- Chen, P., Myers, C. G., Kopelman, S., & Garcia, S. M. (2012). The hierarchical face: Higher rankings lead to less cooperative looks. *Journal of Applied Psychology*, 97, 479–486.
- Cherry, T. L., & Ellis, L. V. (2005). Does rank-order grading improve student performance? Evidence from a classroom experiment. *International Review of Economics Education*, 4, 9–19.
- Cole, J. S., Bergin, D. A., & Whittaker, T. A. (2008). Predicting student achievement for low stakes tests with effort and task value. *Contemporary Educational Psychology*, 33, 609–624.
- Cottrell, N. B., Wack, D. L., Sekerak, G. J., & Rittle, R. H. (1968). Social facilitation of dominant responses by the presence of an audience and the mere presence of others. *Journal of Personality and Social Psychology*, 9, 245–250.
- Dakin, S., & Arrowood, A. J. (1981). The social comparison of ability. *Human Relations*, 34, 89–109.

- Darnon, C., Dompnier, B., & Poortvliet, P. M. (2012). Achievement goals in educational contexts: A social psychology perspective. *Social & Personality Psychology Compass*, 6, 760–771.
- Davidson, N. M. (2009). Property and relative status. *Michigan Law Review*, 107, 757–817.
- De Botton, A. (2004). *Status anxiety*. New York, NY: Pantheon Books.
- Deephouse, D. L. (1999). To be different or the same? It's a question (and theory) of strategic balance. *Strategic Management Journal*, 20, 147–166.
- Destin, M., & Oyserman, D. (2009). From assets to school outcomes how finances shape children's perceived possibilities and intentions. *Psychological Science*, 20, 414–418.
- Destin, M., & Oyserman, D. (2010). Incentivizing education: Seeing schoolwork as an investment, not a chore. *Journal of Experimental Social Psychology*, 46, 846–849.
- Deutsch, M. (1949). A theory of cooperation and competition. *Human Relations*, 2, 129–152.
- Donohue, J. J. (1986). Is title VII efficient? *University of Pennsylvania Law Review*, 134, 1411–1431.
- Donohue, J. J. (1989). Prohibiting sex discrimination in the workplace: An economic perspective. *University of Chicago Law Review*, 56, 1337–1368.
- Ehrenberg, R. G., & Bognanno, M. L. (1990). Do tournaments have incentive effects? *The Journal of Political Economy*, 98, 1307–1324.
- Erev, I., Bornstein, G., & Galili, R. (1993). Constructive intergroup competition as a solution to the free rider problem: A field experiment. *Journal of Experimental Social Psychology*, 29, 463–478.
- Fehr, E., & Fischbacher, U. (2002). Why social preferences matter – the impact on non-selfish motives on competition, cooperation, and incentives. *The Economic Journal*, 112, C1–C33.
- Fehr, E., & Schmidt, K. M. (2003). Theories of fairness and reciprocity—Evidence and economic applications. In M. Dewatripont, L. P. Hansen, & S. J. Turnovsky (Eds.), *Advances in economics and econometrics—8th World Congress, econometric society monographs* (pp. 208–257). Cambridge, England: Cambridge University Press.
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117–140.
- Frank, R. H. (1985). *Choosing the right pond: Human behavior and the quest for status*. Oxford, England: Oxford University Press.
- Frank, R. H. (2010). *Luxury fever: Weighing the cost of excess*. Princeton, NJ: Princeton University Press.
- Frank, R. H., & Sunstein, C. R. (2001). Cost-benefit analysis and relative position. *University of Chicago Law Review*, 68, 323–374.
- Frey, B. S., & Meier, S. (2004). Social comparisons and prosocial behavior: Testing “conditional cooperation” in a field experiment. *American Economic Review*, 94, 1717–1722.
- Garcia, S. M., Bazerman, M. H., Kopelman, S., Tor, A., & Miller, D. T. (2010). The price of equality: Suboptimal resource allocations across social categories. *Business Ethics Quarterly*, 20, 75–88.
- Garcia, S. M., & Miller, D. (2007). Social categories and group preference disputes: The aversion to winner-take-all solutions. *Group Processes and Intergroup Relations*, 10, 581–593.
- Garcia, S. M., Song, H., & Tesser, A. (2010). Tainted recommendations: The social comparison bias. *Organizational Behavior and Human Decision Processes*, 113, 97–101.
- Garcia, S. M., & Tor, A. (2007). Rankings, standards, and competition: Task vs. scale comparisons. *Organizational Behavior and Human Decision Processes*, 102, 95–108.
- Garcia, S. M., & Tor, A. (2009). The N-effect: More competitors, less competition. *Psychological Science*, 20, 871–877.
- Garcia, S. M., Tor, A., Bazerman, M. H., & Miller, D. T. (2005). Profit maximization versus disadvantageous inequality: The impact of self-categorization. *Journal of Behavioral Decision Making*, 18, 187–198.
- Garcia, S. M., Tor, A., & Gonzalez, R. D. (2006). Ranks and rivals: A theory of competition. *Personality and Social Psychology Bulletin*, 32, 970–982.
- Garcia, S. M., & Ybarra, O. (2007). People accounting: Social category-based choice. *Journal of Experimental Social Psychology*, 43, 802–809.
- Gardner, J. W. (1939). Level of aspiration in response to a prearranged sequence of scores. *Journal of Experimental Psychology*, 25, 601–621.
- Geen, R. G. (1989). Alternative conceptions of social facilitation. In P. B. Paulus (Ed.), *Psychology of group influence* (pp. 15–51). Hillsdale, NJ: Erlbaum.
- Gerard, H. B. (1963). Emotional uncertainty and social comparison. *Journal of Abnormal and Social Psychology*, 66, 568–573.
- Gibbons, F. X., & Buunk, B. P. (1999). Individual differences in social comparison: Development of a scale of social comparison orientation. *Journal of Personality and Social Psychology*, 76, 129–142.
- Goethals, G., & Darley, J. (1977). Social comparison theory: An attributional approach. In J. Suls & R. L. Miller (Eds.), *Social comparison processes: Theoretical and empirical perspectives* (pp. 259–278). Washington, DC: Hemisphere.
- Graf, L., Konig, A., Enders, A., & Hungenberg, H. (2012). Debiasing competitive irrationality: How managers can be prevented from trading off absolute for relative profit. *European Management Journal*, 30, 386–403.
- Grote, D. (2005). *Forced ranking: Making performance management work*. Boston, MA: Harvard Business School Press.
- Halevy, N., Bornstein, G., & Sagiv, L. (2008). “In-group love” and “out-group hate” as motives for individual participation in intergroup conflict: A new game paradigm. *Psychological Science*, 19, 405–411.
- Hastorf, A., & Cantril, H. (1954). They saw a game. *Journal of Abnormal and Social Psychology*, 49, 129–134.
- Hazels, B., & Sasse, C. M. (2008). Forced ranking, a review. *SAM Advanced Management Journal*, 73, 35–40.
- Heine, S. J., Kitayama, S., Lehman, D. R., Takata, T., Ide, E., Leung, C., & Matsumoto, H. (2001). Divergent consequences of success and failure in Japan and North America: An investigation of self-improving motivations and malleable selves. *Journal of Personality and Social Psychology*, 81, 599–615.

- Hodges, B. H. (1973). Adding and averages models for information integration. *Psychological Review*, *80*, 80–84.
- Hoffman, P., Festinger, L., & Lawrence, D. (1954). Tendencies toward group comparability in competitive bargaining. *Human Relations*, *7*, 141–159.
- Hogg, M. A. (2000). Social identity and social comparison. In J. Suls & L. Wheeler (Eds.), *Handbook of social comparison: Theory and research* (pp. 401–421). New York, NY: Kluwer Academic.
- Houston, I. M., McIntire, S., Kinnie, I., & Terry, C. (2002). A factor analysis of scales measuring competitiveness. *Educational and Psychological Measurement*, *62*, 284–298.
- Hovenkamp, H. (1994). The limits of preference-based legal policy. *Northwestern University Law Review*, *89*, 4–91.
- Johnson, C. (2012). Behavioral responses to threatening social comparisons: From dastardly deeds to rising above. *Social & Personality Psychology Compass*, *6*, 515–524.
- Johnson, D. W., & Johnson, F. P. (2000). *Joining together: Group theory and group skills* (7th ed.). Boston, MA: Allyn & Bacon.
- Jolls, C., Sunstein, C., & Thaler, R. (1998). A behavioral approach to law and economics. *Stanford Law Review*, *50*, 1471–1550.
- Kagel, J. H., & Roth, A. E. (1995). *The handbook of experimental economics*. Princeton, NJ: Princeton University Press.
- Kilduff, G. J., Elfenbein, H. A., & Staw, B. M. (2010). The psychology of rivalry: A relationally-dependent analysis of competition. *Academy of Management Journal*, *53*, 943–969.
- Klein, J. P., Goertz, G., & Diehl, P. F. (2006). The new rivalry dataset: Procedures and patterns. *Journal of Peace Research*, *43*, 331–348.
- Klein, W. M. P. (2003). Effects of objective feedback and “single other” or “average other” social comparison feedback on performance judgments and helping behavior. *Personality and Social Psychology Bulletin*, *29*, 418–429.
- Kohn, A. (1992). *No contest: The case against competition*. New York, NY: Houghton Mifflin.
- Korobkin, R. B., & Ulen, T. S. (2000). Law and behavioral science: Removing the rationality assumption from law and economics. *California Law Review*, *88*, 1051–1144.
- Ku, G., Malhotra, D., & Murnighan, J. K. (2005). Towards a competitive arousal model of decision-making: A study of auction fever in live and internet auctions. *Organizational Behavior and Human Decision Processes*, *96*, 89–103.
- Latané, B., Williams, K., & Harkins, S. (1979). Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology*, *37*, 822–832.
- Latham, G. P. (2011). *Work motivation: History, theory, research, and practice*. Thousand Oaks, CA: Sage.
- Lawler, E. E. (2003). Reward practices and performance management system effectiveness. *Organizational Dynamics*, *32*, 396–404.
- Lee, J., & Shrum, L. J. (2012). Conspicuous consumption versus charitable behavior in response to social exclusion: A differential needs explanation. *Journal of Consumer Research*, *39*, 530–544.
- Levitt, S. D., & List, J. A. (2007). What do laboratory experiments measuring social preferences reveal about the real world? *Journal of Economic Perspectives*, *21*, 153–174.
- Linn, R. L., Baker, E. L., & Betebenner, D. W. (2001). Accountability systems: Implications of requirements of the No Child Left Behind Act of 2001. *Education Researcher*, *31*, 3–16.
- Locke, K. D. (2007). Personalized and generalized comparisons: Causes and consequences of variations in the focus of social comparisons. *Personality and Social Psychology Bulletin*, *33*, 213–225.
- Lount, R. B., Jr., & Phillips, K. W. (2007). Working harder with the out-group: The impact of social category diversity on motivation gains. *Organizational Behavior and Human Decision Processes*, *103*, 214–224.
- Malhotra, D. (2010). The desire to win: The effects of competitive arousal on motivation and behavior. *Organizational Behavior and Human Decision Processes*, *111*, 139–146.
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, *98*, 224–253.
- McAdams, R. H. (1992). Relative preferences. *Yale Law Journal*, *102*, 1–104.
- Miller, D., & Chen, M. J. (1994). Sources and consequences of competitive inertia – A study of the United States airline industry. *Administrative Science Quarterly*, *39*, 1–23.
- Miller, D. T., Turnbull, W., & McFarland, C. (1988). Particularistic and universalistic evaluation in the social comparison process. *Journal of Personality and Social Psychology*, *55*, 908–917.
- Mittone, L., & Savadori, L. (2009). The scarcity bias. *Applied Psychology: An International Review*, *58*, 453–468.
- Molleman, E., Pruyn, J., & van Knippenberg, A. (1986). Social comparison processes among cancer patients. *British Journal of Social Psychology*, *25*, 1–13.
- Moran, S., & Schweitzer, M. (2008). When better is worse: Envy and the use of deception in negotiations. *Negotiation and Conflict Management Research*, *1*, 3–29.
- Mukherjee, K., & Hogarth, R. M. (2010). The N-Effect possible effects of differential probabilities of success. *Psychological Science*, *21*, 745–747.
- Muller, D., Atzeni, T., & Butera, F. (2004). Coaction and upward social comparison reduce the illusory conjunction effect: Support for distraction–conflict theory. *Journal of Experimental Social Psychology*, *40*, 659–665.
- Munkes, J., & Diehl, M. (2003). Matching or competition? Performance comparison processes in an idea generation task. *Group Processes & Intergroup Relations*, *6*, 305–320.
- Niederle, M., & Vesterlund, L. (2007). Do women shy away from competition? Do men compete too much? *Quarterly Journal of Economics*, *122*, 1067–1101.
- Ordabayeva, N., & Chandon, P. (2011). Getting ahead of the Joneses: When equality increases conspicuous consumption among bottom-tier consumers. *Journal of Consumer Research*, *38*, 27–41.
- Oyserman, D., & Destin, M. (2010). Identity-based motivation: Implications for intervention. *The Counseling Psychologist*, *38*, 1001–1043.

- Pettit, N. C., & Sivanathan, N. (2011). The plastic trap: Self-threat drives credit usage and status consumption. *Social Psychological and Personality Science*, 2, 146–153.
- Pillutla, M. M., & Ronson, S. (2005, August). *Do we prefer coworkers who are better or worse than us? Evidence from the "Weakest Link" game*. Paper presented at the meeting of the Academy of Management, Honolulu, HI.
- Pleban, R., & Tesser, A. (1981). The effects of relevance and quality of another's performance on interpersonal closeness. *Social Psychology Quarterly*, 44, 278–285.
- Plott, C. R., & Smith, V. L. (2008). *Handbook of experimental economics results* (Vol. 1). North Holland, The Netherlands: Elsevier.
- Podolny, J. M. (2005). *Status signals: A sociological study of market competition*. Princeton, NJ: Princeton University Press.
- Poortvliet, P. M. (2012). Harming others' task-related efforts: The distinct competitive effects of ranking information on performance and mastery goal individuals. *Social Psychology*. Advance online publication.
- Poortvliet, P. M., Janssen, O., Van Yperen, N. W., & Van de Vliert, E. (2009). Low ranks make the difference: How achievement goals and ranking information affect cooperation intentions. *Journal of Experimental Social Psychology*, 45, 1144–1147.
- Porter, M. E. (1979, March/April). How competitive forces shape strategy. *Harvard Business Review*, pp. 91–101.
- Porter, M. E. (1980). *Competitive strategy*. New York, NY: Free Press.
- Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard Business Review*, 86, 78–93.
- Posner, R. (1987). The efficiency and the efficacy of Title VII. *University of Pennsylvania Law Review*, 136, 513–521.
- Posner, R. (1989). An economic analysis of sex discrimination laws. *University of Chicago Law Review*, 56, 1311–1335.
- Rafaeli, S., & Noy, A. (2002). Online auctions, messaging, communication and social facilitation: A simulation and experimental evidence. *European Journal of Information Systems*, 11, 196–207.
- Rhea, M. R., Landers, D. M., Alvar, B. A., & Arent, S. M. (2003). The effects of competition and the presence of an audience on weight lifting performance. *The Journal of Strength & Conditioning Research*, 17, 303–306.
- Ross, L., & Nisbett, R. E. (1991). *The person and the situation: Perspectives of social psychology*. New York, NY: McGraw-Hill.
- Rucker, D. D., & Galinsky, A. (2009). Conspicuous consumption versus utilitarian ideals: How different levels of power shape consumer consumption. *Journal of Experimental Social Psychology*, 45, 549–555.
- Ruys, K. I., & Aarts, H. (2010). When competition merges people's behavior: Interdependency activates shared action representations. *Journal of Experimental Social Psychology*, 46, 1130–1133.
- Salovey, P., & Rodin, J. (1984). Some antecedents and consequences of social-comparison jealousy. *Journal of Personality and Social Psychology*, 47, 780–792.
- Sanders, G. S., Baron, R. S., & Moore, D. L. (1978). Distraction and social comparison as mediators of social facilitation effects. *Journal of Experimental Social Psychology*, 14, 291–303.
- Sapolsky, R. M. (2005). The influence of social hierarchy on primate health. *Science*, 308, 648–652.
- Seta, J. J. (1982). The impact of comparison processes on coactors' task performance. *Journal of Personality and Social Psychology*, 42, 281–291.
- Shepperd, J. A., & Arkin, R. M. (1991). Behavioral other-enhancement: Strategically obscuring the link between performance and evaluation. *Journal of Personality and Social Psychology*, 60, 79–88.
- Smiseth, P. T., & Moore, A. J. (2004). Behavioral dynamics between caring males and females in a beetle with facultative biparental care. *Behavioral Ecology*, 15, 621–628.
- Snyder, J. M., & Ting, M. M. (2011). Electoral selection with parties and primaries. *American Journal of Political Science*, 55, 782–796.
- Solnick, S. J., & Hemenway, D. (1998). Is more always better? A survey on positional concerns. *Journal of Economic Behavior and Organization*, 37, 373–383.
- Spence, A. M. (1973). Job market signaling. *Quarterly Journal of Economics*, 87, 355–374.
- Stinnett, D. M., & Diehl, P. F. (2001). The path(s) to rivalry: Behavioral and structural explanations of rivalry development. *Journal of Politics*, 63, 717–740.
- Suls, J., & Wheeler, L. (2000). *Handbook of social comparison*. New York, NY: Kluwer Academic.
- Suls, J. E., & Wills, T. A. E. (1991). *Social comparison: Contemporary theory and research*. Hillsdale, NJ: Erlbaum.
- Summers, J. J., Schallert, D. L., & Ritter, P. M. (2003). The role of social comparison in students' perceptions of ability: An enriched view of academic motivation in middle school students. *Contemporary Educational Psychology*, 28, 510–523.
- Tajfel, H. (1972). La categorization sociale. In S. Moscovici (Ed.), *Introduction a la psychologie sociale* [Introduction to social psychology] (Vol. 1, pp. 272–302). Paris, France: Larousse.
- Tajfel, H., Billig, M. G., Bundy, R. P., & Flament, C. (1971). Social categorization and intergroup behavior. *European Journal of Social Psychology*, 1, 149–177.
- Tang, S. (1999). Cooperation or competition: A comparison of US and Chinese college students. *The Journal of Psychology: Interdisciplinary and Applied*, 133, 413–423.
- Tauer, J. M., & Harackiewicz, J. M. (1999). Winning isn't everything: Competition, achievement orientation, and intrinsic motivation. *Journal of Experimental Social Psychology*, 35, 209–238.
- Taylor, D. M., Moghaddam, F. M., & Bellerose, J. (1989). Social comparison in an intergroup context. *Journal of Social Psychology*, 129, 499–515.
- Taylor, S. E., Buunk, B. P., & Aspinwall, L. G. (1990). Social comparison, stress, and coping. *Personality and Social Psychology Bulletin*, 16, 74–89.
- Tesser, A. (1988). Toward a self-evaluation maintenance framework of social behavior. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 21, pp. 181–227). New York, NY: Academic.
- Tesser, A., & Campbell, J. (1982). Self-evaluation maintenance and the perception of friends and strangers. *Journal of Personality*, 50, 261–279.

- Tesser, A., & Smith, J. (1980). Some effects of task relevance and friendship on helping: You don't always help the one you like. *Journal of Experimental Social Psychology, 16*, 582–590.
- Toda, M., Shinotsuka, H., McClintock, C. G., & Stech, F. J. (1978). Development of competitive behavior as a function of culture, age, and social comparison. *Journal of Personality and Social Psychology, 36*, 825–839.
- Tor, A. (2008). The methodology of the behavioral analysis of law. *Haifa Law Review, 4*, 237–327.
- Tor, A., & Garcia, S. M. (2010). The N-Effect: Beyond probability judgments. *Psychological Science, 21*, 748–749.
- Tor, A., Gazal-Ayal, O., & Garcia, S. M. (2010). Fairness and the willingness to accept plea bargain offers. *Journal of Empirical Legal Studies, 7*, 97–116.
- Triplett, N. (1898). The dynamogenic factors in pacemaking and competition. *American Journal of Psychology, 9*, 507–533.
- Turner, J. C. (1975). Social identity and social comparison: Some prospects for intergroup behavior. *European Journal of Social Psychology, 5*, 5–34.
- Turner, J. C., Brown, R. J., & Tajfel, H. (1979). Social comparison and group interest in ingroup favoritism. *European Journal of Social Psychology, 9*, 187–204.
- Turner, J. C., Hogg, M., Oakes, P., Reicher, D., & Wetherell, M. (1987). *Rediscovering the social group: A self-categorization theory*. Oxford, England: Blackwell.
- Vandegrift, D., & Holaday, B. (2012). Competitive behavior: Tests of the N-Effect and proximity to a standard. *Journal of Neuroscience, Psychology, and Economics, 5*, 182–192.
- Vaughn, J., & Diserens, C. M. (1938). The experimental psychology of competition. *Journal of Experimental Education, 7*, 76–97.
- Weiss, H., & Rupp, D. E. (2011). Experiencing work: An essay on a person-centric work psychology. *Industrial and Organizational Psychology: Perspectives on Science and Practice, 4*, 83–97.
- White, J. B., & Langer, E. (1999). Horizontal hostility; Relations between similar minority groups. *Journal of Social Issues, 55*, 537–599.
- White, J. B., Schmitt, M. T., & Langer, E. J. (2006). Horizontal hostility: Multiple minority groups and differentiation from the mainstream. *Group Processes and Intergroup Relations, 9*, 339–358.
- Whittemore, C. (1924). The influence of competition on performance: An experimental study. *Journal of Abnormal and Social Psychology, 19*, 236–253.
- Whittemore, I. C. (1925). The competitive consciousness. *Journal of Abnormal and Social Psychology, 20*, 17–33.
- Wigfield, A. L., & Eccles, J. S. (2000). Expectancy-value theory of achievement motivation. *Contemporary Educational Psychology, 25*, 68–81.
- Williams, K. D., Harkins, S., & Latané, B. (1981). Identifiability as a deterrent to social loafing: Two cheering experiments. *Journal of Personality and Social Psychology, 40*, 303–311.
- Wit, A., & Wilke, H. (1999). Public good provision under environmental and social uncertainty. *European Journal of Social Psychology, 28*, 249–256.
- Wood, J. V. (1996). What is social comparison and how should we study it? *Personality and Social Psychology Bulletin, 22*, 520–537.
- Zajonc, R. B., Heingartner, A., & Herman, E. M. (1969). Social enhancement and impairment of performance in the cockroach. *Journal of Personality and Social Psychology, 13*, 83–92.
- Zajonc, R. B., & Sales, S. M. (1966). Social facilitation of dominant and subordinate responses. *Journal of Experimental Social Psychology, 2*, 160–168.
- Zell, E., & Alicke, M. D. (2010). The local dominance effect in self-evaluation: Evidence and explanations. *Personality and Social Psychological Review, 14*, 368–384.
- Zink, C. F., Tong, Y., Chen, Q., Bassett, D. S., Stein, J. L., & Meyer-Lindenberg, A. (2008). Know your place: Neural processing of stable and unstable social hierarchy in humans. *Neuron, 58*, 273–283.
- Zuckerman, E. W., & Jost, J. T. (2001). What makes you think you're so popular?: Self-evaluation maintenance and the subjective side of the "friendship paradox." *Social Psychology Quarterly, 64*, 207–223.