Social Comparison Transitivity

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Social Comparison Transitivity

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ABSTRACT

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Social Comparison Transitivity

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People strive to know themselves often using social comparison to gather much of this self-knowledge. Comparisons with others offer a useful playground of information about our own skill level. Social comparison transitivity refers to the use of information about a competitor’s other achievements to gauge one’s own ability. Three studies were included in this paper. In the pilot study, participants competed against another participant and learned who performed better on an ambiguous task. Afterwards, they also learned about how their competitor did against a third individual. In Study 1, a vignette was used to examine people’s capabilities at making transitive inferences using three football teams. Finally, Study 2 relied on a similar procedure to the pilot study but switched the order of the feedback so that participants found out about their competitor before competing against them. The studies revealed that the information about their competitor did have effects on their self-evaluation, and people did make transitive inferences from the social comparison information.

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SOCIAL COMPARISON TRANSPRITY

People strive to know themselves. In fact, scientists, philosophers, and lay people have investigated self-knowledge for thousands of years, hoping to better understand its importance. Self-knowledge allows people to live the lives they desire. Unfortunately, self-knowledge proves hard to achieve and realizations about the self can be fleeting. The difficulty in garnering self-knowledge partly comes from the varied, limited, and potentially contradictory performance and ability feedback that people receive in their daily lives. In addition to inadequate feedback, the self-relevant information people receive is not always straightforward or easy to interpret. Instead, there is a tendency for feedback to be ambiguous. A main contributor then to the struggle for self-knowledge is the complexity of real world information (Alicke & Sedikides, 2009). During the pursuit of self-knowledge, people learn to use comparisons with others, as ways to clarify self-relevant feedback and ultimately better understand the self. The study of how self-knowledge is affected by comparisons with others began with Festinger’s social comparison theory and continues today (1954; Stapel & Blanton, 2006).

Even though social comparisons have been stimulating research for years, what has been neglected in the social comparison literature is the awareness that the people we use as comparisons are also compared to others. Moreover, this additional information about our comparison target should affect self-evaluation. Amassing knowledge about the future and past performance of a comparison target allows people to form more accurate pictures of their own achievements. These pictures offer additional clarity in interpreting social comparison information. Without recognizing the skill level of comparison targets,
it proves difficult to establish true representations of ability from competing against them. Performing better than someone of average ability only demonstrates above average ability and little more, while performing better than someone of below average ability merely implies ability not below mediocre without any real indication of potentially prosaic ability. To demonstrate real competency and superior ability, people must show that they execute better than the best, and identifying the best requires people to learn more about their targets.

In the vast majority of social comparison studies, comparisons occur directly between two or more people, comprise one-time evaluation opportunities, and offer limited information about competitors and their history. For example, Person A may receive a performance outcome and then compare this outcome to that of Person B on one occasion in a laboratory. This methodology neglects a common feature of ordinary comparison opportunities; that is, the ability to see how Person B fares against others. If I am better than Person B, but Person B then gets trounced in every other comparison, my conception of my own ability may be drastically diminished. Conversely, if Person B trounces everyone else, my confidence in my ability is vastly increased. These performance comparisons represent examples of what we will call “social comparison transitivity.”

People rely on social comparison information when confronting novel tasks. To make predictions about future performances, people often involve comparisons with others to aid in their decisions. According to the proxy model of social comparison for assessment of ability, people use others to determine what they are capable of doing
Comparing to others who have already accomplished the task in question allows individuals to assess their probability of success. The comparison targets that have already completed the task are referred to as proxies. Proxies are more valid when they are similar on related attributes or have performed similarly on a preliminary task related to the ability in question while using maximal effort (Suls, Martin, & Wheeler, 2002). The model speaks to the overwhelming need to gather more information about competitors to accurately assess ability. Without initial similarity on a parallel performance, identifying a proxy’s success on a task proves useless to estimate people’s own likelihood of success. In social comparison transitivity, learning how competitors perform against others allows for better inferences of people’s own ability. Instead of seeing how people compare with their proxy on a related task, social comparison transitivity relies on comparison target’s performances against others to form a picture of their skill and eventually our own skill.

Like information gathered through a proxy, knowledge about our competitor’s other performances can help in the search for self-knowledge. Social comparison information paired with the knowledge offered by incorporating transitivity could potentially lead to greater self-knowledge. Usually seen in a mathematical setting, the transitive property explains the relationship between more than two objects. According to the transitivity axiom, if there are three objects A, B, and C, then if A is greater than B, and B is greater than C, A is also greater than C. Imagine further that A is the focal object that people are trying to better comprehend. Gaining more information about B and how B compares to another object illuminates facts about A. Learning about all three objects
offers a way to appreciate more about the focal object. Deducing the relationship between A and C happens naturally and helps in gaining added perspective on the situation.

The axiom easily applies to social comparison situations and will lead to the aforementioned “social comparison transitivity.” People can use knowledge of a comparison target’s other outcomes in a transitive manner to infer about their own ability. For example, a younger sibling may idolize his older brother and his ability to play basketball. One day the younger brother realizes that he is able to beat his older brother. At this point, the younger sibling desires to understand how this victory speaks to his general basketball prowess. The younger brother should gather information about how his older brother performs against other basketball players. If his older brother loses to his entire set of neighborhood peers, then the younger brother should not feel unduly confident in his basketball ability. Without evaluating his brother’s performance against others, the younger brother may feel overly validated in his achievement and misinterpret his true skill level.

In many real life scenarios, a success may follow a failure or a failure may follow a success. During most sport’s regular season, teams are victorious one week and suffer defeat a week later. A loss can be accepted more easily knowing that you have succumbed to a worthy opponent. Losing to an undefeated team is not shameful, and the knowledge of their record may even negate some of the sting of the loss. On the other hand, losing to a team that has only won one other game the whole season may make a team reevaluate their strategy. Wins can also benefit from social comparison transitivity, as a hard fought win may be exceptionally sweet when considering the level of the
opponent and their undefeated record. Social comparison transitivity and gathering information about competitors’ other game outcomes offer teams the ability to more faithfully reflect on their achievement or failure. In the NCAA basketball tournament, a substandard game can easily separate one team from the championship. After losing, a team may want their defeaters to win as many games possible to make their own loss more palatable and to keep their positive self-concept in place. In the 2011 NCAA tournament, a Florida loss to Butler might cause Florida fans to join the Butler bandwagon, to save face and leave intact a high evaluation of Florida ability.

The present research examines how people enact social comparisons and how they utilize transitive information in the process. We want to better understand how people coordinate information about their comparison target’s prior and future outcomes. Specifically, participants will learn about a current competitor’s future and past endeavors on either an Interpersonal Success Orientation (ISO) task or a Graduate Record Examination (GRE) verbal reasoning test, as well as how they measure up to their competitor. This knowledge should predictably affect self-evaluation and the evaluation of the competitor. The notion that added information about a competitor can affect self-evaluation is reflected in the idea of social comparison transitivity. The theoretical background for social comparison transitivity is outlined in the following sections on social comparisons, transitivity, and self-motives along with some of their manifestations.
SOCIAL COMPARISON

People constantly assess their skill, ability, opinion, and talent using the information garnered from social comparisons. Over the past 60 years, social comparisons have been shown to be both ubiquitous and spontaneous (Alicke & Sedikides, 2009; Blanton & Stapel, 2008). The goal of the current research is to understand how social comparisons and the transitive property are used together to infer information about the self. Specifically, the research hopes to explain how the social comparison transitivity opportunities and the indirect information that they offer are used in people’s self-evaluations. The following sections include a brief explanation of social comparison theory, the types of comparisons that exist and their connection to social comparison transitivity, and finally transition to an overview of the newer findings in assimilation and contrast research.

Social Comparison Theory

In his seminal theory, Festinger first recognized the seemingly evident finding that people compare themselves with others and that these comparisons affect their self-evaluations (1954). As such, social comparison refers to the process through which people gather self-knowledge by evaluating their attitudes, abilities, opinions, beliefs, or any other feature in comparison with others (Festinger, 1954). Festinger initially believed that people prefer to compare with similar others, as similar others intuitively offer the most informative comparisons. Furthermore, he believed that people default to objective information to assess skill level, only relying on the subjective comparison information when it cannot be directly experienced in the environment. In its subsequent
reformulations, researchers have realized that social comparisons are more complicated than once believed. Specifically, people play a more active role in making use of the comparison information (Suls & Wheeler, 2000). In fact, people will at times ignore objective information, relying instead on subjective comparisons, when both are present (Wood, 1989).

The major processes comprising social comparison include acquiring, thinking about, and reacting to social information (Wood, 1989). People’s perception and not objective reality drive the social comparison process. Thus, people’s construction, perception, and interpretation of the comparison and the target of comparison represent their reality. The impact of a social comparison can vary from reformulating a self-evaluation to confirming an existing self-conception.

Social comparison results from the interpretation of comparison tests. Comparison tests involve evaluating a situation with reference to previous and/or future ones, as well as with the experiences and conditions of other people and groups (Alicke, Guenther, & Zell, 2012). A comparison test constitutes assessing the comparative standings of the criterion (often the self) and the target (another person, object, or event) on almost any variety of dimensions. Comparison tests occur in two different fashions: deliberate and planned or spontaneous and forced (Wood, 1989). Deliberate comparison tests occur when people choose their targets of comparison. An example of a pre-designed comparison test would be working out with an athletic friend to better estimate current fitness level. These planned comparison tests can aid in making individuals feel more competent or can simply offer an accurate estimation of their skill level. In many real life
situations, people do not have the opportunity to choose comparison tests but receive them from the environment. For example, performance feedback at work is often plentiful and uninitiated, instead being thrust upon individuals. Relationship partners and friends also liberally offer unprovoked social feedback.

On a more general level, people are constantly bombarded with information about other people’s successes and failures and their lifestyles through social interaction and media exposure (Stapel & Koomen, 2000). Subjection to this information necessitates reflection on people’s own competencies and accomplishments leading to social comparison (Gilbert, Giesler, & Morris, 1995). In the current study, participants receive forced comparison information, as they do not choose their target of comparison or if they desire the feedback. Participants perform against another person and receive outcome feedback without instigation.

Types of Comparisons

Beyond the planned or spontaneous distinctions, comparisons also vary on the type of target being used. Downward comparisons refer to comparisons with worse off others, while upward comparisons are made with better off others (Wills, 1981). Downward comparison theory advocates the self-enhancing positive effects of making downward comparisons and warns against the potentially worrisome effects of upward comparisons. According to the theory, threatened people will make more downward comparisons, and these comparisons have the potential to boost subjective well being (Wood, Taylor, & Lichtman, 1985). More recently, evidence has mounted that downward comparison theory may not hold, and the relationship between direction of comparison
and effects on the self are more complicated than once imagined (e.g. Suls et al., 2002; Collins, 2000; Wheeler & Miyake, 1992). Research has indicated that downward comparisons do not always result in positive affect and self-enhancement, instead having more nuanced effects (Taylor & Lobel, 1989). At times, upward comparisons can lead to positive affect, especially when people perceive similarity between themselves and an upward target or see the upward target as attainable (Lockwood & Kunda, 1997). In these cases, people feel good because they are in the same category with an upward target or can eventually reach that category (Collins, 2000). Upward and downward comparisons and their ability to both lead to positive and negative cognitions will recur in the discussion of the current models of assimilation and contrast.

The usefulness of social comparison information continues to become apparent and the theory initially proposed by Festinger has received countless alterations and expansions, including a distinction between instrumental and social self-evaluation that highlights the importance of social comparison for self-knowledge (Alicke, 2007). Instrumental self-evaluation relies on information about the self in relation to one’s surroundings. This information includes physical capabilities such as how fast one runs or swims, intellectual competencies such as memory capacity, and any other objective information that can be gleaned from one’s milieu (Alicke, Guenther, and Zell, 2012). This information imparts to people what environmental challenges they can potentially surmount in absolute terms. Social self-evaluation, on the other hand, relies on comparisons with others to assess ability using only relational information. This kind of evaluation allows people to calibrate their standing in reference to others.
With the following example, the difference between the two kinds of self-evaluation becomes more apparent. Through instrumental self-evaluation, people can conclude that they run 100 meters in 20 seconds. This information alone has little value in gauging their running ability because the speed that others run the same distance is indispensable to appreciating whether people are fast, average, or slow. Learning that the best athletes in the world run 100 meters in approximately ten seconds indicates that a 20 second runner is not fast moving. In this example, the social comparison information places the facts into a more expansive context to arrive at a whole understanding of people’s capabilities. Beyond providing a more intelligible context, comparing with those around us can be essential to knowing psychological characteristics. Psychological characteristics, such as dispositions, only exist abstractly in relation to other individuals (Gilbert, Geisler, & Morris, 1995). Thus, social comparison information and social self-evaluation are essential in testing many attributes relevant to people’s self-concept, such as kindness, helpfulness, and aggressiveness. For example, a person is kind because they behave more altruistically than the average person. Mother Teresa is remembered as exceedingly kind because others are so self-centered and uncaring in stark contrast to her selfless behavior.

To fully interpret instrumental, objective information, the addition of social self-evaluative information is indispensible. Without knowledge about how one stands in comparison to others, it is futile to assess skill and hard to plan for one’s future. One would be remiss to move to New York to pursue a modeling career without considering one’s attractiveness in comparison to the general population beforehand. According to the
proxy model, people inherently understand this and the smarter model hopefuls will use successful models as proxies to determine if they can attain their desired fame and notoriety (Wheeler, Martin, & Suls, 1997).

As with objective ratings, social comparisons fill gaps left by temporal comparison information. Temporal comparisons consist of comparing a current status with a prior or projected, future status on any given dimension (Albert, 1977; Suls & Mullen, 1983-84). Temporal comparisons have instrumental purpose in looking at the progression or deterioration of a trait or skill. They, however, also lack the capacity, like objective ratings, to calculate the amount of a characteristic that people possess. To determine academic ability, people would be well served to look at the progression of their grade point average, a temporal comparison, but they may obtain more useful information from comparing their GPA to other students, a social comparison. The most improved students in high school can feel proud of their accomplishments, but they must still consider their rank in the overall class to know which colleges they can realistically apply to and matriculate at.

Social comparison transitivity can further fill gaps left by instrumental, social, and temporal comparisons. To form an accurate self-portrait, the information garnered from social comparison transitivity should not be ignored, but instead used for the unique perspective it offers. Incorporating information about comparison targets serve people well when generalizing to the self. If people aspire to learn how fast that they run a mile, then people need to combine many pieces of information to create a whole assessment of speed. Instrumental self-evaluation offers concrete information about the time it takes
them to run a mile. Temporal comparisons expand the knowledge about speed to include their progression after three months of training. Making a social comparison leads people to contrast the time it takes them to run a mile to the time it takes a specific friend to run a mile. Combining all of these evaluations leaves people with an almost comprehensive assessment of speed. The missing piece to complete the picture of speed is to add the information garnered from social comparison transitivity. People need to learn how fast the specific friend runs compared to many other people. In other words, these are all pieces of relevant data that should be used together to appreciate people’s proficiency at running a mile.

Models of Assimilation and Contrast

As alluded to previously, social comparison theory has been reformulated many times refining the particulars of social comparison processes. Different researchers have formulated unique models of social comparisons while applying converging constructs of assimilation and contrast. Each model emphasizes a process of using comparison information either as part of oneself (assimilation) or as a reference point with which to compare (contrast). Assimilation occurs when the comparison is used as part of one’s self-construal. Basking in someone’s reflected glory can only happen when one assimilates information about a close other to the self (Tesser, 1988). Without that inclusion, one cannot feel pride in knowing the accomplisher. Contrast arises when the target of comparison is used as a distinguishing standard. The main differentiator between assimilation and contrast is whether the target is included as part of the self or excluded and instead used as a comparison standard. The following social comparison
models, however, differ in their terminology and the processes that lead a person to choose whether to assimilate or contrast.

Before delving into the intricacies of the social comparison models, it is useful to note the scenarios that encourage either assimilation or contrast. Assimilation is facilitated by the belief that achieving the same status as the target is realizable (Lockwood & Kunda, 1997). For example, a comparison to Einstein will likely lead to contrast as his acumen seems inconceivable. However, a comparison to a chemistry teacher may lead to assimilation as people can more effortlessly imagine being as intelligent as a teacher in the future. Assimilation is further promoted when comparing with a close other on an irrelevant domain or when psychologically connected to a target (Tesser, 1988). People are more psychologically connected when they are members of the same group or when they have similar attributes (Collins, 2000). On the other hand, contrast is the dominant response to unfamiliar and unattainable targets such as when comparing with a talented stranger on a relevant domain.

In the following few paragraphs, current models of assimilation and contrast are explained beginning with the Stapel model, moving to Mussweiler’s selective accessibility model, and ending with Markman’s reflection and evaluation model. According to Stapel’s model, whether people assimilate or contrast social comparison information depends on the distinctiveness of the information and the perceived mutability of the self-concept (Stapel & Koomen, 2000). When the information is distinct, contrast is likely to occur, and the information is used as a comparison standard. With abstract or ambiguous information, assimilation often occurs, and the information is
used as an interpretation frame. Mutable self-concepts also induce assimilation. People can more easily incorporate new information into their self-construal when the self-concept is seen as able to change (Stapel & Koomen, 2000).

This model has further incorporated self-activation as a main determinant of the effects of social comparison (none, contrast, assimilate) with more self-activation leading to stronger effects. Further, social self-construals (“we”) activate an integration mind-set, where similarities between the self and other are activated, and assimilation is likely to occur. Personal self-construals (“I”) activate a differentiation mind-set, in which self-distinctiveness is emphasized, and contrast effects are likely to occur. Moreover, effects will be stronger when the direction (up/downward) is self-enhancing (Stapel & Koomen, 2001).

The selective accessibility model (SAM) employs a slightly different approach to assimilation and contrast focusing on the target knowledge that is activated during a comparison process (Mussweiler, 2003). This activated knowledge is the main factor in determining whether assimilation or contrast occurs. A comparative evaluation comprises three stages: standard selection, target-standard comparison, and evaluation. This model specifically examines the second stage where a comparison has occurred and the judgment-relevant knowledge has already been activated. Whether comparisons result in assimilation or contrast is principally a function of which type of testing an individual engages in: similarity or dissimilarity.

The process of target-standard comparison according to SAM goes as follows. People make an initial target-standard assessment where they consider the salient features
of the target. This valuation leads to a general impression of either similarity or dissimilarity, which guides the subsequent hypothesis testing. If the initial assessment indicates similarity, then people generate a similarity-hypothesis, but if the initial assessment indicates dissimilarity, then individuals generate a dissimilarity hypothesis. Similarity testing usually precipitates assimilation while dissimilarity testing prompts contrast effects. Once the hypothesis has been generated, people have increased accessibility to hypothesis-consistent knowledge as they actively seek this confirming information. Regardless of the activated hypothesis and the resultant accessible information, the target is used as a reference point against which to compare. This can augment contrast effects or oppose assimilation effects and potentially lead to assimilation and contrast occurring together during similarity testing.

The reflection and evaluation model (REM) builds on the ideas of the selective accessibility model while incorporating the idea of mental simulation instead of hypothesis testing to explain comparative thinking (Markman and McMullen, 2003). Mental simulation is defined as the consideration of alternatives to the present reality and comprises two distinct modes of thinking: reflection and evaluation. Reflection is an “as if” mode of thinking characterized by vividly simulating that the information about the comparison standard is true of or part of the self. This leads information about the standard to be included in people’s self-construal. After inclusion in self-construals, standard-consistent cognitions become highly accessible, as in SAM, and lead to affective assimilation. Evaluation, on the other hand, uses information about the standard as a reference point to evaluate people’s current standings. Information about the
standard is excluded from self-construals and the process leads to affective contrast. The processes of assimilation and contrast can both lead to positive or negative affect mainly depending on the direction of comparison.

Assimilation leads to positive affect when it stems from reflection on an upward comparison but negative affect when from a downward comparison. Including superior targets in people’s self-construals will leave them with a positive feeling while including inferior individuals will not. Evaluation inducing contrast from a downward comparison leads to positive affect, but from an upward comparison, negative affect. Comparing to inferior others without inclusion in self-construals should lead to more positive feelings while comparing to superior others without inclusion in self-construals should lead to more negative feelings.

All of these models rely on assimilation and contrast to explain the social comparison process but approach the constructs from slightly different perspectives. In the social comparison transitivity scenario, these processes will likely come into play and lead to differing reactions to the outcome feedback. The problem in prediction about assimilation and contrast is that there are so many factors that could alter participants’ reactions. The first task involved is novel but related to people’s likelihood to succeed, so to know how they will react to either outperforming or underperforming depends on how likely they see themselves succeeding. The second GRE task also suffers from similar interpretation problems, as the reaction depends on how participants interpret their verbal reasoning skill. Participants are usually unacquainted with one another before the experiment, although they are all members of the same university and oftentimes the
same class. Still, participants are unlikely to see these comparison targets as close enough to assimilate to, and the study encourages competition leading to contrast. The tasks are introduced to appraise each individual participant’s level of success or verbal reasoning ability, which encourages a focus on the personal self-construal “I”. Due to the contrasting effects, participants who perform worse than their counterpart are expected to have lower self-evaluations than those who perform better overall.
TRANSITIVITY

Although not usually discussed within the scope of social comparison theory, the concept of transitivity does appear in the social relations literature and figures prominently into the cognitive literature on choice preferences. A review of the research demonstrates that people are not only capable of making transitive inferences but also do so fairly easily. In the social comparison transitivity situation, people are likely to use information about a competitor’s other achievements transitively to impact their own self-evaluation.

In the study of social relations, sociological research has long investigated the concept of transitivity. When people make inferences about social relations, they attempt to comprehend patterns of interpersonal relationships. These patterns are called networks, and their goal is to establish who knows one another or who is a friend of whom. People aim to understand networks to better predict future behavior of others and to promote appropriate social conduct (Janicik and Larrick, 2005; Freeman, 1992). In a work setting, managers consider employee relations before creating work teams to ensure that the individuals can operate together effectively. When planning a social occasion, people must account for social relations to guarantee a pleasant atmosphere where everyone gets along. In the social networking literature, network closure refers to those situations where a person will infer transitivity. For example, network closure appears when a person assumes that if Andy has two friends, Bart and Chris, then Bart and Chris must also be friends. In real life, people often infer network closure, implying that the relationship between individuals is transitive (Coleman, 1988, 1990).
This ability to make transitive inferences is a fundamental capability that develops in both nonhuman and human species (Trabasso, 1977; von Fersen, Wynne, Delius, Staddon, 1991). Even a child as young as seven has the ability to make transitive inferences about social relations, and this ability improves regularly with age (Markovits & Dumas, 1999). Transitivity underlies two basic relational schema pertaining to the perception and understanding of social relationships. The balance schema signals people to perceive friendship relations as reciprocal and transitive (Heider, 1958; Crockett, 1982). If A is friends with B then one infers that B is also friends with A. If A is friends with B, and B is friends with C then we assume A is friends with C. The linear-ordered schema prompts people to perceive influence relations as asymmetric and transitive (DeSoto, 1960). If A influences B, and B influences C, then we tend to deduce that A also influences C but not necessarily by the same amount. Patterns of relations that demonstrate balance or linear ordering are easier for people to learn than networks that do not (Crockett, 1982; DeSoto, 1960; Press, Crockett, & Rosenkrantz, 1969; van Kreveld & Zajonc, 1966).

Although transitive triads in patterns of human and nonhuman relations are plentiful and truly do occur with greater than chance regularity, social network relations do not always adhere to transitivity principles (Davis, 1970; Kumbasar, Romney, & Batchelder, 1994; Ellis, 1993). People have friends from different aspects of their lives. These friends can be acquired from their jobs or their partners and are unlikely to be acquainted with one another. In these scenarios, the triadic structure is incomplete and the
balance and linear-ordered schemas are inappropriate to employ (de Noov, 1999; Holland & Leinhardt, 1970).

In spite of the importance of establishing correct patterns of interpersonal relations, people incorrectly evaluate the networks of others yet show increased accuracy and awareness of their own patterns of interaction. People rely on cues, assumptions, above-mentioned schemas and other indirect sources of information to evaluate how and whether others know one another. Consequently, ordinary people frequently make errors in judging social relations among their peers (DeSoto, Henley, & London, 1968; Rubin & Zajonc, 1969; von Hecker, 1997; Zajonc & Sherman, 1967). A typical error is assuming that two people have a social relationship instead of assuming a lack of a social relationship. Transitivity has been shown to be a stable and repeatable trend in the formation of network connections and as such, it is logical that people err on the side of presuming a relationship (Louch, 2000). However, people often perceive higher levels of network closure in their social networks than warranted (Kilduff, 2008).

In a recent study by Flynn, Reagans, and Guillory (2010), researchers examined whether need for closure affects how people seek order in judging social relations. The study looked further into the question of whether people can accurately judge who is friends with whom. They examined if those high in need for closure (NFC) are more prone to commit errors in judging social relations. Transitivity in relations is hypothesized to satisfy high NFC individuals’ preference for order. This preference for order may lead those high in NFC to inordinately rely on balance and linear-ordered schema and ultimately make more errors in evaluating social relations. The researchers
asked students who had been in a class for a semester together to list the other students that they knew. They also asked the students whether or not other classmates knew one another. Those high in NFC were more likely to assume a transitive relationship and closure in their social network. They speciously believed that two people they knew were also acquainted with one another. Vacuous transitivity is the opposite of transitivity in that it implies that if two people do not know you, then they also do not know one another. High NFC people were more likely to accurately report vacuous transitivity as well. This seems logical in maintaining the sense of order that those high in NFC prefer because it is easier to incorporate that two strangers to you are also strangers.

Further making the claim for the use of transitivity is its use in preferences. Transitivity is intimately related to preferences and could arguably be the most fundamental axiom of rational choice (Bar-Hillel & Maragalit, 1988). According to transitivity in the case of choice preferences, an agent who prefers $x$ to $y$ and $y$ to $z$, then must prefer $x$ to $z$. If a person prefers vanilla ice cream to chocolate and chocolate to strawberry, then they should also prefer vanilla to strawberry. Almost all normative, prescriptive, and descriptive theories of choice and decision-making involve transitivity (Kahneman & Tversky, 1979; Luce, 2000; Savage, 1954; von Neumann & Morgenstern, 1947). Any theory that uses a utility function then implies or presupposes transitivity. Transitivity and the concept of linear order are also intertwined. Over the years, cognitive psychologists have argued over whether transitivity or intransitivity reigns over choice preferences and in a recent review, the case for transitivity looks stronger
As such, it appears that people are capable of inferring transitivity and often this serves as a logical outgrowth of decision-making.

As alluded to in the review above, people use transitivity easily and naturally and at times may even misuse it. It is both tenable and likely that people will apply transitivity in social comparison situations. In the search for self-knowledge, it only makes sense to use all of the available resources, which includes transitive inferences. If Person A outperforms Person B and Person B outperforms Person C then people should be able to combine this information to then assume that Person A would outperform Person C. This thought process allows people to garner more information from social comparison experiences and to create a more accurate assessment of ability. Prior social comparison work has neglected that people have the ability to see how their competitors manage against others. This information about how people’s competitors do against others affects self-evaluations because of the ability to interpret things transitively. People can overly utilize social comparison transitivity leading to an over or underestimation of ability, as seen previously in social relations. To further understand how social comparisons and transitivity function together, there has to be an explanation of the motives driving behavior. People use transitivity principles and social comparison information to attain the goals desired from their active self-motives and a thorough explanation of these motives follows.
SELF-MOTIVES

Self-evaluation is the process where the self-concept is socially navigated and amended (Sedikides & Strube, 1997). This process works in a motivated manner. The underlying motives behind self-evaluation guide behavior by leading people to focus on only select, self-relevant information, estimate its probity, extract inferences about themselves, and form future plans. The self-motives being referred to are self-enhancement, self-assessment, self-verification, and self-improvement. People behave and strive for different goals depending on the activated motive. These motives are also responsible for governing people’s choices of and reactions to comparison tests (Alicke, Guenther, & Zell, 2012). Each motive will be examined in detail along with some effects that stem from these self-motives, such as the genius effect, the frog pond effect, and schadenfreude.

Self-enhancement is the drive to affirm the self and to convince ourselves, and any close others that we are intrinsically praiseworthy persons. At times, it can be a desire to see oneself as more positive, known as self-promotion, or to maintain an already positive self-view, known as self-protection (Sedikides & Gregg, 2003). Self-enhancement originates in people’s need to have positive and well-protected self-concepts. These positive self-concepts allow people to cope with the ever-changing world and serve an adaptive function. Moreover, people rely on their positive self-concept to feel efficacious in their endeavors and confident in attempting novel tasks (Sedikides & Strube, 1997). These functional, positive self-concepts do not need to be conceptually and perfectly accurate, leaving space for self-enhancement. Due to this wiggle room, self-
enhancement may occur in situations where the facts do not justify the positive assertions made (Sedikides & Strube, 1997).

Countless examples of self-enhancement abound in social psychology literature. The better than average effect refers to the erroneous belief held by the majority of people that they are better than average (Alicke, 1985). People hold illusions of control leading to an overestimation of the amount of control they have over irrepressible and chance events (Langer, 1975). Individuals also unrealistically believe that a larger number of positive events will happen to them than to others (Regan et al, 1995). People demonstrate the self-serving attributional bias by ascribing positive outcomes internally but negative outcomes externally (Miller & Ross, 1975). These self-enhancement biases frequently lead to attentional and cognitive distortions. For example, people will actually remember more strengths and positive aspects of the self than weaknesses and negative aspects of the self (Sedikides & Green, 2000). People selectively avoid attending to unflattering information and selectively expose themselves to information supporting prior decisions (Taylor, 1991; Festinger, 1957). People will also accept positive feedback without a second thought while spending cognitive energy to refute negative feedback (Arkin & Maruyama, 1979). Any strategic social comparisons made for the purpose of boosting or maintaining people’s positive self-concept constitutes self-enhancement.

Self-enhancement occurs more easily with added ambiguity and as a result, people use abstract methods to make trait and behavioral comparisons instead of concrete behavioral analyses (Alicke, 1985). Comparison with a real interaction partner rather than with an average peer diminishes some self-enhancement effects (Alicke, 1995). Unless
forced to make more concrete comparisons with specific people, individuals will hold
onto and maintain notions of themselves as better than average. People will also use the
ambiguity of trait definitions to work in their favor. They see themselves as having
positive traits while lacking negative traits. In other words, people describe the intangible
idea of intelligence to be tailored to their strengths (Dunning et al., 1989). Specific social
comparisons may not have the power to overthrow people’s fairly stable conceptions of
themselves, their abilities, and their traits. This suggests that even with glaring
contradictions, people may be able to maintain their incorrect self-conceptions and
positive self-image.

From the descriptions above, it seems that people only attempt to feel good about
themselves and pay little to no attention to the reality of the situation. On the contrary,
reality constraints are often inherent in self-enhancement. A 300-pound man is not likely
to say that he is more fit than the majority of people. This assertion would be nearly
impossible to believe unless the man was a professional athlete. Due to these
constrictions, people use self-enhancement in a motivated way constrained by
believability.

The social comparison process can be used solely objectively or in a motivated
manner to create or maintain a positive self-image. It is this motivated use of social
comparison that makes it intertwined with the concept of self-enhancement, as social
comparisons offer a fruitful area for enhancement. To maintain or increase their positive
self-conceptions, people may choose downward social comparisons with worse off
others. In the transitive situation, people will likely use strategies and interpretations
guided by the self-enhancement motive. The unfamiliar tasks and the unspecific feedback of the transitivity situation present ample opportunity to self-enhance. For example, people may distort their performance and further misrepresent their competitor’s ability to seem better than warranted and feel more validated in their win or less upset by their loss.

People not only seek to enhance their positive self-concepts, but also desire consistency in their self-concepts. The desire to maintain consistency between the self-concept and new self-relevant information is another guiding self-motive known as self-verification. This motive can be interpreted as the drive to seek out information that is in harmony with people’s self-views (Swann, 2002). People desire this consistency for two main reasons: to increase feelings of psychological coherence and to be more predictable to others. Psychological coherence allows people to define existence, organize experience, predict future events, and guide social interactions. Having stable and coherent self-views is advantageous because being predictable to others engenders smoother social interactions. When this motive is activated, people tend to interact with others who confirm their self-concept and focus attention on information and feedback consistent with their existing self-concepts. In the case of social comparison transitivity, people will incorporate the information about their competitor and their triumphs or failures to maintain a consistent self-concept. If someone believes that he or she will not be good at the experimental task, then they may more easily incorporate information indicating that they lost to a mediocre competitor than beat a respectable competitor.
Beyond remaining consistent, people also desire to hold a precise picture of the self. Self-assessment is the drive that people have to obtain this consensually accurate evaluation of the self. This can increase the certainty with which self-knowledge is held and allow people to find environments well matched to their abilities. When this motive is in play, people will seek more diagnostic information and construct more high diagnostic tasks to truly ascertain their skill level (Trope, 1980). This self-motive should aid people in using all of the information about their competitor in the social comparison transitivity situation. To accurately appraise one’s skill and gain a true sense of self, a logical person must pay attention to all of the potentially helpful information including the second round performance of their comparison target.

People are additionally motivated to improve. They strive to ameliorate their traits, abilities, skills, health status, and well being or are focused on overall betterment of the self. This motivation is called self-improvement. Attempts at self-improvement do bring about growth, progress, development, and hope. Achieving long-term goals hinges on the activation of the self-improvement motive (Taylor, 1995). The idea of self-improvement has also been enlarged to include another sub-motive called self-expansion. As with self-improvement, self-expansion deals with growth and becoming more than before by incorporating others into our self-concepts (Aron & Aron, 1996). In social comparison transitivity, the desire to improve should lead people to attend to their comparison target’s other encounters to gain a better understanding of where they stand on the dimension in question. With clearer knowledge about current abilities, people can more astutely find where improvements are needed.
As noted formerly, many of these motives come into play in the transitivity situation. Self-assessment can lead people to use the transitive information to form a more accurate picture of their own abilities. The secondary, competitor information can clarify what an initial loss or win really means. One route to deduce ability is by competing against many individuals and seeing how people perform. Another route is to examine how people’s original competitors do against others, as in the case of social comparison transitivity. Knowing whether people lose to a genius or a person of lesser ability can be inferred from the social comparison transitivity situation. How an outperformer does against another competitor helps people to accurately estimate where their own performance stands. As mentioned before, social comparison transitivity can also be used in a less objective and more self-enhancing way to augment people’s accomplishments. People self-enhance by exaggerating the ability of their competitors or overstating their achievements, as will be explained next with the genius effect.

The genius effect is another byproduct of self-enhancement and the motivation to maintain a positive self-concept. The genius effect refers to the tendency to see those who outperform us as far above average in ability, in other words a genius. By making the people who outperform us geniuses, individuals can salvage favorable self-images. The implication is that everyone would lose to a genius (Alicke et al., 1997). If the people who outperform us are geniuses, then the negative comparisons are not applicable and do not represent a valid reflection of our own ability. People not only highly rate their outperformers, but also highly rate those they outperform in an effort to make their success look more impressive. Succeeding against consummate competitors warrants
more praise than overpowering feeble opponents. As this study hopes to demonstrate, the genius effect should occur in the transitivity situation. The actors who outperform their competitors should rate them and others that the competitor competed against higher in ability than objective observers. Participants should also elevate the performance of those who they outperform in an effort to augment their stellar performance.

Another remnant of self-enhancement applicable to the present research is called the frog-pond effect. The frog-pond effect refers to the propensity for high-performing students at academically inferior schools to evaluate themselves more positively than low-performing students at superior schools, after controlling statistically for ability level (Marsh and Parker, 1984). In a study on the frog pond effect, the researchers explain the frog pond phenomenon as stemming from social categorization (Alicke, Zell, & Bloom, 2010). From early childhood, people are categorized in a social way as being the most dramatic in the family to being the most outgoing student in the class. The attention to local information, referred to as local dominance, instead of potentially more diagnostic, general information originates from the years of social categorization and comparing to those closely surrounding you. Thus people choose to rely on information designating their standing even in minimal groups than more general and abstract information (Zell & Alicke, 2009). This attention to local comparison information should make salient the feedback that people will receive in the present study. People should pay attention and care about the their performance against another individual of equal standing at their university. The frog-pond effect also has a self-enhancing aspect in that people will use local comparisons as a way to avoid potentially less positive global comparisons. People
may find themselves overjoyed at the idea that they are more likely to succeed or have higher verbal reasoning ability than another participant that they will temporarily forget the myriad of examples from their life of how this is unlikely to be true.

Schadenfreude is another effect usually aimed at maintaining a positive self-concept that may affect the social comparison transitivity situation. Although people may believe that they only hope for the best for other people, research into the topic of schadenfreude demonstrates that people sometimes take pleasure from the misfortune of others. Research has shown a connection between envy and schadenfreude, where pleasure at misfortune is more likely to arise when the misfortune occurs to an advantaged and self-relevant other (Smith et al., 1996). This is reminiscent of Tesser’s SEM, as people will react negatively and feel threatened by a close other who does well on a self-relevant domain (Tesser, 1988). In the current study, people may experience schadenfreude at the failure of those who outperform them. When people perform worse than other individuals, they may take pleasure in their future loss or previous loss. Although this will not negate your loss, it may offer people the opportunity to feel that the score has been evened and those people have gotten what they deserve.

Past research on schadenfreude uses methodology different from this research. Those studies usually relied on introducing a fictional high achiever either through vignette or video technology and then having that individual experience misfortune in a potentially unrelated avenue. Oftentimes the research on schadenfreude looks at more group mentality than at an individual level. In the current study, participants compete against real others in a specific domain and then learn that they fail or succeed in the
same domain. This offers the opportunity to see a more nuanced laboratory study at an individual level of the occurrence of schadenfreude.
RESEARCH OVERVIEW

Three studies explored the influence of indirect feedback about a once competitor on self-evaluations, and whether people make transitive inferences in social comparison situations. In the pilot study, students took an ambiguous test measuring Interpersonal Success and received manipulated feedback indicating whether they performed better or worse than their competitor. They then completed another test while their former competitor took a second test against a third participant. Participants received predetermined information about how their prior competitor did on the second test. It was anticipated that the feedback about their competitor would influence self-evaluations beyond their own first round performance. Study 1 attempted to replicate and expand the findings of the pilot study using a vignette about three football teams. Finally, Study 2 improved on the pilot study by allowing participants to receive self-relevant feedback only after competing with their opponent and using different test stimuli.
PILOT STUDY

In the past, social comparison research has often relied on studies that involved a one-time comparison. A participant received feedback indicating that he or she performed better or worse than another participant in a specified domain without learning more about the state of affairs. In actuality, people seldom have only a single comparison opportunity. When enrolled in a university class, students earn performance feedback from more than a lone exam and have ample opportunity to compare each different exam result with many other classmates. Studies have varied numerous aspects of the social comparison situation including closeness to the other person, domain targeted, and self-relevance of the domain (e.g. Suls, Martin, & Wheeler, 2002; Chambers & Windschitl, 2004; Mussweiler & Ruter, 2003). What has not been adequately addressed and what needs further exploration is how learning more about a target of comparison will affect the use of social comparison information for self-evaluation. In the pilot study, participants not only learned how they fared against a competitor, but also how their competitor executed against a third individual. This offers participants information that is frequently available in the real world, how a target of comparison performs against others. It forces participants to realize that everyone compares themselves to others, even our targets of comparison. Although the effects of social comparison have been examined in great depth, little research has explored the impact of indirect feedback, specifically feedback about competitors, on self-evaluation and in turn, how people use transitive principles to understand social comparisons.

In the pilot study, participants were provided with information about their
performance relative to another individual on an ambiguous task. The participants were only informed of who performed better or worse without receiving any objective scores. After reviewing this feedback, participants completed the same task again alone. They were under the impression that their prior comparison target had performed the second task with a third participant. They then learned the outcome of their previous competitor and the third participant on a second version of the ambiguous task.

The pilot study assessed how people respond to information that indirectly relates to them, expressly feedback about the future performance of someone who was once their competitor. Past research and theories indicated that this second round feedback would influence self-evaluation. Moving beyond a simple genius effect (Alicke et al., 1997), this study provided more information about the competitor, namely later successes or failures, and focused on the increased information’s effects on self-evaluation. This study and the idea of social comparison transitivity more broadly aimed to understand if transitivity was incorporated into the information used in self-judgments.

As alluded to earlier, transitivity can be used for self-enhancing or self-assessing purposes. The former implies a motivated use of the information, while the latter indicates a more logical thought process. If you outperform another person who has outperformed a third individual, it may be reasonable to assume that you would also outperform the third individual (the one who lost to your competitor) in that domain. This inference offers people the capacity to more accurately assess their true ability. Although this inference seems sensible, people may go beyond the objective facts to assume that the people they outperform are better than warranted. Having the means to connect the
dots and create a transitive triad of ability does not necessarily signify that these assumptions are justified. Instead, people may be using social comparison transitivity to enact self-enhancing behaviors, feeling unduly validated in their performance, or removing the sting associated with a loss. Information solely about others can then affect our self-evaluations in either a motivated or rational way.

To test for these self-enhancement effects, observers were included in all of the studies presented in this paper. Observer responses were compared to actor responses to test for self-enhancement. Observers received no self-relevant feedback and therefore should not demonstrate motivated biases. By adding observers, it was easier to assess the prevalence of self-enhancing behaviors. Actors and observers should behave differently if self-enhancement was the driving force.

Pilot Study Procedure

Each experimental session contained 3 participants. Participants A and B were randomly placed in a group condition while Participant C was placed in a sequestered, alone condition. Participant C then left the room and unbeknownst to Participants A and B, filled out a separate survey, and left the experiment. An Interpersonal Success Orientation (ISO; see Appendix A for directions and sample questions) task was explained to the remaining two participants and then begun on the computer. Upon completion, Participants A and B received bogus feedback on the computer screen indicating who performed better on the task without providing any objective scores. The feedback page used stars next to the participants’ names to indicate which person did better (See Appendix B for example). The experimenter then asked one of the
participants to relocate to another room. Each participant was then led to believe they were completing the alone task, while the other participant was again performing a group task against Participant C. In reality, both Participants A and B performed alone and completed another ISO task. After finishing, Participants A and B received no further feedback about their own performance. They did, however, view on their computer another feedback page revealing who did better on the second ISO task between the other participant and Participant C. Again, stars next to the name indicated the participant who scored higher. After reviewing this second round feedback, students evaluated their own and both other participants’ performance on the ISO test and overall level of interpersonal success orientation. The observer condition had a similar procedure, except participants were given instructions to imagine that you were one of the participants and received this feedback. They were never given any self-relevant feedback but still completed the ISO task as though they would.

The dependent variables measured how the participants felt about their own ISO ability, their immediate competitor (Participant B), and the third participant (Participant C) using three groups of questions. These questions were: “How would you rate your/B’s/C’s Interpersonal Success Orientation,” “How well do you think you/B/C performed on this test,” on 0 (very bad/very poorly) to 10 (very good/very well) scales and “Of 100 people, where do you think your/B’s/C’s performance falls” with 1 being the worst performer and 100 the best performer. The responses to the last group of questions were transformed from a 100-point scale to an 11-point scale. The scores were divided by 11 and then multiplied by 100. After transforming the final group of questions, these
items were aggregated to create one self-evaluation measure (Cronbach’s $\alpha = .85$), one Participant B evaluation measure (Cronbach’s $\alpha = .88$), and one Participant C evaluation measure (Cronbach’s $\alpha = .85$).

Observers answered similar questions, but did not receive any self-relevant feedback and thus could not rate their own performance. Therefore, the questions assessing one’s own performance in the actor condition instead read: “How would you rate Participant A’s Interpersonal Success Orientation,” “How well do you think Participant A performed on the test” and “Out of the 100 people participating in this study where do you think Participant A’s performance on this test falls,” on the same scales as mentioned above. Using the same procedure, the last group of questions was transformed from a 100-point scale to an 11-point scale. Once transformed, these items were again aggregated to generate one Participant A evaluation (Cronbach’s $\alpha = .86$), one Participant B evaluation (Cronbach’s $\alpha = .89$), and one Participant C evaluation (Cronbach’s $\alpha = .93$).

Results of Pilot Study

Separate 2 (own performance in first round: better or worse) X 3 (competitor’s performance in second round: better, worse, no information about second performance) ANOVA’s were conducted on the aggregated self-evaluation ratings, Participant B ratings and Participant C ratings for the actors. Participants then saw feedback corresponding to one of six potential actor conditions, as each independent variable was between subjects (See Table 1 for means and standard deviations for actors’ self-ratings, Participant B ratings, and Participant C ratings). Identical analyses were done for
observers (See Table 2 for means and standard deviations for observers’ ratings of each participant with Participant A being the focal actor).

Table 1

*Means (Standard Deviations) for Pilot Study: Actors, N = 115*

<table>
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<tr>
<th>Round</th>
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<th>You lose</th>
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<tbody>
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<td>You win</td>
<td>You lose</td>
</tr>
<tr>
<td>2nd</td>
<td>They win</td>
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Ratings of Participant A

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Ratings of Participant B

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Ratings of Participant C

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Table 2

Means (Standard Deviations) for Pilot Study: Observers, $N = 117$

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Ratings of Participant A

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Ratings of Participant B

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Ratings of Participant C

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<td>1.26</td>
<td>1.05</td>
<td>1.58</td>
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</table>
Actors

Analyses indicated a main effect of who won in the first round on ratings of one’s own ability, $F(1, 109) = 7.92, p < .01$. Self-evaluation ratings were higher when participants performed better ($M = 7.30$) compared to when they performed worse in the first round ($M = 6.40$). The outcome of the second round did not affect self-evaluation, $F(2,109) = 2.24, p = .11$. Analyses did not reveal a significant interaction of first and second round outcomes, $F(2,109) = 1.37, p = .259$.

For ratings of one’s competitor, Participant B, analyses revealed a main effect of who won in the first round, $F(1, 109) = 39.29, p < .001$. Actors rated Participant B higher when Participant B had outperformed them in the first round ($M = 8.04$) compared to when they had outperformed Participant B ($M = 6.38$). When people lost, they may have rated their outperformer higher than warranted, signifying a potential genius effect (Alicke et al., 1997). Ratings of Participant B were also influenced by second round performance, $F(2,109) = 6.72, p = .002$. Participants rated Participant B higher when Participant B won in the second round against Participant C ($M = 7.98$) compared to when lost ($M = 6.89$) or when no second round information was provided ($M = 6.92$).

Analyses of Participant C ratings revealed a significant main effect of first round performance, $F(1,71) = 4.59, p = .036$, and second round performance, $F(1,71) = 17.73, p < .001$. Although participants only have information about Participant C’s performance in the second round, the ratings of Participant C were still affected by what occurred in the first round. After losing to Participant B in the first round, participants rated Participant C higher ($M = 7.69$) than after winning ($M = 7.09$). This indicated that
participants rated Participant C higher after losing in the first round to Participant B, regardless of the outcome of the second round. To assuage negative feelings about their own loss, people increased the ability of those individuals who could potentially reflect on their performance. Participants rated Participant C higher when Participants C did better than Participant B in the second round ($M = 7.99$) compared to when Participant C did worse in the second round ($M = 6.72$). In the pilot study, control participants did not rate Participant C.

**Observers**

Unlike actors, no main effect was found on ratings of the focal actor. Participant A was rated similarly regardless of whether he or she won or lost in the first round, $F(1, 111) = .308, p = .58$. This denotes that people were more impressed with their own win than with an equivalent accomplishment by another. Similar to self-evaluation, ratings of Participant B did not adjust based on first round performance, $F(1, 111) = 1.06, p = .305$. However, ratings of Participant B did vary based on who won in the second round, $F(2, 111) = 8.84, p < .001$. This implied that everyone rated Participant B’s performance higher when he or she outperformed Participant C in the second round ($M = 7.78$) compared to when Participant C outperformed him or her ($M = 6.00$) or no second round information was provided ($M = 6.69$). The agreement of the observers and actors indicated little self-enhancement, but instead a more rational evaluation of the feedback.

Observers showed a similar pattern to actors in ratings of Participant C. Ratings of Participant C were influenced by a main effect of first round performance, $F(1, 73) = 5.24, p = .025$, as well as second round performance, $F(2, 73) = 41.50, p < .001$. After
Participant A lost to Participant B in the first round, participants rated Participant C higher ($M = 7.73$) than when Participant A won ($M = 6.86$). As seen with the actors, participants rated Participant C higher after the focal actor lost in the first round even though this feedback was not directly related to Participant C. As expected, participants also rated Participant C higher when Participant C won against Participant B in the second round ($M = 8.30$) compared to when Participant C lost ($M = 5.99$).

Consistent with predictions, feedback about performance influenced one’s self-evaluation. No significant interaction was found between first round outcome and second round outcome in either the actor or observer version. Many of the second round effects were in the predicted direction, but did not reach statistical significance. People rated themselves more favorably after an initial loss if their outperformer subsequently outperformed another participant compared to when their outperformer lost, although not attaining significance $F(1,109) = 2.22, p = .139$. However, people rated themselves more favorably after an initial loss if their outperformer subsequently won compared to when no information was given about the second round, $F(1,109) = 4.52, p = .036$. This did not occur in the observer condition. This indicated that participants felt better about their ability when they had evidence that they lost to a better competitor. These findings suggested that our use of social comparisons for self-judgments did not stop simply because feedback was not directly related to the self.
STUDY 1

Due to some of the intriguing findings and lack of interaction effects in the pilot study, a vignette study (Study 1) and a revamped version of this lab test of social comparison transitivity (Study 2) were enacted. These studies hoped to build on the pilot study through improved methodology and increased control of other potential factors affecting the impact of the manipulations. In the pilot study, participants learned of their competitor’s performance after already receiving their own feedback. The devastation from losing or the elation from winning could prevent people from fully processing the information about their competitors’ consequent performances. People may better incorporate their competitors’ performances into self-evaluative judgments when learning about their competitors’ abilities first, as opposed to after competing against them. Instead of examining how the future endeavors of one’s competitor affect self and other-evaluations, Studies 1 and 2 explored how competitors’ prior experiences affect self and other-evaluations. Study 1 used a hypothetical football game vignette to mimic the social comparison transitivity situation, while Study 2 used a very similar paradigm to the pilot study. Both still relied on the same theoretical background to again investigate the idea of social comparison transitivity. In these incarnations, participants learned of their competitor’s past success or failure and then vied with their competitor.

As mentioned, Study 1 applied a more basic design to examine at the simplest level whether or not transitive inferences were being used in self-evaluation. The pilot study and Study 2 were both enacted in a lab, creating an unusual and unfamiliar scenario. To assuage this potential issue, Study 1 did not employ a lab situation and
allowed for corroboration of what does happen in the lab. The football vignette should more realistically demonstrate a situation where transitivity would be enacted. The vignette was also short and easy to follow, limiting the potential negative effects due to lack of attentional focus. The present study investigated at the most basic level if transitive effects were occurring. Without the potential pitfalls and confusion of the lab study, do people process this indirect information in a transitive manner to affect self-evaluation?

Method

Participants and Design

Participants were 118 Ohio University undergraduate students whose participation partially fulfilled a requirement for introductory psychology, and 152 volunteers from Amazon’s Mturk website who participated for $0.20. The study had a 2 (Own team’s performance in the second week: Better or worse) X 3 (Competitor performance in the first week: Better, worse, a tie) between subjects design resulting in six actor conditions. As before, each actor condition was mirrored by a similar observer condition. Participants that failed any of the manipulation checks were removed from the analyses, resulting in the removal of 42 participants’ responses. This left 120 actor responses and 108 observer responses in the analyses.

Materials

Participants were directed to imagine that they were big fans of a specified football team, the Cougars. They then read a short vignette about the performance of their team and two other teams in the beginning of the season, the Tigers and the Huskies. The
Cougars’ immediate competitor was the Tigers and the third team was the Huskies. Participants learned about the outcome of the game in the first week of the season between the Tigers and Huskies, and the outcome of the game in the second week between the Cougars and Tigers. This resulted in participants learning about their competitor’s prior performance against a third team and their own team’s performance against their competitor. The control condition occurred when participants learned that their competitor tied the third team in the first week (the Tigers and Huskies tied). It was impossible to provide no outcome information, as a game always would have an outcome. A tie did not offer any indication of team superiority making it a suitable control. See Appendix C for examples of the scenarios. As mentioned, the study also included a corresponding observer condition for each of the actor conditions. In the observer conditions, participants imagined that they were avid fans of football but not any of the specific teams in the vignette.

**Procedure**

Participants signed up for the study either through the Psychology Department Psycpool or through the Mturk website. Once they chose to participate in the study, the participants were redirected to a Qualtrics survey that contained six actor versions and six observer versions. Each participant only completed one version of the survey. After entering the website, participants read the consent form and agreed to participate in the study. They then read a short scenario about three football teams at the beginning of the season. In the actor condition, participants were to suppose that they were fans of the Cougars. In the scenario, the Cougars did not play in the first week of the season and the
other two teams played each other. The participants then learned which team won the first game. In the second week, the Cougars played the Tigers already knowing how the Tigers performed in the first week of the season. Participants then discovered whether their team, the Cougars, won or lost the game. As in the pilot study, no scores were ever provided for the games, only outcome results. When done reading the scenario, each participant rated their own team’s and all other teams’ performance up to that point in the season.

**Dependent Variables**

The dependent variables measured how the participants felt about and rated their team (the Cougars), their immediate competitor (the Tigers), and the third team (the Huskies) using the following three groups of questions: “How would you rate your teams’/the Tigers’/the Huskies’ football skill (athletic ability),” “How well do you think your team/the Tigers/the Huskies performed in the games,” on 0 (very bad/very poorly) to 10 (very good/very well) scales and “Out of 100, where do you think your teams’/the Tigers’/the Huskies’ performance falls” with 1 being the worst performer and 100 the best performer. The last group of items was transformed to an 11-point scale in the same manner as the pilot study. These items were then aggregated based on the team being judged to create one index of your team’s evaluation (*Cronbach’s α = .93*), one index of your competitor’s evaluation (*Cronbach’s α = .89*), and one index of the other team’s evaluation (*Cronbach’s α = .93*). Three manipulation checks were included to ensure that people read the story thoroughly, knew which team they supported, and remembered the outcomes of the games.
Observers responded to the same questions regarding the Tigers and Huskies. Since observers were not fans of the Cougars, the questions related to the Cougars were slightly altered. The questions read: “How would you rate the Cougar’s football skill,” “How well do you think the Cougars performed in the game,” and “Out of 100, where do you think the Cougars performance falls.” Again the items were aggregated to create one measure for each team judged (the Cougars: *Cronbach’s α* = .85, the Tiger’s: *Cronbach’s α* = .93, and the Huskies: *Cronbach’s α* = .93). In the observer condition, two manipulation checks were added to verify that participants knew which team won each week.

**Results**

As before, Separate 2 (own team’s second week performance: better or worse) X 3 (competitor’s week one performance: better, worse, no information about previous performance) ANOVA’s were conducted on the aggregated evaluation of your team (the Cougars), the immediate competitor (the Tigers) and the other team (the Huskies). See Table 3 and 4 for means and standard deviations of the actors and observers.
Table 3

*Means (Standard Deviations) for Study 1: Actors, N = 120*

<table>
<thead>
<tr>
<th>Week</th>
<th>Your team wins</th>
<th>You team loses</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Tigers win</td>
<td>Tigers lose</td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Tigers win</td>
<td>Tigers lose</td>
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**Ratings of the Cougars**

<table>
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<tr>
<th></th>
<th>M</th>
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<th>M</th>
<th>SD</th>
<th>N</th>
</tr>
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<td>20</td>
</tr>
<tr>
<td></td>
<td>9.06</td>
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<td>18</td>
<td>6.48</td>
<td>1.65</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>6.48</td>
<td>2.04</td>
<td>19</td>
<td>5.78</td>
<td>1.77</td>
<td>23</td>
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<tr>
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<td>5.78</td>
<td>1.78</td>
<td>23</td>
<td>5.88</td>
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**Ratings of the Tigers**

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<th>M</th>
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<th>M</th>
<th>SD</th>
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<td>5.87</td>
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<tr>
<td></td>
<td>6.04</td>
<td>1.95</td>
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<td>8.94</td>
<td>1.21</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>8.94</td>
<td>1.45</td>
<td>19</td>
<td>8.07</td>
<td>1.44</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>8.07</td>
<td></td>
<td>23</td>
<td>8.26</td>
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<td></td>
</tr>
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**Ratings of the Huskies**

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<th>M</th>
<th>SD</th>
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<td>5.60</td>
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<td>18</td>
<td>8.76</td>
<td>1.60</td>
<td>18</td>
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<tr>
<td></td>
<td>8.76</td>
<td></td>
<td>18</td>
<td>7.45</td>
<td></td>
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</tr>
</tbody>
</table>
Table 4

*Means (Standard Deviations) for Study 1: Observers, N = 108*

<table>
<thead>
<tr>
<th>Week</th>
<th>2nd</th>
<th>Your team wins</th>
<th></th>
<th>1st</th>
<th>You team loses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tigers win</td>
<td>Tigers lose</td>
<td>No info</td>
<td>Tigers win</td>
<td>Tigers lose</td>
<td>No info</td>
</tr>
</tbody>
</table>

Ratings of the Cougars

<table>
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<th>M</th>
<th>SD</th>
<th></th>
<th>M</th>
<th>SD</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.59</td>
<td>1.44</td>
<td>22</td>
<td>8.29</td>
<td>1.14</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>8.15</td>
<td>1.33</td>
<td>17</td>
<td>6.03</td>
<td>1.58</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>6.03</td>
<td>1.49</td>
<td>21</td>
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</tr>
<tr>
<td></td>
<td>5.74</td>
<td>1.13</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Ratings of the Tigers

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th></th>
<th>M</th>
<th>SD</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7.36</td>
<td>1.97</td>
<td>14</td>
<td>4.71</td>
<td>0.99</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>5.82</td>
<td>1.75</td>
<td>17</td>
<td>9.33</td>
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</tr>
<tr>
<td></td>
<td>9.33</td>
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<td>17</td>
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<td>13</td>
</tr>
<tr>
<td></td>
<td>8.45</td>
<td>1.67</td>
<td></td>
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</table>

Ratings of the Huskies

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th></th>
<th>M</th>
<th>SD</th>
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<tbody>
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<tr>
<td></td>
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<td>1.47</td>
<td>21</td>
<td>8.89</td>
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<td></td>
<td>7.14</td>
<td>1.70</td>
<td></td>
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</tbody>
</table>

*Actors*

Fans of the Cougars rated them higher when they won the second game against the Tigers as opposed to when they lost, $F(1,114) = 116.66, p < .001$. People logically
rated a team that won as better \( (M = 9.22) \) than a team that lost \( (M = 6.04) \). The prior performance of the Tigers did not have a significant effect on ratings of the Cougars, \( F \) (2,114) = .93, \( p = .399 \). No significant interaction existed between the Cougars’ performance and the prior performance of the Tigers, \( F \) (2,114) = .32, \( p = .726 \).

The evaluation of the Tigers depended on a main effect of second week performance, \( F \) (1, 115) = 48.77, \( p < .001 \). Participants rated the Tigers higher when they beat the Cougars \( (M = 8.43) \) as opposed to when they lost \( (M = 6.45) \). Opinion of the Tigers was also affected by their prior performance in the first week of the season against the Huskies, \( F \) (2,115) = 7.50, \( p = .001 \). Participants rated the Tigers highest when they beat the Huskies \( (M = 8.25) \) compared to when they lost \( (M = 6.94) \) or tied \( (M = 7.26) \). Again no significant interaction was found between week one outcomes and week two outcomes on ratings of the Tigers, \( F \) (2,115) = .80, \( p = .453 \).

For ratings of the Huskies, analyses indicated a main effect of the first week outcome \( F \) (2,113) = 19.98, \( p < .001 \). Ratings of the Huskies were higher when they beat the Tigers \( (M = 8.31) \) than when they lost \( (M = 5.71) \) or when there was a tie \( (M = 6.93) \). Analyses also uncovered a marginal main effect of the second week outcome, \( F \) (1,113) = 3.149, \( p = .079 \). Participants rated the Huskies higher when their team, the Cougars, lost in the second week \( (M = 7.23) \) compared to when they won \( (M = 6.67) \). When their team lost, participants might have regarded all their comparison targets as higher in an attempt to remove the sting of a loss. This indicated a motivated effect, as this pattern was not replicated in the observer version.
To test directly for genius effects, three planned contrasts were performed. A genius effect would lead actors to rate the Huskies higher when your team lost in the second week and the Huskies beat the Tigers compared to when your team won in the second week and the Huskies won in the first week. This did not appear to be the case, $F(1,213) = 2.33, p = .128$. The genius effect also predicted differences in ratings between actors and observers. Actors would rate the Huskies higher than observers when the Cougars won and the Huskies won, but this did not occur, $F(1,213) = .89, p = .342$. It would also be expected that when the Cougars lost and the Huskies beat the Tigers that actors would rate the Huskies higher than observers, but again this did not occur, $F(1,213) = .048, p = .827$. Genius effects did not seem to occur in the current study, but this could likely be explained by the limited self-relevance of the manipulation. People were only to imagine being a fan of the team and would have less motivation to protect their self-worth by overestimating their outperformer’s ability.

**Observers**

For evaluation of the focal team, the Cougars, the analysis revealed a main effect of second week outcome, $F(1, 102) = 75.10, p < .001$. Observers rated the Cougars higher when they won ($M = 8.36$) compared to when they lost ($M = 6.03$). The first week outcome had no effect on ratings of the Cougars, $F(2,102) = .66, p = .52$. No significant interaction existed between first and second week outcomes, $F(2,102) = .34, p = .715$.

For ratings of the competitor, the Tigers, the analysis discovered a main effect of second week outcome, $F(1, 99) = 80.48, p < .001$, and of first week outcome, $F(2, 99) = 12.65, p < .001$. As expected, the Tigers were rated higher when they beat the Cougars in
the second week ($M = 8.79$) as opposed to when they lost to the Cougars ($M = 6.09$). First week outcome led observers to evaluate the Tigers the highest when they beat the Huskies ($M = 8.30$) compared to when they lost ($M = 6.51$) or tied ($M = 7.04$). A marginally significant interaction was found between the first week outcomes and the second week outcomes on ratings of the Tigers, $F(2, 99) = 2.89, p = .06$. When the Tigers beat the Cougars in the second week, then all the ratings of the Tigers performance were high. When The Tigers lost to the Cougars in the second week, then ratings were highest when they won in the first week and lowest when they lost. Tigers were most highly rated when they won two games and lowest when they lost two games.

For ratings of the other team, the Huskies, analyses only indicated a main effect of the first week outcome, $F(2, 100) = 26.51, p < .001$. Ratings of the Huskies were higher when they won ($M = 8.66$) than when they lost ($M = 6.04$) or when they tied ($M = 6.66$). Participants only learned about the Huskies performance during that first week of the season, and as a result, the second week outcomes did not affect their ratings. In the actor condition, the second week outcomes do have a limited effect on ratings of the Huskies. This may represent a motivated bias to improve judgments of one’s own team by lessening the sting of the Cougars’ loss when they were fans.

For the most part, actors and observers responded similarly to the vignette. Ratings of the Cougars were mainly dependent on their performance in the second week. Ratings of the Tigers were affected by their performance in both games in which they participated. Finally, ratings of the Huskies were always affected by the first week outcome but only affected by second week outcome in the actor condition.
STUDY 2

To address the issues discussed before and find increased support for the notion of social comparison transitivity, a new version of the lab study was created and enacted. This study hoped to corroborate the results of Study 1 in the lab with purportedly self-relevant feedback. Like Study 1, Study 2 provided participants with feedback about their competitor before providing them with self-relevant feedback. The pilot study had three participants in each session, but only two were used to collect data. The two valid participants had to believe that their prior competitor was taking a second test with the third participant, even though the researcher had already allowed them to leave. As a result, participants potentially could have disregarded and disbelieved this premise. In the present study, four people were required to run the study and each participant saw the other three participants at a few instances during the experiment. This increased participants’ belief that they were actually competing with one another.

The other major difference in this version of the study was the use of a subset of questions from a GRE verbal reasoning test instead of the Interpersonal Success Orientation measure. Initially, the ISO was chosen for its ambiguous nature, but after careful scrutiny of the pilot study and discussion with participants, it appeared that students did not care about their performance on this measure and did not always believe in its validity. The GRE test was a validated test used for graduate school admission, yet most early college students would find the test unfamiliar and would be unable to accurately gauge their performance. Furthermore, performance on this test should be important to college students, as many may entertain ideas of graduate schooling.
Consequently, the GRE should prove more meaningful to the self-concept than the fabricated ISO task. As before, people still had room to elevate their performance on this task either by outperforming a worthy competitor or losing to one.

Method

Participants and Design

Participants were 226 Ohio University undergraduate students whose participation partially fulfilled a requirement for introductory psychology. The study had a 2 (Own performance: Better or worse) X 3 (Competitor’s prior performance: Better, worse, no information about other performance) between subjects design. This resulted in six actor conditions. Participants first learned about their competitor’s performance against a third individual. They then performed in a session with their competitor and learned who performed better. The study also included observer conditions for each of the six actor conditions to use for comparison in the analysis. Thirty participants in the actor version had to be removed due to failed manipulation checks, leaving the actors with 66 participants. Fifteen participants in the observer version were removed because of failed manipulation checks, resulting in 115 observer participants.

Materials

The two GRE verbal reasoning tests were compiled of randomly chosen questions from old GRE practice tests. Specifically, each verbal reasoning test consisted of seven antonym problems and seven analogy problems. Researchers chose these problems due to their straightforward directions and low likelihood of participant familiarity (See...
Appendix D for example problems). Participants viewed and answered these tests on a computer using Medialab software.

**Procedure**

Each experimental session of actors contained four participants. If four participants did not sign up or less than four arrived at the study, the observer version was run. All of the participants were greeted and brought into the lab by a researcher. After consenting to participate, the participants were separated in the lab. Two participants were taken into one room, and the other two participants were led into a separate room. This resulted in two participants in both of the two rooms, with every individual sitting in front of a computer. All participants heard and then read instructions explaining that they were going to complete a GRE verbal reasoning test and would not receive feedback about their performance. They were further informed that the participants in the other room were completing the same GRE verbal reasoning test and would receive feedback about their performance. This task was framed as competitive in nature, as the two participants in the other room would be notified of who performed better on the test. The researcher further told participants that after everyone concluded the first GRE verbal reasoning test, one person from each room would be switched, leaving each participant to complete a second verbal reasoning test against one of the other participants. Before escorting one participant to the other lab room, the experimenter casually informed each of them of the prior performance of their upcoming opponent. They learned verbally that the upcoming competitor had done better or worse than the other participant on the first trial of the GRE test, depending on the participant’s randomly assigned condition. If a
participant was assigned to one of the two control conditions, then the participant learned nothing about their upcoming competitor’s prior performance on the test. One participant from each side then switched rooms.

After switching, the participants in both rooms read the directions for the second GRE test. After absorbing the directions, they made an expectation estimation of how they anticipated performing, and then completed the second GRE test. Upon completion, participants in the same room received feedback indicating who performed better on the test without learning any objective score information. This left participants with the knowledge of how they performed on one GRE test, but information on how their competitor did on two GRE tests: the test just taken with them and the prior test against the person from the other room. After receiving feedback, each participant evaluated their own and all other participants’ performance on the GRE test and overall level of verbal reasoning ability using similar dependent measures as in the pilot study. Additionally, participants rated how difficult they believed the task to be. Two manipulation checks were included to ensure that participants remembered what happened to their competitor in the first round and who did better on the GRE test that they participated in during the second round. See Appendix E for an example of the final questionnaire. After finishing the questionnaire, participants were debriefed and thanked for their participation.

Observers went through a similar procedure to the actors. The participants were greeted and taken to the lab by a researcher. After consenting to participate, the participants were placed in separate rooms in front of a computer. Participants then heard the following instructions aloud: “You will now be observing an experimental session
that had previously taken place. There were four participants in the original experimental session. You will learn about what they did and how they previously performed on two GRE verbal section tests. More instructions will be provided on the computer when you begin, so please read them carefully. You will be acting as an observer and focusing on the performance of Participant A. Any feedback received is not reflective of your ability, but of someone who has previously participated in the study. Please read all directions carefully and completely.” After asking for any clarification, participants began the study and went through the directions, two GRE verbal reasoning tests, the feedback, and the final questionnaire. Observers received the appropriate feedback for the condition they were assigned. Participants were shown a recap of the study to make sure that they followed the order of the feedback. This recap reminded observers of who played each other in which round and the outcomes, improving performance on the manipulation checks. Again manipulation checks were used to ensure that participants had understood the study and were aware of which participants performed better on the GRE verbal reasoning tests.

**Dependent Measures**

For the purpose of the dependent measures, the participant who was your competitor during the second GRE test was referred to as Participant B and the participant in the other room who competed with Participant B in the first round was Participant C. After completing the two GRE verbal section tests and receiving the appropriate feedback, participants evaluated their and the other participants performance on the test (How well do you think you/B/C did on the test), and verbal reasoning ability
(How would you rate your/B/C’s verbal reasoning ability) on 0 (very bad/very poorly) to 10 (very good/very well) scales. The participants also ranked their and the other participants’ ability and performance (Of 100 people, where do you think your/B/C’s performance falls) from 1 (the worst performer) to 100 (the best performer). After transforming the last item to an 11-point scale, these items were aggregated based on the person being judged to create one index of self-evaluation (Cronbach’s $\alpha = .91$), one index of Participant B evaluation (Cronbach’s $\alpha = .86$), and one index of Participant C evaluation (Cronbach’s $\alpha = .87$).

The questions and scales were the same for observers except that no question asked about “your” performance. For the questions that previously reflected a participant’s own performance, they now read: “How well do you think Participant A performed on the test,” “How would you rate Participant A’s verbal reasoning ability,” and “Of 100 people, where do you think Participant A’s performance falls.” Again the items were aggregated to create one evaluative measure for each participant judged, (Participant A: Cronbach’s $\alpha = .94$, Participant B: Cronbach’s $\alpha = .93$, Participant C: Cronbach’s $\alpha = .90$).

Results

Separate 2 (own performance in second round: better or worse) X 3 (competitor’s prior performance in first round: better, worse, no information about previous performance) ANOVA’s were conducted on the aggregated self-evaluation ratings, Participant B ratings and Participant C ratings for the actor and observer versions (See Table 5 and 6 for means and standard deviations of the actor and observer ratings).
Table 5

*Means (Standard Deviations) for Study 2: Actor, N = 66*

<table>
<thead>
<tr>
<th>Round</th>
<th>You win</th>
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<tbody>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>They win</td>
<td>They lose</td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>They win</td>
<td>They lose</td>
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**Self-Evaluation Ratings**

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<th>SD</th>
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<th>SD</th>
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**Participant B Ratings**

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<th>SD</th>
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<td>1.70</td>
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**Participant C Ratings**

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<th>SD</th>
<th>M</th>
<th>SD</th>
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</thead>
<tbody>
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<td>1.15</td>
<td>6.46</td>
<td>1.43</td>
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</tbody>
</table>
Table 6

*Means (Standard Deviations) for Study 2: Observer, N = 115*

<table>
<thead>
<tr>
<th>Round</th>
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</tr>
</thead>
<tbody>
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<td>You win</td>
<td>You lose</td>
</tr>
<tr>
<td>1st</td>
<td>They win</td>
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<table>
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<th>Focal Participant Ratings</th>
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<td>$SD$</td>
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<tr>
<td>$N$</td>
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<table>
<thead>
<tr>
<th>Participant B Ratings</th>
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</thead>
<tbody>
<tr>
<td>$M$</td>
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<tr>
<td>$SD$</td>
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</table>

<table>
<thead>
<tr>
<th>Participant C Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>$M$</td>
</tr>
<tr>
<td>$SD$</td>
</tr>
</tbody>
</table>

*Actors*

For self-evaluation, the analysis revealed a main effect of participant’s performance, $F(1,60) = 57.53, p < .001$. Participants rated their verbal reasoning ability
higher when they outperformed their competitor \((M = 7.08)\) compared to when their competitor outperformed them \((M = 4.26)\). Self-evaluation ratings were also affected by their competitor’s first round performance, \(F(2,60) = 4.45, p = .016\). Participants rated their own performance higher when their competitor previously won \((M = 6.37)\) compared to when their competitor previously lost \((M = 5.25)\) or no prior information was provided \((M = 5.20)\). No significant interaction existed between participant’s performance and the prior performance of the competitor, \(F(2,60) = 1.01, p = .37\).

Planned contrasts examined whether participants judged their second round win or loss differently, depending on their competitor’s prior win or loss. When participants won in the second round, they judged their ability higher when their competitor won as opposed to lost previously, \(F(1, 60) = 8.29, p = .006\). This indicated that participants made transitive inferences and judged their ability as more meritorious, after defeating a strong competitor. Unexpectedly, participants that lost in the second round did not alter judgments of their ability based on whether their competitor won or lost previously, \(F(1,60) = 1.04, p = .312\). The indirect feedback about the competitor affected self-evaluation, as seen in the main effect of first round performance and the difference in the first planned contrast.

For ratings of one’s competitor, Participant B, the analysis discovered a main effect of participant’s own performance in the second round, \(F(1,60) = 4.25, p = .044\). By competing against them, participants lost if their competitor succeeded. As a result, the competitor was rated higher when he or she performed better than you \((M = 7.25)\) as opposed to when you performed better \((M = 6.57)\). Ratings of the competitor were also
affected by a main effect of competitor’s prior performance on the first GRE verbal reasoning test, $F(2, 60) = 3.16, p = .05$. Participants rated their competitor the highest when the competitor performed better on the first GRE verbal reasoning test ($M = 7.48$) compared to when the competitor lost ($M = 6.62$) or no information was provided about the previous test ($M = 6.64$). Again no significant interaction was found between the competitor’s prior performance and the participant’s performance on ratings of Participant B, $F(2, 60) = 1.16, p = .32$.

For ratings of Participant C, analyses only indicated a main effect of the competitor’s performance on the initial GRE, $F(2, 60) = 11.22, p < .001$. Ratings of Participant C were higher when he or she won in the first round ($M = 7.65$) than when he or she lost ($M = 5.66$) or when there was no information about first round performance ($M = 6.25$).

During the dependent variable questionnaire, participants were also asked “What do you think would happen if you performed against Participant C?” on a 0 (they would do better) to 10 (I would do much better) scale. Analyses of the responses indicated that participants think they would be more likely to do better than Participant C when they outperformed Participant B in the second round ($M = 6.38$) compared to when Participant B outperformed them ($M = 5.38$), $F(1, 60) = 4.94, p = .03$. Participants also indicated that they would be more likely to outperform Participant C, if Participant C had previously lost to Participant B ($M = 6.91$) compared to when Participant C had beaten Participant B ($M = 4.87$) or no information about the first round performance was provided ($M = 5.80$),
Participants are incorporating the transitive information into their judgments of how they would fare against Participant C in a potential match.

Participants also estimated how much better or worse they thought they did than Participant B in the second round depending on their feedback condition on a scale from 0 (not at all better/worse) to 10 (much better/worse). Participants did not view any objective score information so they could use their imagination to assume how much better or worse they did. When you won, you thought that you did much better than Participant B when Participant B lost in the first round ($M = 6.17$) compared to when Participant B won in the first round ($M = 3.64$) or when no information condition was available ($M = 5.11$), $F (1,60) = 6.87$, $p = .011$. A planned contrast showed that ratings of how much worse you did were higher when no information was provided about the first round than in any other condition where you lost, $F (1,60) = 4.80$, $p = .032$. When you lost, ratings of how much worse you did were very similar regardless of whether Participant B won ($M = 6.17$) or lost ($M = 5.82$) previously but much higher when no information was provided about the first round ($M = 7.64$). Overall, participants thought they did much worse when they lost in comparison to how much better they thought they did when they won. This may be self-defensive as participants wanted to have done much worse than their counterpart to indicate that their opponent was highly skilled.

**Observers**

For evaluation of the focal actor, Participant A, the analysis revealed a main effect of Participant A’s second round performance, $F (1,109) = 113.66$, $p < .001$. Observers rated Participant A’s verbal reasoning ability higher when he or she outperformed the
competitor, Participant B, ($M = 8.60$) compared to when he or she was outperformed by Participant B ($M = 5.54$). The analysis also revealed a main effect of the competitor’s prior performance $F(2, 109) = 6.83, p = .002$. Observers rated Participant A’s verbal reasoning ability higher when Participant B won in the first round ($M = 7.89$) compared to when Participant B lost ($M = 6.93$) or when nothing was learned about the first performance ($M = 6.68$). In other words, competing against a previously successful opponent increased ratings of Participant A’s ability. No significant interaction existed between first and second round performance, $F(2, 109) = .36, p = .699$.

As in the actor condition, planned contrasts were performed to examine how winning or losing was directly affected by the competitor’s prior performance. When the focal actor won in the second round, observers judged Participant A’s ability marginally higher when their competitor won as opposed to lost previously, $F(1, 109) = 3.60, p = .061$. Observers judged Participant A higher when they beat a competitor with a winning record. When Participant A lost in the second round, observers altered their judgments based on whether the competitor won or lost previously, $F(1, 109) = 7.95, p = .006$. The indirect feedback about the competitor affected evaluation of Participant A, as seen in the main effect of first round performance and the difference in the planned contrasts. In the actor version, the second contrast did not reach significance but potentially could with increased sample size, as the observers do take this information into consideration for evaluation.

For ratings of the competitor, Participant B, the analysis uncovered a main effect of participant’s performance in the second round, $F(1, 109) = 54.94, p < .001$, and of
competitor’s prior performance on the first GRE verbal reasoning test, $F(2,109) = 10.54$, $p < .001$. As expected, the competitor was rated higher when he or she performed better than Participant A ($M = 8.21$) as opposed to when Participant A performed better ($M = 6.20$) in the second round. First round performance led observers to rate the competitor the highest when the competitor performed better on the first GRE verbal reasoning test ($M = 8.00$) compared to when the competitor lost ($M = 6.45$) or no information was provided about the previous test ($M = 7.01$). Again no significant interaction was found between the competitor’s prior performance and the second performance on ratings of Participant B, $F(2,109) = 1.23$, $p = .295$.

For ratings of the participant who took the initial GRE against participant B, called Participant C, analyses indicated a main effect of the competitor’s performance on the initial GRE, $F(2,109) = 9.53$, $p < .001$. Ratings of Participant C were higher when he or she won in the first round ($M = 7.03$) as opposed to when he or she lost ($M = 5.65$) or no information about first round performance was given ($M = 6.64$). Analyses did not reveal a significant main effect of second round performance, $F(1,109) = 2.25$, $p = .137$. Unlike in the actor version, this indicated that when the focal actor performed worse in the first round, Participant C ratings did not alter.

Observers and actors appeared identical in response to how one would perform against Participant C. In the observer condition, the question was framed as to what would happen if Participant A performed against Participant C. When Participant A won in the second round, observers rated Participant A as more likely to do better than Participant C ($M = 7.40$) compared to when Participant A lost ($M = 6.06$), $F(1,108) =$
15.94, $p < .001$. Observers rated Participant A as more likely to outperform Participant C when Participant C lost in the first round ($M = 8.18$) compared to when Participant C won ($M = 5.76$) or no information was provided about the first round ($M = 6.34$), $F(2,108) = 18.76, p < .001$.

Observers showed a somewhat similar pattern from actors in how they responded to the question about how much better or worse Participant A did than Participant B. When the focal actor won in the second round, ratings of how much better were marginally lower when the competitor won in the first round ($M = 5.85$) compared to when the competitor lost ($M = 7.00$) or no information was provided ($M = 6.61$), $F(2,109) = 3.62, p = .06$. When the focal actor lost in the second round, ratings of how much worse were very similar regardless of the outcome of the first round.

To test directly for genius effects, three planned contrasts were performed. A genius effect would lead actors to rate Participant C higher when they lost in the second round and Participant C beat Participant B compared to when they won in the second round and Participant C won in the first round. This did not appear to be the case, $F(1,60) = .052, p = .821$. The genius effect also predicted differences in ratings between actors and observers. Actors would rate Participant C higher than observers when you won and Participant C won, but this did not occur, $F(1,169) = 1.91, p = .169$. It would also be expected that when you lost and Participant C beat Participant B that actors would rate Participant C higher than observers, but again this did not occur, $F(1,169) = .88, p = .349$. 
Performing the analysis with the version (actor or observer) as a third factor for direct comparison did not alter the main effects of first and second round performance. Further, few differences occurred between actors and observers, making this addition of limited interest. For self-evaluation, observers rated the focal actor \( (M = 7.16) \) higher than actors rated themselves \( (M = 5.63) \), \( F(1,169) = 34.65, p < .001 \). This probably stemmed from observers not bracing for the difficulty of the test, as they knew from the beginning that they would not receive feedback about their performance. For ratings of Participant B, the competitor, an interaction between version and second week performance was revealed, \( F(2,169) = 9.32, p = .003 \). When participants won, they rated Participant B similarly in both the actor \( (M = 6.57) \) and observer \( (M = 6.20) \) version, but when they lost, participants rated Participant B higher in the observer \( (M = 8.21) \) than actor \( (M = 7.25) \). Lastly, participants did not rate Participant C differently in the actor or observer versions.

In both the actor and observer condition, participants were affected by the competitor’s prior performance. This may reflect the rationality of using the transitive property to aid in self-evaluation. Participants were making transitive inferences, as shown in their responses to the likelihood of beating C and the main effects of first round performance on self-evaluation. Ratings of the self or focal actor were mainly dependent on their performance in the second round. Ratings of the Participant B were affected by their performance in both rounds in which they participated. Finally, the first round always affected ratings of Participant C.
DISCUSSION

Even with decades of research on social comparisons (Festinger, 1954; Wood 1989), and the fact that people often search for ways to gain self-knowledge, little research has explored how a competitors’ past and future affects self-evaluation. Along these lines, the present studies investigated people’s interpretation of performance feedback about a once competitor. Specifically, the research gave people ancillary information about their competitor, future or past performance. The goal was to examine whether this indirect, secondary information about a competitor influenced self-evaluation and other-evaluations.

In many real-life instances, people have information about peers or other potential competitors before contending with them. For example, people would expect fierce competition when trying to gain employment at a top investment bank. Earning this highly sought after investment-banking job could feel more gratifying, knowing that you were selected over many qualified candidates. It was expected that performance feedback about a competitor would affect self and other evaluations. Furthermore, it was predicted that actors would demonstrate a more motivated interpretation of the feedback than observers. Actors would use their competitor’s other wins to maintain their high self-evaluation after a loss or to increase their self-evaluation after a win. At a more basic level, the goal of the research was to discover if people even relied on transitive inferences when making social comparisons. Beyond demonstrating that individuals do use transitive inferences, the research wanted to evaluate which self-motive drove interpretation, self-enhancement or self-assessment.
In all three studies, participants made transitive inferences. This can be easily seen from the responses asking participants to evaluate their likelihood of beating Participant C. Participants understood that if A beat B, and B beat C, then A should beat C. In fact, people thought they were the most likely to outperform Participant C after they had beaten Participant B and Participant C had lost to Participant B. In this scenario, participants had positive feedback about their performance with indication that Participant C was a weak competitor. People then made a transitive inference and believed that they could defeat Participant C. On the other hand, people thought that they were least likely to do better than Participant C when they had lost to Participant B and Participant C had beaten Participant B. In that instance, people received negative feedback about themselves with a warning that Participant C was a strong competitor. People are not simply ignoring the information about the competitor, but using it to make expectations about the future.

Results consistently indicated that both actors and observers rated themselves higher after besting their competitor. Logically, confidence in ability would increase after outperforming someone. To evaluate the quality of a competitor, people relied on available information about their competitor’s other trials. Study 2 found that when this secondary information was provided to participants, it influenced self-evaluations. Participants had higher self-ratings when their competitor outperformed Participant C in the first round. This was consistent regardless of whether participants won or lost in the second round. Facing a strong competitor led to increases in self-evaluation without taking into consideration participants’ own performance. Losing to a strong competitor
offered participants the chance to negate their loss and maintain a high self-evaluation, while surpassing a skilled competitor provided participants with a chance to interpret increased ability. In fact, participants rated their own performance higher when they beat an already accomplished competitor compared to a losing competitor or without extra information about the competitor. Study 1 did not replicate these effects, however, this could be attributed to the limited self-relevance of the hypothetical football scenario. This narrow self-relevance restricted the effects of social comparison transitivity on self-evaluation. As a result, participants likely experienced decreased motivation to defend or augment their self-concept.

As previously mentioned, self-evaluations were always affected by the participant’s performance against a competitor. In Study 2, it was further demonstrated that participant’s self-ratings were affected by the performance of their competitor against a third individual. This indicated that the performance of the competitor influenced self-evaluation and again demonstrated that participants made transitive inferences. For the most part, actors and observers responded similarly to the vignette and to the lab study indicating that traditional genius effects were not found in the results.

**Theoretical and Practical Implications**

Consistent with social comparison research, information about others impacts self-evaluations, as this information provides some clarity when interpreting the complexity of self-relevant feedback. Social comparison transitivity further builds on this idea that people use comparisons with others to improve understanding of their own capabilities. As seen in the proxy model of social comparison for assessment of ability,
people look to similar others to determine their capabilities and estimate success, especially on novel tasks (Wheeler, Martin, & Suls, 1997). Social comparison transitivity offers people another way to assess potential. People can recollect how a competitor has done on other occasions or follow their performance on upcoming endeavors. To estimate the likelihood of outperforming Participant C in the future, participants incorporate information about the competitor’s other performances.

As discussed within the introduction, people are capable of making and utilizing several types of self-evaluation (Alicke, 2007). Instrumental self-evaluation provides objective score information, social self-evaluation incorporates comparisons with others, and temporal self-evaluation analyzes progression or deterioration over time. Together, these forms of self-evaluation improve people’s pictures of their skills, talents, weaknesses, etc. Social self-evaluation is particularly useful on social and moral dimensions that lack objective levels and rely on interpersonal context, such as happiness, thoughtfulness, and intelligence. Knowing that a college student calls his or her mother once a week does not indicate their level of thoughtfulness without knowing peer norms. On dimensions such as these, people use comparisons with others to calculate ability.

The two measures used in the present studies, likelihood to succeed and verbal reasoning, require comparison with others to accurately ascertain a person’s standing. Verbal reasoning varies depending on the standards of judgment, which differ based on age, education, and a host of other factors. In the present study, participants could make social self-evaluations but also learn information provided by social comparison transitivity. Participants not only discover how they score against a competitor, but also
how well that competitor stacks up against a third participant. Social comparison transitivity offers this added benefit and represents a previously overlooked aspect of the social comparison situation.

The studies demonstrate that transitivity does not only occur in social relations and choice preferences, but also in social comparisons. The ability to make transitive inferences is developed fairly early in life and is incorporated into many facets of evaluation (Markovits & Dumas, 1999; Trabasso, 1977). People are capable of making transitive inferences and use this information to speak to their own ability. Participant C is the third individual that never directly competes against the participants, yet people are appropriately evaluating Participant C based on all of the outcomes. Self-evaluations were not affected as much as anticipated, but that could be due to methodological weaknesses as opposed to the limited effects of social comparison transitivity.

As mentioned, people do use transitivity in social comparison situations. In the struggle to gain self-knowledge, people attempt to gather information and use transitivity as an available resource. If Arthur routs Oliver in chess and then I quickly demolish Arthur, I would rightfully expect that I could easily manhandle Oliver. Knowing about Arthur’s past with Oliver could and should aid in my prediction of what will happen when I play Oliver. People can deduce transitive relationships and use this to speak to their self-evaluation. The use of social comparison transitivity does not exist in a vacuum of accuracy and rationality but instead is often influenced by people’s operating self-motives.
Limitations and Future Directions

The study indicated that social comparison transitivity existed but to a lesser extent than expected. Although a strong initial effort, the studies suffered from some limitations and weaknesses. To begin with, Study 2 was plagued by small sample size in the actor condition. Since the study required four participants, many experimental sessions could not be run because less than four people showed up or signed up. As a result, the study had a smaller sample size than desired, and this decreased confidence in the findings. Many attempts were made to gather more participants, but it proved extremely difficult to assemble four participants in the lab.

The lab studies used two different tests on the participants, the ISO and the GRE verbal reasoning section test. When participants received feedback about the tests, they only received information about who performed better without any objective performance score. This was initially done to increase believability and understanding. People had no prior experience with the ISO test, giving little intuitive meaning to a number score and requiring additional explanation to make intelligible to participants. Beyond limited meaning, it was also feared that that participants would not believe that they achieved the provided score on difficult GRE verbal reasoning tests. However, people would more plausibly believe that they did better or worse than a second individual, regardless of their feelings about the test. The ambiguous feedback also provided participants more room to interpret their own and their competitor’s ability. Even though well intentioned, this plan may have decreased believability. When receiving a test in the real world, students would be given an objective number score or letter grade. The student could then
easily compare grades with other classmates. An objective score had to be created to calculate who performed better, yet participants were not provided with one. Not supplying an objective score could have increased suspicion by making the study seem more contrived and unrealistic.

As anticipated from the discussion above, it was expected that participants would have liked objective score information. In Study 1, participants responded to an open-ended question asking them “What other information would you like to have to answer the previous questions.” More than half of participants commented that they would have liked to know the scores of the games. People normally had outcome scores when judging performance, especially of football games. Although not asked in Study 2, participants likely would have answered similarly if given the opportunity.

In future research concerning social comparison transitivity, scores should be provided. This could be done with another vignette variation, as well as in a lab study. By providing scores, researchers can see how this factor affects social comparison transitivity. Will participants be able to say that a great player trounced them, if that player loses the next week? The person who beat you handedly has now lost, leaving it more difficult to believe that a strong opponent outperformed you. Losing terribly could be contrasted with barely losing to see how this alters the effect of your competitor’s performance. The objective scores could help reveal the limitations of social comparison transitivity and discover how much better or worse a person needs to perform to see its effects.
Another issue that may have influenced participants was the quantity of information to remember and keep organized, especially in the observer version of Study 2. Steps were taken to make the task as clear and simple as possible including diagramming the situation, yet during the funneled debriefing, some participants thought that the study involved a test of memory. In a similar vein, the actors in Study 2 were always verbally informed about their competitor’s other performance. It is unclear whether participants listened to these statements fully, as many were too focused on switching rooms. The people that did not listen to the statements were weeded out through the manipulation check, but the number of failing participants was higher than preferred.

Vignettes always pose generalization issues, as participants report imagined reactions, and do not experience the situation directly. In Study 1, participants answered questions about their reaction to a football game vignette, where they were to imagine that they cheer for a fictional team. They do not experience actual feedback about their performance and were even further removed, as participants were only pretending to be a fan. However, the results of Study 1, where participants simply imagined the scenario, mostly replicated those of Study 2 where participants actually received feedback. These parallel results suggest that people are able to predict, with a reasonable degree of accuracy, how they would respond to transitivity feedback, thus validating the use of vignettes in this context. To better imitate the social comparison transitivity situation, a vignette could ask people to imagine that they were the actual characters in the story receiving their own feedback.
Future research needs to be done to better understand the strength of the phenomenon in discussion. The current studies had a weak manipulation that plagued true understanding of social comparison transitivity. Some participants found the study confusing and ignored the feedback information about their peers. Although the vignette tried to address this problem, it essentially created extended observer conditions instead of an accurate test of self-evaluation. In the future, it would be wise to use legitimate, believable feedback that participants would care about and acknowledge. False feedback always poses a tricky problem, as students can become suspicious of the studies. Offering real feedback would remove this obstacle. People could take the GRE verbal reasoning test and have it hand-graded to heighten believability.
CONCLUSION

These studies comprise a good first step in the study of social comparison transitivity. They demonstrate that people are capable and do make transitive inferences in their social comparisons. To go further with this research, a stronger manipulation needs to be established. Together, the present studies are the first to explore how people respond to other performance information about their competitor, and should pave the way for future studies further examining the conditions under which social comparison transitivity affects self-evaluation.
REFERENCES


APPENDIX A: EXAMPLE OF INTERPERSONAL SUCCESS ORIENTATION

MEASURE

Test of Interpersonal Success Orientation
Psychology Press ©

The following test of Interpersonal Success Orientation consists of three parts. Part One is a test of logical reasoning ability, Part Two is a test of memory association, and Part Three is a test of interpersonal behavioral intelligence. Each part of the test is scored independently, and a combined score is calculated to yield an overall Interpersonal Success Orientation score. For this measure, higher scores indicate a greater likelihood of experiencing material and interpersonal success, while lower scores indicate a low likelihood of doing so.

It is very important that for each section, you read the instruction provided closely and carefully while paying particular attention to the example items when given.

Please get ready to begin Part One.

Interpersonal Success Orientation – Part I
Logical Reasoning Test

This is a test of your ability to tell whether the conclusion drawn from certain statements is correct or incorrect. Although all of the statements given are really nonsense, you are to assume that the first two statements in each problem are correct. The conclusion drawn from them may or may not show good reasoning. You are to think only about the reasoning.

If the conclusion drawn from the statements shows good reasoning, circle “G” below the item. If the conclusion drawn from the statements shows poor reasoning, circle “P” below the item.

The following are some examples of correct reasoning in the nonsense syllogism test:

1) All trees are fish. All fish are horses. Therefore, all trees are horses.  
   "G"
2) All trees are fish. All fish are horses. Therefore all horses are trees.

Your score on this test will be the number of items marked correctly.

You will have 5 minutes to complete this part of the test. When you have finished this part, please remain seated and Part 2 will begin shortly thereafter.

You have 5 minutes to complete this part of the test.

1. All birds have purple tails. All cats are birds. Therefore all cats have purple tails

2. No singer is a pogo stick. All pogo sticks are movie stars. Therefore no singer is a movie star.

3. All cars have sails. Some swimming pools are cars. Therefore some swimming pools have sails.

Interpersonal Success Orientation – Part II
Memory Association Test

This is a test of your ability to learn combinations of words and numbers. In this part of the test you will study a screen showing 15 object names with numbers. After studying the screen showing both objects and numbers you will be directed to a page showing the names of the objects in a different order. You will be asked to write down the numbers that go with them.

Your score will be the number marked correctly.

For the memory portion of the test you will have 3 minutes to study the object-number combinations. You will then have 2 minutes to write as many numbers as possible in the recall portion of the test.
Study this list. You will have 3 minutes.

<table>
<thead>
<tr>
<th>Object</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>tree</td>
<td>58</td>
</tr>
<tr>
<td>floor</td>
<td>29</td>
</tr>
<tr>
<td>chair</td>
<td>33</td>
</tr>
<tr>
<td>wall</td>
<td>56</td>
</tr>
<tr>
<td>shoe</td>
<td>17</td>
</tr>
<tr>
<td>table</td>
<td>78</td>
</tr>
<tr>
<td>coat</td>
<td>49</td>
</tr>
<tr>
<td>roof</td>
<td>22</td>
</tr>
<tr>
<td>dish</td>
<td>36</td>
</tr>
<tr>
<td>pillow</td>
<td>43</td>
</tr>
<tr>
<td>post</td>
<td>65</td>
</tr>
<tr>
<td>tile</td>
<td>35</td>
</tr>
<tr>
<td>plate</td>
<td>26</td>
</tr>
<tr>
<td>shade</td>
<td>40</td>
</tr>
<tr>
<td>rock</td>
<td>62</td>
</tr>
</tbody>
</table>
Interpersonal Success Orientation – Part III
Interpersonal Intelligence Test

This is a test of your interpersonal behavioral intelligence. In this part of the test you will be presented with 15 scenarios describing an interpersonal situation. You will then be asked to indicate, of the choices provided, how you would personally approach and manage each situation.

Scoring is done on a weighted scoring scale on which certain response options are awarded more points than are others.

1. Time you’re spending with an old friend seems less and less enjoyable. The two of you are drifting apart. Would you
   a. honestly tell your friend it’s just not fun anymore
   b. express your concerns and work it out together
   c. stop returning phone calls or invitations
   d. quietly let the relationship die. Relationships change, people change.

2. A mutual friend tells you your best friends spouse is having an affair and has proof. Would you
   a. it depends on the nature of your relationship with your friend
   b. tell the spouse you know and give them time to confess
   c. immediately tell your friend
   d. stay quiet
APPENDIX B: EXAMPLE OF FEEDBACK

*GRE Verbal Reasoning Test Results:*

Stars (*** *) indicate who has performed better on the GRE test.

***You

Your competitor

In comparison to your competitor, you performed better.
Instructions: Below, you will read a hypothetical scenario about three football teams. The scenario is similar to something that might happen during a regular football season. Please read the story very carefully before answering any questions so that you are absolutely sure of what happened and who was involved. Please make sure to answer all of the questions associated with each scenario.

The Tigers, the Cougars, and the Huskies are all in the same division in their respective football league. All teams have trained hard and are excited for the season to begin. Imagine that you are a big fan of the Cougars.

It is the beginning of the season and as such each team has not played the other. During the first week of the season, the Huskies and the Tigers play one another. The Tigers win the game.

The Cougars did not play a game during the first week of the season and are playing the Tigers in the second week of the season.

The Cougars and Tigers play and the Tigers win.
Antonyms
Directions: Each question below consists of a capitalized word that is followed by five words or phrases: Choose the lettered word or phrase whose meaning is most nearly opposite to the meaning of the capitalized word. Because some questions require you to distinguish fine shades of meaning, it is advisable to consider all the choices before deciding on the best choice.

1. License:
curb - C
tie
rule
impress
age

2. febrile:
lacking fever - C
unable to climb
unable to grasp
sturdy
coarse

3. insidious:
comparable
direct - C
external
moral
fearless

4. virtuoso:
malefactor
gnome
incompetent - C
lackey
sinner

Analogies:
In each question below, a related pair of words is followed by five lettered pairs of words. Choose the one pair that best expresses a relationship similar to that expressed in the original pair.

1. Proponent : Theory::
nonbeliever: sin
traitor: country
adherent: belief - C
attorney: law
scientist: hypothesis

2. discharged: soldier
fired: cannon
graduated: student - C
appointed: judge
transferred: employee
docked: salary

3. outfox: strategy
outdo: trickery
defeat: stamina
outlast: force
victimize: terror
outrun: speed - C

4. Coax: blandishments
amuse: platitudes
compel: threats - C
deter: tidings
batter: insults
exercise: antics
APPENDIX E: DV QUESTIONNAIRE

1. How well do you think you performed on the test?
0-10 very poorly to very well

2. How would you rate your verbal reasoning ability?
0-10 very bad to very good

3. Out of the 100 people participating in this study where do you think your performance on this test falls? (1 being the worst performer in the study and 100 being the best performer in the study)

4. How well do you think Participant B performed on this test?

5. How would you rate Participant B’s verbal reasoning ability?

6. Where does Participant B's performance on the test fall out of the 100? (again 1 being the worst and 100 being the best)

7. How well do you think Participant C performed on this test?

8. How would you rate Participant C’s verbal reasoning ability?

9. Where does Participant C's performance on the test fall out of the 100? (again 1 being the worst and 100 being the best)

10. How would you rate the difficulty of the GRE verbal reasoning test?
0-10 not at all difficult to extremely difficult

11. How much better do you think you did than Participant B?
0-10 not at all better to much better

12. Would you like to know more about Participant C's performance?
Yes or no
13. How do you feel about your performance on the verbal reasoning test?
0-10 very bad to very good

14. What do you think would happen if you performed against Participant C (the other person)?
0 they would do better, 5 is the same, 10 I would do much better

15. Who would you prefer to compete against in the future?
Someone of lesser ability to b
Someone of equal ability
Someone of greater ability

16. How would you perform against the person chosen in the previous question?
0 they would do better, 5 is the same, 10 I would do much better

17. How important is the domain of verbal reasoning to you?
0-10 not at all to very

18. How much worse do you think Participant B is than you?
0 –10 not at all worse to much worse

19. Who performed better on the second GRE test?
Your competitor, Participant B
You

20. Who performed better on the first GRE test?
Participant B
Participant C