

Effects of Temporal Self-Comparisons on the Pursuit of Improvement

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**Abstract**

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This dissertation consists of three chapters. Chapter one reviews the current state of knowledge on temporal self-comparisons and distills different theories and findings into three key principles that can guide future research on the role of temporal comparisons in consumer behavior. Chapters two and three are empirical investigations intended to stand alone as submissions to peer-reviewed journals. Chapter two examines the effects of temporal self-comparisons on product upgrade behavior (i.e., the pursuit of improvement external to the self). Four experiments show a “temporal egotism” process whereby consumers project their own self-improvement perceptions onto self-connected brands, which subsequently increases product upgrade likelihood. Chapter three explores the interactive effects of temporal and social comparisons on self-improvement pursuit (i.e., the pursuit of improvement internal to the self). Five experiments demonstrate that temporal decline in the self increases consumers’ interest in self-improvement products and remedial behaviors when they are of relatively high social standing, but not when they are of lower social standing.

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## **Chapter I. Temporal Self-Comparisons in Consumer Behavior: Key Principles and Directions for Future Research**

In the course of everyday life, consumers frequently engage in temporal self-comparisons—comparisons of the current self to the self at some point in the past or future (Albert 1977). For example, consumers may compare their weight now to when they were in high school, or their current salary to what they earned when they started working, or their current happiness to how happy they were before a major life event. Indeed, with the growing popularity of the “quantified self”—the consumer trend of using wearable technology movement to track virtually every facet of life (Wolf 2010)—the opportunities for temporal self-comparisons on even more specific dimensions are increasing. Moreover, as a parallel trend takes root in the workplace, with employers increasingly using wearable technology to track employees (Dishman 2014), modern consumers often receive temporal self-comparison feedback whether or not they actively seek it.

Despite the apparent relevance of temporal self-comparisons to consumer behavior, the academic field of consumer research has all but ignored the topic. Looking beyond this field, there is a modest literature on temporal self-comparisons in social psychology, which dates back to Albert’s (1977) seminal work. However, even within the domain of social psychology, temporal comparisons have received relatively little attention, especially as juxtaposed with the related topic of social comparisons (Festinger 1954). Thus, knowledge of the systematic effects of temporal self-comparisons, the processes by which such comparisons wield influence, and the conditions under which their effects will arise is sorely lacking.

This chapter synthesizes existing research on temporal self-comparisons (and judgments of temporal change, more generally) in order to identify key principles that can guide consumer researchers in their efforts to understand the role of temporal self-comparisons in behavior. Specifically, we propose three key tenets of temporal self-comparisons: (1) Improvement Affinity: people generally have a preference for improving trajectories and outcomes resulting from improvement; (2) Construction and Malleability: temporal self-comparisons and perceptions of change are not always based on objective evaluations or accurate memory, but instead can be constructed online and are sensitive to situational factors; and (3) Temporal Focus Flexibility: temporal self-comparisons involve multiple selves to which individuals can selectively attend. In the following sections, we discuss existing research that provides direct or indirect evidence for each tenet. Furthermore, based on each tenet, we highlight corresponding research questions that remain unanswered, some of which we explore in chapters 2 and 3.

## **IMPROVEMENT AFFINITY**

### Evidence of the Improvement Affinity Principle

An abundance of evidence suggests that people generally prefer improvement (i.e., favorable/downward temporal comparisons), both when evaluating the self and when evaluating entities external to the self. Most directly related to the topic at hand, early research on temporal self-comparisons proposed that individuals desire improvement in their abilities over time and thus favor comparisons indicating personal improvement over those indicating decline (Albert 1977). Consistent with this, research on subjective well-being has found that perceptions of self-

improvement in various domains (e.g., social life, academic performance) positively predict life satisfaction in these same domains (Emmons and Diener 1985; Fox and Kahneman 1992).

Indeed, prior research even contends that one key function of emotions is to indicate change relative to a reference point, with improvement in one's conditions or progress toward one's goals eliciting positive affect (Carver and Scheier 1990; Frijda 1988). Given that people generally desire positive moods, it perhaps comes as no surprise that they similarly desire improvement, an antecedent to positive moods.

Just as people prefer improvement when evaluating themselves, they desire improvement when judging external entities. For example, in their classic research on interpersonal attraction, Aronson and Linder (1965) documented a "gain-loss" effect, whereby individuals liked others more when their relationship developed from negative to positive (i.e., improved) than when the relationship was invariably positive. At the root of this effect is the idea that people are more sensitive to change relative to a reference point than they are to absolute levels, an idea echoed in Kahneman and Tversky's (1979) prospect theory. Stemming from this notion of reference-dependent preferences, related research on judgment and decision making has found that people prefer outcomes resulting from improvement to equivalent outcomes resulting from more stable trajectories, and this has been demonstrated in a variety of contexts, from investment decisions (Hsee and Abelson 1991), to salary preferences (Hsee and Abelson, and Salovey 1991). In fact, some research has found that people prefer improving salary trajectories to declining ones even when the sum total of income over time is higher in the declining case, and even though the context precluded extrapolating the salary trajectory into the future (Loewenstein and Sicherman 1991). In sum, research from a variety of social science disciplines attests to the fact that people have an affinity for improving trajectories.

Importantly, these findings indicate that temporal comparisons have effects over and above those of social comparisons. It is generally accepted that people prefer higher social standing when evaluating the self (e.g., people would rather be at the 90<sup>th</sup> percentile than the 60<sup>th</sup> percentile). However, holding the terminal social standing constant, the improvement affinity principle suggests that there is additional utility gained (or lost) due to the temporal trajectory that led to the outcome. For example, people should be more satisfied when they improved from the 60<sup>th</sup> percentile to the 90<sup>th</sup> percentile than if they were always at the 90<sup>th</sup> percentile. That is, beyond performance relative to a contemporary social standard, satisfaction depends on the temporal change that yielded one's final social standing.

#### Related Research Questions

Given the general desire for improvement, one question that naturally arises is how individuals react to its absence, or worse, its opposite. According to Albert (1977), personal decline is especially threatening and should encourage remedial efforts, consistent with the general principle that people are motivated to reduce negative deviations from desired standards (Carver and Scheier 1981; Higgins 1987). However, such a remedial process may not arise unequivocally. Indeed, research on learned helplessness suggests that temporal decline could have the opposite effect, causing people to reduce rather than increase self-improvement efforts (Elliott and Dweck 1988). In light of these divergent possibilities, it would be useful to identify situational and dispositional moderators of the motivational effects of temporal decline. For example, other salient sources of feedback about one's abilities (e.g., social comparisons) may determine how individuals respond to temporal decline. Conceivably, when these other sources

of self-evaluative information suggest low ability, temporal decline may not encourage remedial efforts, whereas when they suggest high ability, temporal decline may encourage remedial efforts. This follows from the idea that individuals of high (vs. low) ability have more to lose and thus decline should be a more prominent threat.

A second question arising from the improvement affinity principle is how and when this preference will manifest in people's present-future temporal self-comparisons. Recent research has found evidence of a self-serving bias whereby people generally expect their future self to be superior to their current self—that is, they expect to improve (Kanten and Teigen 2008; Wilson et al. 2012). However, none of this work considered the potential influence of past-present temporal comparisons on these expectations of future improvement. When information about prior temporal change is salient, it is unclear whether people will maintain their rosy expectations for the future or whether they will extrapolate their current trajectory. For example, if a person's decline in fitness is salient, will he still expect his fitness to improve in the future, or will he expect to continue declining in the future? Furthermore, how will these expectations subsequently influence behavior in the present? On one hand, expecting decline to persist might be the proverbial kick in the pants that he needs to get back in the gym, consistent with the idea that feared possible selves can motivate self-beneficial behaviors (Hoyle and Sherrill 2006; Markus and Nurius 1986). On the other hand, it might discourage him and cause him to actively disengage from fitness pursuit (Elliott and Dweck 1988). Future research should investigate the factors that influence the relationship between perceived (i.e., past-present) change and expected (i.e., present-future) change.

## CONSTRUCTION AND MALLEABILITY

### Evidence of the Construction and Malleability Principle

The literature on temporal self-comparisons has long abandoned the notion that these self-evaluations necessarily reflect reality. Rather, substantial evidence indicates that people often construct their recollections of past selves online in accordance with implicit theories of development, culturally shared beliefs about the trajectory of different personal attributes and dimensions over the lifespan (McFarland, Ross, and Giltrow 1992; Ross 1989). For example, most people believe that social skills generally improve with age. Thus, when making temporal self-comparisons, they might actually derogate the past self in retrospect (i.e., construct a past self that is worse than it was in reality) in order to align their perceived change with the salient implicit theory, and this is especially likely in the absence of objective evidence.

Furthermore, implicit theories of development can be primed by external factors and these situationally activated theories similarly influence temporal self-comparisons. Illustrating this, students who were randomly assigned to enroll in a 3-week study skills program (which activated the implicit development theory that study skills should improve) retroactively derogated their initial skill level, thereby confirming their expectations of improvement (Conway and Ross 1984). Specifically, Conway and Ross collected self-evaluations of study skills before the program began and after the program ended, and they also instructed participants to recall their initial self-evaluation at the end of the program. Students who participated in the program—those for whom the implicit theory was primed—recalled self-evaluations that were consistently

lower than the initial self-evaluations, whereas students in the control condition demonstrated no such bias in recall.

Relatedly, a growing body of research has found that active self-enhancement motives (i.e., the desire to feel good about oneself) can shape temporal self-comparisons and perceptions of change (Ross and Wilson 2002; Wilson and Ross 2001; McFarland and Alvaro 2000). According to temporal self-appraisal theory (Wilson and Ross 2000; 2001), recent past selves have stronger implications for current self-regard than do distant past selves. As a result, people are willing to denigrate distant past selves for the sake of concluding that they have improved over time—a conclusion that has positive implications for the current self. Demonstrating that such disparagement of past selves serves to satisfy self-enhancement motives, McFarland and Alvaro (2000) directly manipulated self-threat before measuring people’s evaluations of their past and present selves on various attributes. In general, people rated their present self more favorably than their past self; however, this was more pronounced for those in the threat condition, and this difference was entirely attributable to ratings of the past self. Whereas, self-threat did not affect ratings of the present self, it decreased ratings of the past self. Further indicating the influence of self-enhancement motives on temporal comparisons, studies have found that people generally perceive greater improvement in themselves than do more objective observers (McFarland and Alvaro 2000), and people perceive greater improvement in themselves than they perceive in close others (Wilson and Ross 2001).

Given that the distance from a past self dictates the willingness to derogate that past self, it follows that factors which make the past *feel* more distant, regardless of objective distance, should ultimately influence perceptions of change. For example, simply framing the same point in the past as the “distant past” versus the “recent past” can increase how remote a past self feels

and thus the likelihood of derogating that past self (Wilson and Ross 2001). Likewise, perceptual manipulations such as depicting the same point (e.g., 5 years ago) on a shorter timeline (e.g., spanning from 10 years ago to today) versus a wider timeline (e.g., spanning from 20 years ago to today) can increase subjective distance from a past self and the willingness to derogate the past self (Ross and Wilson 2003). Taken together, prior research suggests that comparing the present self to the same point in the past can yield different conclusions about how much one has changed, depending on situational variables.

Notably, social comparisons may also be constructed and malleable to situational factors; however, the construction of social comparisons fundamentally differs from the construction of temporal comparisons. Specifically, when constructing temporal comparisons, situational factors tend to influence perceptions of the past self, but not perceptions of the present self (McFarland and Alvaro 2000). That is, during temporal comparisons, perceptions of the present self are relatively fixed and used as an anchor from which people adjust to create judgments of the past self. In contrast, when constructing social comparison judgments, situational factors tend to influence perceptions of the (present) self, but not perceptions of the other person (Brown 2012). That is, during social comparisons, perceptions of the other (i.e., the social standard) are relatively fixed and used as an anchor from which people adjust to create judgments of the present self. In short, construction of temporal comparisons focuses on the past selves whereas construction of social comparisons focuses on the present self. This difference in temporal focus could have divergent downstream consequences, which we discuss in greater detail later in this chapter.

## Related Research Questions

Several interesting questions stem from the notion that situational factors can shape temporal self-comparisons and perceptions of change. For example, how might incidental mood states influence people's temporal comparison judgments and downstream behaviors? A large body of consumer research has examined the effects of incidental mood on judgments (see Cohen, Pham, and Andrade 2008 for a review), but this literature yields conflicting predictions of how mood could affect temporal self-comparisons. On one hand, the affect confirmation hypothesis states that people disproportionately weight information that is consistent with their mood (Adaval 2001). Thus, positive moods might cause people to overweight evidence that they have improved over time and underweight evidence to the contrary, thereby inflating self-improvement perceptions on balance. On the other hand, the mood-as-a-resource hypothesis states that positive mood provides a buffer against threatening information, thereby reducing defensiveness and self-serving biases (Aspinwall 1998; Raghunathan and Trope 2002; Trope and Neter 1994). Accordingly, positive moods might enable people to be more honest and less self-serving in their temporal self-comparisons, thereby deflating self-improvement perceptions. One promising avenue for future research would be to reconcile these conflicting perspectives.

Another question of particular relevance to marketers is whether temporal comparisons of brands and products are similarly malleable. Consumers often make temporal comparisons of products and brands when deciding whether to upgrade to a new version of a product (e.g., from the iPhone 5 to the iPhone 6). According to prior research on product upgrade behavior, the perception of improvement in a product line or in a brand is a key driver of the decision to upgrade (Cripps and Meyer 1994; Novemsky and Kahneman 2005; Okada 2001, 2006).

However, this literature has remained silent on the drivers of these brand/product improvement perceptions and the sensitivity of these temporal brand comparisons judgments to situational factors. One such factor that could potentially shape product improvement judgments is the salience of self-improvement. Indeed, research on the self and identity has demonstrated that active self-relevant information has a powerful influence on external judgments. Specifically, people's attitudes toward themselves (i.e., self-esteem) and perceived personal attributes often transfer to external entities, especially when they are self-connected (Gawronski, Bodenhausen, and Becker 2007; Greenwald et al. 2002; Krueger and Clement 1994; Naylor, Lamberton, and Norton 2011; Perkins and Forehand 2011; Weiss and Johar 2013). Thus, it is possible that salient perceptions of improvement in the self may color perceptions of improvement in products and consequently motivate product upgrades.

Finally, just as implicit theories of human development influence temporal self-comparisons (McFarland et al. 1992; Ross 1989), consumers might also hold implicit theories about temporal change in products and brands that similarly influence temporal comparisons of brands. For example, there may be some specific product categories in which people generally expect to see greater improvement over time (e.g., computers, mobile phones), and others in which people generally expect relatively little change over time (e.g., food, furniture). Temporal comparisons of products in these categories may be constructed to confirm these expectations. Likewise, consumers may hold different implicit theories for different brands within the same category. For example, consumers might expect a performance apparel brand like Nike to continually innovate and improve, but expect a heritage apparel brand like Brooks Brothers to remain more or less the same over time. In general, testing the construction and malleability

principle in the context of temporal comparisons of brands could yield novel insights about the formation of brand perceptions.

## **TEMPORAL FOCUS FLEXIBILITY**

### Evidence of the Temporal Focus Flexibility Principle

Perhaps one reason that the topic of temporal self-comparisons has received relatively little attention in consumer research is that people generally expect them to operate in much the same way as social comparisons. Indeed, for each proposition in Albert's (1977) temporal comparison theory, there is a corresponding principle in Festinger's (1954) social comparison theory. The main difference in these two seminal works is that where Festinger discussed other people as a standard of comparison, Albert discussed past selves as a standard of comparison. On the surface, this may appear a fairly trivial difference, but it actually reveals a more consequential/fundamental distinction between the two types of comparisons. Whereas social comparisons involve only one self (the present self) and thus one source of self-regard, temporal comparisons involve multiple selves (the present and past/future selves) and thus multiple sources of self-regard.

Identity research has long held that the self-concept comprises multiple temporal dimensions—past, present, and future selves (Albert 1977; Markus and Nurius 1986; Markus and Wurf 1987)—and people vary both dispositionally and situationally in their tendencies to primarily focus on one temporal dimension (i.e., temporal focus; Holman and Silver 1998; Shipp, Edwards, and Lambert 2009; Zimbardo and Boyd 1999). As temporal comparisons

(unlike social comparisons) heighten the salience of multiple temporal dimensions of the self, people have greater flexibility in temporal focus. That is, individuals can focus on both the past and present selves, they can focus selectively on the past self, or they can focus selectively on the present self.

Unsurprisingly, as the present (vs. past or future) self is generally more salient (Ross 1989) and has stronger implications for current self-regard (Wilson and Ross 2001), present focus tends to predominate (Shipp et al. 2009). That said, considerable anecdotal evidence suggests that people often focus on the past and bask in past glory when they have declined over time. For example, we have all encountered that overweight former athlete who desperately hangs on to his glory days as a star running back. Although his fitness has declined over time and the comparison standard (his younger, fitter self) is far superior to his current self, he can still feel good about himself by reliving those memories. Consistent with this, temporal self-appraisal theory predicts that in addition to derogating past selves in service of self-enhancement motives, elevating the past self is a potential route to self-enhancement in the face of objective decline (Ross and Wilson 2000). Thus, in general, prior research suggests that temporal self-comparisons provide a menu of selves, allowing individuals to attend to whichever self suits their fancy at a given time.

### Related Research Questions

Based on the temporal focus flexibility principle, one important question is how past versus present temporal focus will influence the motivational consequences of temporal self-comparisons. For example, when people make favorable temporal comparisons (i.e., when

improving), focusing on the past (vs. present) self may highlight the amount of progress they have made, which could ultimately reduce further self-improvement strivings. Consistent with this, prior research on goal pursuit has found that goal progress often begets disengagement (Fishbach and Dhar 2005; Fishbach, Dhar, and Zhang 2006). Alternatively, focusing on the past self may heighten a fear of relapse that ultimately encourages people to pursue further improvement, consistent with the motivational influence of feared possible selves (Hoyle and Sherrill 2006; Markus and Nurius 1986). Further still, focusing on an inferior past self could activate self-verification motives, a desire to confirm one's perceptions of the present self (Swann 1983; Swann and Read 1981), which could ultimately incite self-improvement efforts. Indeed, prior work suggests that being confronted with a dissimilar past self should prompt attempts to confirm one's current self-views (Albert 1977). Accordingly, when people perceive themselves to be better than they were in the past, approaching self-improvement behaviors could serve to verify this.

Likewise, there are a number of interesting possibilities regarding the effects of past (vs. present) temporal focus when people make unfavorable temporal comparisons (i.e., when declining). From a goal pursuit perspective, focusing on the past should spur improvement efforts as it highlights how one's lack of progress toward some desired standard (Fishbach and Dhar 2005; Fishbach, Dhar, and Zhang 2006). On the other hand, focusing on the past could license disengagement from self-improvement pursuit, because people are basking in past glory and the resulting pride can have demotivating consequences (Wilcox, Kramer, and Sen 2011). Further still, focusing on the superior past self could activate self-verification motives, as people wish to confirm not just their positive current self-perceptions, but also their negative current self-perceptions (Swann 1983). Thus, when people perceive themselves to be worse than they

were in the past, avoiding self-improvement behaviors could serve to verify this. Future research should examine the implications of temporal focus flexibility principle as well as the process through which temporal focus interacts with the direction of temporal comparison.

## **CONCLUSION**

In the chapters that follow, we present two sets of experiments that examine different research questions arising from the proposed tenets of temporal comparisons. Chapter 2 concerns the construction and malleability principle. Particularly, we investigate how contextual factors—namely, the salience of one’s own self-improvement—can influence temporal comparisons of brands and subsequent product upgrade decisions, thereby demonstrating that the construction and malleability principle also characterizes temporal comparisons of external entities such as brands and products. Chapter 3 considers the improvement affinity principle, and the question of when temporal decline will increase the pursuit of self-improvement. Specifically, we test the moderating role of social standing—whether individuals are better or worse than others on the dimension of decline—to illuminate the underlying motives that drive how individuals respond to temporal decline.

## **Chapter II. Temporal Egotism: Temporal Self-Comparisons as an Anchor for Brand Improvement Judgments**

Brands commonly release “new and improved” versions of their existing products, an event that in extreme cases can draw crowds of overnight campers who are eager to upgrade. A chief concern among marketers is how to best motivate such upgrades. Although it is well known that upgrade probability increases with increased perceptions of improvement, innovativeness, and novelty (Cripps and Meyer 1994; Grewal, Mehta, and Kardes 2004; Novemsky and Kahneman 2005; Okada 2001, 2006), relatively little consumer research has investigated the drivers of these perceptions. The present research focuses on a novel means of enhancing perceptions of product innovativeness: the generalization of the consumer’s personal sense of improvement to self-associated brands. In short, consumers who are encouraged to focus on their own improvement are more likely to perceive corresponding improvement in self-associated brands.

The impetus for this proposed method of influencing product improvement perceptions is research on implicit egotism that suggests that the self is a primary reference point in evaluations of external entities such as brands, products, and other people and that individuals often see themselves in self-connected entities. For instance, consumers non-consciously project their global self-esteem (i.e., overall attitudes toward the self) onto self-connected brands, products, and social groups (Brendl et al. 2005; Gawronski, Bodenhausen, and Becker 2007; Gramzow & Gaertner 2005; Pelham, Mirenberg, and Jones 2002; Perkins and Forehand 2011). Moving beyond basic attitudinal judgments, consumers also project their personal attributes (e.g., creativity) onto self-associated products (Weiss and Johar 2013) and project their personal preferences and tastes onto self-associated people (Krueger and Zeiger 1993; Naylor, Lambertson,

and Norton 2011). In a similar vein, we propose that consumers may reference their own self-improvement when assessing improvement in brands, and thereby project their perceptions of self-improvement onto self-connected brands and products. Thus, the more consumers perceive themselves to be improving, the more they will believe that self-connected brands have improved, which consequently increases product upgrade intentions.

This research is the first to examine whether implicit egotism extends beyond the present self to comparisons between past and present selves, an effect we term temporal egotism. In four studies, we assess whether perceived global self-improvement influences perceived product improvement and intentions to upgrade, contingent on self-brand connection. Consistent with prior related research (Fenigstein and Abrams 1993; Marks and Miller 1987), we posit that the underlying mechanism has both cognitive and motivational components. To explore the cognitive component, we test the moderating role of situational self-focus (studies 1 and 2) and trait self-consciousness (study 3), both of which should influence the accessibility of the self as a reference point for judgment (Fenigstein and Abrams 1993; Fenigstein, Scheier, and Buss 1975; Weiss and Johar 2013). To investigate the motivational component, we examine whether temporal egotism increases as the personal importance of improvement increases (study 2). Such a moderation would implicate motivational drivers given that past research has observed that the projection of personally important attributes is self-enhancing (Crano 1983; Marks and Miller 1987). Moreover, we test whether the effect of self-improvement reverses for brands that consumers are especially motivated to see as dissimilar from themselves (study 3).

The contributions of this research are threefold. First, we identify a new identity-based process that may influence consumers' likelihood to upgrade, thereby advancing the literature on product upgrade decisions (Cripps and Meyer 1994; Grewal, Mehta, and Kardes 2004;

Novemsky and Kahneman 2005; Okada 2001, 2006; Zhu, Chen, and Dasgupta 2008). Secondly, we enrich consumer research on implicit egotism (Brendl et al. 2005; Gawronski, Bodenhausen, and Becker 2007; Perkins and Forehand 2011; Weiss and Johar 2013) by demonstrating that a more broadly conceptualized self than previously examined—one that includes both past and present temporal dimensions (Albert 1977; Markus and Wurf 1987)—can serve as a reference point for brand judgments. Finally, by examining the effects of perceived improvement between past and present selves on product improvement judgments and upgrade decisions, this research also stands as one of the first systematic investigations of temporal self-comparisons (Albert 1977; Wilson and Ross, 2001; Zell and Alicke 2009) in consumer behavior.

## **PRODUCT UPGRADE DECISIONS AND PERCEIVED PRODUCT IMPROVEMENT**

A modest but growing body of literature has investigated psychological factors that influence consumers' decisions to upgrade to newer versions of products they already own. Generally, this work has examined the monetary and psychological costs and benefits involved in product upgrade decisions, as well as factors that attenuate or accentuate these costs and benefits (Novemsky and Kahneman 2005; Okada 2001, 2006; Zhu, Chen, and Dasgupta 2008). Importantly, most of this work directly or indirectly implicates the critical role of perceived global improvement in the product.

Specifically, prior research has invoked the sunk cost effect (Arkes and Blumer 1985) to inform consumers' upgrade decision process. Consumers are reluctant to upgrade to newer versions of products before they feel they have “gotten [their] money's worth” from the older version that they currently own (Okada 2001, p. 435). However, the perceived magnitude of

improvement between the old and new versions of the product can temper this loss aversion and increase consumers' product upgrade behavior (Novemsky and Kahneman 2005; Okada 2006). Illustrating this, Okada (2006) found that consumers were more willing to upgrade when the newer version of a product included entirely novel features rather than mere improvements on existing features (see also Cripps and Meyer 1994; Grewal, Mehta, and Kardes 2004).

Although previous research explicitly highlights the key role of perceived improvement and novelty in product upgrades, the drivers of these critical perceptions remain unexplored. Drawing on research on implicit egotism (Brendl et al. 2005; Gawronski, Bodenhausen, and Becker 2007; Perkins and Forehand 2011) and egocentric biases (Krueger and Zeiger 1993; Naylor, Lambertson, and Norton 2011; Weiss and Johar 2013) we propose that the self is an input in brand improvement judgments that ultimately drive product upgrades.

## **SELF-EVALUATIONS AS INPUTS IN PRODUCT EVALUATIONS**

Although perceived self-improvement may not be the first thing that comes to mind when considering potential antecedents of brand improvement judgments, a substantial body of identity research suggests that the self is a dominant basis for most external judgments. Specifically, research on implicit egotism—the automatic transfer of affective evaluations of the self to self-associated stimuli (Brendl et al. 2005; Pelham, Mirenberg, and Jones, 2002)—and egocentric biases—the tendency to overgeneralize from self-perceptions (Clement and Krueger 2000; Krueger and Clement 1994; Ross, Greene, and House 1977)—implicates the self as a foremost reference point. Accordingly, in the tradition of these literatures, we turn to the self as a potential driver of brand improvement judgments and product upgrade decisions. Moreover, self-

improvement perceptions can be directly influenced by marketers through promotional techniques that draw consumers' attention to dimensions on which they have been improving and away from dimensions of decline. In the following sections, we review research supporting the possibility that perceptions of self-improvement can influence brand improvement judgments and product upgrade decisions and develop our specific hypotheses.

### Implicit Egotism: The Self as a Reference in Attitude Judgments

Since people desire consistency in their self-concept, global attitudes toward the self (i.e., self-esteem) should spontaneously transfer to self-associated stimuli (Greenwald et al. 2002). That is, self-esteem serves as a central reference point when evaluating attitudes toward self-associated stimuli, and individuals assimilate their attitudes toward these stimuli to their self-esteem. Indeed, such implicit egotism effects have been demonstrated for a variety of stimuli, from people (Gramzow and Gaertner 2005; Jones et al. 2004) to places (Pelham, Mirenberg, and Jones 2002) to products (Brendl et al. 2005; Perkins and Forehand 2011). Just as higher self-esteem and active self-enhancement motives promote stronger in-group preferences (Gramzow and Gaertner 2005), they also enhance individuals' attitudes toward brands with names that are similar to one's own (Brendl et al. 2005), objects that individuals have consciously chosen (Gawronski, Bodenhausen, and Becker 2007), and brands that are nonconsciously associated with the self (Perkins and Forehand 2011). In fact, recent work suggests that similar implicit egotism mechanisms can account for the endowment effect (Dommer and Swaminathan 2013), whereby the price people are willing to accept for a good tends to be higher than the price they are willing to pay for the same good (Kahneman, Knetsch,

and Thaler 1990). Taken together, these studies demonstrate that individuals tend to automatically assimilate their general attitudes toward self-associated objects to their general attitudes toward themselves. The more people like themselves, the more they like things that are linked to themselves.

Although the implicit egotism literature generally supports the idea that consumers reference the self when making external judgments, prior work in this area focuses exclusively on how self-esteem enters into overall attitudinal judgments of products and brands. In judging the improvement in a product (vs. one's general attitude toward the product), it is likely that self-evaluations more nuanced than global self-esteem will serve as a reference. Specifically, we posit that individuals' perceptions of global self-improvement will be a reference for product improvement judgments. Thus, we turn to research on egocentrism, which has shown similar effects when making more complex external evaluations than general attitudes.

#### Egocentric Biases: The Self as a Reference in Trait Perceptions

Egocentrism research has demonstrated that individuals transfer not only self-esteem, but also personal traits, beliefs, preferences, and tastes to external entities. According to the well-documented false consensus effect (Ross, Greene, and House 1977), people generally overestimate the prevalence of their personal preferences and traits. For example, individuals who enjoy science tend to perceive this preference as more common in society than those who do not (Krueger and Zeiger 1993); likewise, individuals who are risk averse tend to perceive this trait as more common in society than those who are not (Krueger and Clement 1994). In fact, such egocentric biases have been shown to increase the perceived similarity of ambiguous

reviewers and, consequently, the persuasiveness of their product reviews (Naylor, Lamberton, and Norton 2011). Of particular relevance to the present research, recent work has demonstrated similar egocentric biases in product judgments—that is, consumers reference their personal traits not just when evaluating corresponding traits of other people, but also when evaluating brands and products (Weiss and Johar 2013).

Importantly, similar to implicit egotism, research on egocentrism has observed that the likelihood of self-content transfer increases with strength of association between the self and the stimulus. For example, Krueger and Zeiger (1993) found that false consensus effects arose for judgments of in-group members, but not out-group members. Similarly, Naylor, Lamberton, and Norton (2011) found that consumers project their tastes onto ambiguous product reviewers to have similar tastes except when the perceived link between the self and the reviewer is undermined. In the context of product judgments, Weiss and Johar (2013) found that people project their own traits onto products they own but not products they do not own. In general, the leading explanation for these egocentric biases is a cognitive one—the self and self-related information are typically more accessible than other potential reference points, and people tend to anchor on salient reference points (Krueger and Clement 1994; Naylor, Lamberton, and Norton 2011; Weiss and Johar 2013). Thus, when evaluating external stimuli on a specific dimension (e.g., creativity), people will anchor on their own corresponding self-perceptions. Insofar as the target stimulus is self-associated, people will assimilate their judgments of the stimulus to their own corresponding self-perceptions.

When making brand improvement judgments, the corresponding self-perception is not so much a judgment of how one is at a fixed point in time, but how one differs between two points in time. Thus, we posit that the relevant anchor will be perceived self-improvement over time. In

the present research, we focus on perceptions of global self-improvement, rather than self-improvement on a particular dimension, as the anchor for global brand improvement judgments. That said, we believe that similar effects should arise when consumers focus on a particular dimension of self-improvement and evaluate brands on that same dimension. Ultimately, however, correspondence between the dimension of self-improvement and the dimension of brand improvement is not necessary for the predicted effects to arise.

#### Temporal Egotism: The Self as a Reference in Product Improvement Judgments

Identity research has long held that the self-concept is multifaceted, comprising components beyond the person we are at the present moment (Markus and Wurf 1987). Self-discrepancy theory (Higgins 1987) posits that in addition to who we actually are, the self consists of the person we would like to be (i.e., the ideal self) and the person we think we should be (i.e., the ought self). Likewise, temporal comparison theory (Albert 1977) maintains that we have multiple temporal selves: Beyond the person we currently are (i.e. the present self), the self consists of the person we were before (i.e., the past self) and the person we expect to be in the future (i.e., the future self). Most extant research on implicit egotism has only examined the effects of the present self on product judgments, and the role of other facets of the self-concept, such as the past self, remains in question. Indeed, recent research has explicitly called for more work investigating whether consumers assimilate product judgments to facets “beyond the actual self, such as the ideal, ought, or future self” (Weiss and Johar 2013, p. 200).

The present research tests whether self-improvement perceptions, which involve not just the present self but also past selves, can color perceptions of improvement in products. We

propose that product improvement judgments will reflect consumers' self-perceptions, much like product attitude and product attribute judgments. Importantly, prior research on related topics has found that a psychological connection between the self and the brand is necessary for consumers to project their self-evaluations onto brands. For example, the crux of implicit egotism is the notion that people want their attitudes toward themselves and their attitudes toward self-associated stimuli—extensions of the self (Belk 1988)—to be consistent (Greenwald et al. 2002). In fact, this holds even when the self-association is formed non-consciously (Perkins and Forehand 2011). In a similar capacity, others have used practical manipulations like ownership as a proxy for this underlying self-association. For example, Weiss and Johar (2013) found that for people who tend to use product ownership as a cue for self-association (i.e., when “mine-me sensitivity” is high), ownership increased the assimilation of product judgments to personal attributes. Likewise, we predict that consumers will use the self as a reference point and project their own self-improvement onto brands when self-brand connection (SBC; Escalas and Bettman 2003) is high, but not when SBC is low. Consequently, these product improvement judgments should increase the likelihood of upgrading, as suggested by prior research (Okada 20001, 2006). Notably, directly examining SBC rather than using a proxy such as ownership also provides the methodological benefit of eliminating the need for additional factors (e.g., mine-me sensitivity) in our design. Stated formally,

**H1a:** Individuals who see themselves as improving (vs. stable) will perceive greater improvement in brands/products when SBC is high, but not when SBC is low.

**H1b:** There will be an indirect effect of self-improvement on product upgrade intentions through perceived improvement in brands/products when SBC is high.

## Evidence of the Temporal Egotism Mechanism: Moderation by Self-Focus

Further consistent with prior egocentrism research, we expect that the effect of perceived self-change on brand improvement judgments will be more likely when situational or dispositional self-focus—the trait or state of directing attention toward the self (Scheier and Carver 1985)—is higher. This follows from the notion that higher self-focus should increase the accessibility of self-related information as a reference point (Fenigstein and Abrams 1993; Fenigstein, Scheier, and Buss 1975; Weiss and Johar 2013). For example, Fenigstein and Abrams (1993) found that both experimentally manipulated and measured self-focus positively predicted false consensus biases. Similarly, Weiss and Johar (2013) demonstrated that individuals higher in dispositional self-focus were more apt to anchor product evaluations on their personal traits. Thus, as evidence of the underlying temporal egotism process, we predict that self-focus will moderate the extent to which consumers anchor brand improvement judgments on their perceived self-improvement. Stated formally,

**H2:** The interactive effects of perceived self-improvement and SBC on brand/product improvement judgments will be accentuated when self-focus is high and attenuated when self-focus is low.

## Motivational Drivers of Temporal Egotism

Leading accounts of implicit egotism and egocentric biases suggest that these effects are driven by both cognitive factors and motivational factors. As discussed earlier, the main cognitive factor is the accessibility of self-related information as a reference point (Fenigstein

and Abrams 1993; Naylor, Lamberton, and Norton 2011; Weiss and Johar 2013). Furthermore, prior research has identified self-enhancement, or the desire to feel positively about oneself, as a key motivational factor (Brendl et al. 2005; Gramzow and Gaertner 2005; Marks and Miller 1987; Sherman, Presson, and Chassin 1984). Generally, this research suggests that people can satisfy chronic and pervasive self-enhancement motives by projecting their personal attributes onto external targets, as seeing one's attributes in the external world reinforces the favorability of the self. Attesting to this underlying self-enhancement motive, prior research demonstrates that people are more likely to project their self-perceptions and beliefs in domains that are personally important (Crano 1983; Marks and Miller 1987; Sherman et al. 1984)—that is, domains on which self-worth is more contingent. Of note, this mirrors research showing greater self-esteem maintenance and self-enhancement efforts in domains of personal relevance, as these domains are foundational to the self-concept (Crocker and Wolfe 2001; Tesser, Millar, and Moore 1988).

We similarly suggest that temporal egotism is not a purely cognitive, accessibility-based process but instead is also driven by motivational inputs such as self-enhancement motives. Insofar as self-enhancement influence temporal egotism processes, then the projection of one's self-improvement onto self-connected brands should be more likely when the attribute improvement is personally important. As suggested by prior work (Crano 1983; Marks and Miller 1987; Sherman et al. 1984), projecting one's attributes—here, improvement—onto external entities serves to affirm the favorability of the self and should be especially effective when improvement is a personally valued attribute. Accordingly, we hypothesize the following:

**H3:** Temporal egotism effects should be accentuated among individuals for whom improvement is personally important.

Moreover, to the extent that temporal egotism is motivated, then consumers should not only assimilate judgments of self-connected brands to their own self-improvement, but may also contrast judgments of strongly dissociative brands from their own self-improvement. Indeed, prior research in this area suggests that consumers are motivated to perceive dissociative objects (i.e., objects with negative self-connection) as opposite from the self (Gawronski, Bodenhausen, and Becker 2007; Weiss and Johar 2013). Given the critical importance of high self-brand connection to the hypothesized temporal egotism effect, we propose that judgments of strongly dissociative brands will diverge from consumers' perceptions of self-improvement, a contrastive temporal egotism effect. That is, focusing on one's own self-improvement will actually decrease perceptions of improvement in self-disconnected brands. This leads to the following hypothesis:

**H4:** If there is a motivational component to temporal egotism, then the effect should reverse when evaluating dissociative brands.

## **PILOT STUDY**

The objective of the pilot study was to test the core prediction that consumers will assimilate brand improvement judgments to their perceptions of self-improvement when SBC is higher, but not when it is lower. Thus, we measured perceptions of self-improvement and SBC with Apple as our key independent variables, and we measured perceptions of improvement between the Apple iPhone 5 and Apple iPhone 6 and intentions to upgrade from the iPhone 5 to the iPhone 6 as the key dependent measures.

## Method

*Participants.* One hundred and one participants (45 females; median age = 31 years) from Amazon's Mechanical Turk panel completed this study in exchange for a nominal fee.

*Procedure.* First, to ensure that self-focus was high enough and perceptions of self-improvement were salient enough for any potential effects to emerge, all participants were instructed to list three important, positive ways they had improved over the past ten years. Next, participants completed a product evaluation task, designed to mirror the experience of shopping online for a new phone, in which they viewed a chart comparing the features and specifications of the Apple iPhone 5 and the Apple iPhone 6. This presentation mimics the side-by-side comparison feature frequently used by online retailers. After viewing the information about the two phones, participants rated the extent to which the iPhone 6 is "an improvement over the iPhone 5" on a 1 (*not at all*) to 7 (*very much*) scale and then indicated their WTP to upgrade from the iPhone 5 to the iPhone 6 on a \$0 to \$500 sliding scale. Finally, participants rated and their subjective perceptions of self-improvement by responding to the questions "In general, how much improvement have you experienced over the past five years?" on a 1 (*very little improvement*) to 7 (*a lot of improvement*) scale and "In general, to what extent have you changed over the past five years?" on a 1 (*not at all*) to 7 (*very much*) scale. These latter two items were averaged to form an index of perceived self-improvement ( $\alpha = .85$ ). They also rated their SBC with Apple using three items based on Escalas and Bettman's (2003) scale ( $\alpha = .95$ ). See appendix A1 for all stimuli and measures used in the pilot study.

## Results

As predicted, a linear regression of brand improvement ratings on mean-centered perceived self-improvement, mean-centered SBC, and their interaction revealed a significant main effect of SBC ( $b = .19, t = 2.23, p < .05$ ), qualified by a significant self-improvement x SBC interaction ( $b = .15, t = 2.31, p < .05$ ). There were no other significant effects. To probe this interaction, we applied the Johnson-Neyman technique (Spiller et al. 2013), which indicated that the simple effect of perceived self-improvement was significant and positive at any level of mean-centered SBC above 1.16 ( $b_{JN} = .30, t = 1.98, p = .05$ ), which corresponds to a raw SBC score of 4.25 out of 7. In other words, for strongly self-connected brands, higher perceptions of self-improvement were associated with higher brand improvement evaluations, as predicted. Figure 1 illustrates these results. A similar analysis of WTP to upgrade revealed a significant main effect of SBC ( $b = 24.53, t = 4.52, p < .001$ ), but a nonsignificant main effect of self-improvement and a nonsignificant interaction (all  $t$ s  $< 1.20$ , NS).

Additionally, we tested whether the interactive effect of perceived self-improvement and SBC on brand improvement judgments mediated WTP. Specifically, following bootstrapping procedures, we conducted moderated mediation analysis using Hayes's (2012) PROCESS macro (model 8; 5,000 bootstrapped samples). This analysis revealed a significant positive indirect effect of self-improvement on WTP through brand improvement at one standard deviation above the mean of SBC (effect = 6.37; 95% CI: .09, 17.89), but a nonsignificant negative indirect effect at one standard deviation below the mean of SBC (effect = -2.29; 95% CI: -9.85, 2.29). Thus, for strongly self-connected brands, higher perceived self-improvement increased brand improvement judgments, which consequently increased WTP to upgrade.

## Discussion

Supporting hypothesis 1a, the pilot study provided initial evidence suggesting that consumers assimilate brand improvement judgments to their perceptions of self-improvement when SBC is high, but not when SBC is low. This finding mirrors prior work demonstrating the effects of consumers' self-evaluations and self-brand associations on product attitudes (Gawronski, Bodenhausen, and Becker 2007; Perkins and Forehand 2011) and product trait perceptions (Weiss and Johar 2013). However, unlike extant research on implicit egotism and egocentric biases, the focal self-evaluation here involves multiple temporal selves. Furthermore, supporting hypothesis 1b, product improvement judgments mediated WTP to upgrade from the older to the newer version of the focal product. Notably, this latter finding is aligned with previous research suggesting that the perception of improvement in a brand or product is integral to upgrade decisions (Okada 2001, 2006).

Although the results of the pilot study were generally consistent with our predictions, the correlational design precludes firm causal inference. Study 1 improves upon the pilot study by manipulating rather than measuring perceived self-improvement. Specifically, participants describe ways that they have improved over time or ways that they have remained the same over time. Furthermore, study 1 provides an initial test of the proposed underlying mechanism (hypothesis 2) by examining the moderating role of situational self-focus. Specifically, half the participants will focus on a friend (rather than the self) and describe ways their friend has improved or remained the same.

Importantly, this self-focus manipulation allows us to rule out alternative explanations. For example, it is possible that our manipulation of perceived self-improvement is simply a manipulation of implicit theories—the extent to which people believe that change is possible (Dweck, Chiu, and Hong 1995). By manipulating whether people focus on how they have improved over time or how they have remained the same, we may potentially be priming implicit theories of change which in turn can drive product improvement judgments. Relatedly, we may simply be priming the concept of improvement more generally, which could subsequently influence participants’ perceptions of the brands and products they encounter. Indeed, classic research on priming (Herr 1986; Srull and Wyer 1979) has demonstrated that activating a trait concept (e.g., hostility) can lead individuals to perceive the world around them as consistent with the activated concept (e.g., judging others’ ambiguous behavior as more hostile). Here, priming the concept of improvement may cause individuals to see brands in a consistent light.

By manipulating whether the focus is the self or a friend, we can directly test our proposed temporal egotism account against these alternative explanations. If the proposed effect results from temporal egotism, then improvement in the self, but not improvement in a friend, should increase product improvement perceptions—that is, self-focus should moderate the effect. On the other hand, if the effects result from simply priming implicit theories of change or the general concept of improvement, then it should not matter whether the improvement is in the self or a friend—that is, self-focus should not moderate the effect.

## STUDY 1

Having obtained preliminary support for the predicted effect, in study 1 we examine the underlying process by testing the moderating effect of situational self-focus. We predict that perceived self-improvement will interact with SBC and self-focus to influence brand improvement judgments. When SBC is high, perceived improvement in the self (but not in a friend) will increase brand improvement judgments and product upgrade intentions. However, if the alternative processes (priming implicit theories or the general concept of improvement) are at play, then perceived improvement in both the self and a friend should increase brand improvement judgments and upgrade intentions (i.e., a main effect of perceived improvement but no interaction with self-focus).

### Pretest

We conducted a pretest to verify the effectiveness of the perceived self-improvement manipulation we use throughout the rest of the paper. One hundred and twenty-eight U.S. participants (45 females; median age = 30) from Amazon's Mechanical Turk panel completed this pretest in exchange for a nominal fee. To manipulate perceived self-improvement, participants were randomly assigned to focus on ways they have improved or remained the same over time. Specifically, those in the improvement condition listed three personally important positive ways they have changed over the past five years, while those in the stability condition listed three personally important positive ways they have remained the same over the past five years. Next, participants rated their subjective perceptions of self-improvement by responding to

the question, “In general, how much improvement have you experienced over the past five years?” on a 1 (*very little improvement*) to 7 (*a lot of improvement*) scale. Participants then rated the difficulty of generating the three examples of improvement or stability on a 1 (*very easy*) to 7 (*very difficult*) scale. Finally, participants reported their age and gender.

As expected, a one-way ANOVA yielded no effect of our manipulation on difficulty ratings ( $M_{\text{stability}} = 3.11$ ,  $M_{\text{improvement}} = 3.01$ ,  $F < 1$ , NS). Further supporting the appropriateness of the manipulation, a one-way ANOVA revealed that participants in the improvement condition judged themselves as having improved more over the past five years ( $M = 5.12$ ) than those in the stability condition ( $M = 4.62$ ,  $F(1, 126) = 4.65$ ,  $p < .05$ ). Having confirmed that the manipulation is effective, we now proceed to the main study.

## Method

*Participants.* One hundred and twenty-eight participants (50 females; median age = 27) from Amazon’s Mechanical Turk panel completed this study in exchange for a nominal fee.

*Procedure.* Participants were randomly assigned to one of four conditions in a 2 (perceived change: improvement vs. stability) x 2 (self-focus: self vs. other) between-subjects design with SBC as a measured independent variable. First, participants reported their SBC with Samsung on a 0 (*strongly disagree*) to 100 (*strongly agree*) sliding scale using Escalas and Bettman’s (2003) 7-item measure ( $\alpha = .96$ ). To manipulate improvement, half of the participants described important, positive ways they have been changing or important, positive ways they

have remained stable over time. To manipulate self-focus, respondents completed their assigned improvement (or stability) descriptions either for themselves or for a friend.

As in the pilot study, participants then viewed side-by-side images of the Samsung Galaxy S4 and Samsung Galaxy S5 mobile phones, underneath which was a chart comparing the features and specifications of the two phones. Next, participants rated the improvement between the Samsung Galaxy S4 and Samsung Galaxy S5 using five items. Specifically, they evaluated the similarity and difference between the phones on two 7-point items anchored with (*not at all different / very different*) and (*not at all similar / very similar*). They also rated the phones on a 7-point item anchored by “the S5 is much worse (much better) than the S4” and rated the extent to which the newer version is an improvement on the older version using a 1 (not at all) to 7 (very much) item. As a final measure of brand improvement perceptions, participants selected one of seven increasingly overlapping Venn diagrams that represented the change between the Samsung Galaxy S4 and Samsung Galaxy S5. We reverse-coded the necessary items and averaged the five measures to form an index of perceived brand improvement ( $\alpha = .81$ ). Participants then indicated their likelihood of upgrading from the Samsung Galaxy S4 to the Samsung Galaxy S5 if they had the opportunity on a 1 (*unlikely*) to 7 (*likely*) scale.

Next, participants completed manipulation checks. Participants in the self-focus (other-focus) condition rated their agreement with the statements, “During the self-assessment task, I was thinking of ways that I have (my friend has) been changing over time” and “During the self-assessment task, I was thinking of ways that I have (my friend has) been stable over time.” Finally, participants reported their age and gender and completed a suspicion probe. See appendix A2 for all manipulations, stimuli, and measures used in study 1.

## Results

*Manipulation Checks.* For those who focused on the self, a one-way ANOVA of thoughts about personal change revealed that participants in the improvement condition thought about how they have been changing ( $M = 6.34$ ) more than those in the stability condition ( $M = 2.94$ ,  $F(1, 61) = 72.88$ ,  $p < .001$ ). A similar ANOVA on thoughts about personal stability found that participants in the stability condition thought about how they have remained the same ( $M = 6.06$ ) more than those in the improvement condition ( $M = 2.59$ ,  $F(1, 61) = 65.15$ ,  $p < .001$ ).

Likewise, for those who focused on a friend, a one-way ANOVA of thoughts about the friend's improvement revealed that participants in the improvement condition thought about how their friend has been changing ( $M = 6.25$ ) more than those in the stability condition ( $M = 1.79$ ,  $F(1, 63) = 170.51$ ,  $p < .001$ ). A similar ANOVA of thoughts about the friend's stability showed that participants in the stability condition thought about how their friend has remained the same ( $M = 6.67$ ) more than those in the improvement condition ( $M = 2.53$ ,  $F(1, 63) = 135.37$ ,  $p < .001$ ). Finally, no participants guessed our hypothesis in the suspicion probe.

*Brand Improvement Judgments.* Improvement in the Samsung Galaxy was regressed on the following independent variables: perceived self-improvement (contrast-coded), mean-centered SBC, self-focus (contrast-coded), all two-way interactions, and the critical three-way interaction. This revealed a significant main effect of SBC ( $b = .01$ ,  $t = 2.80$ ,  $p < .01$ ) and the predicted three-way interaction among perceived improvement, SBC, and self-focus ( $b = .01$ ,  $t = 2.76$ ,  $p < .01$ ). All other effects were nonsignificant. To explore the three-way interaction, we tested the simple interaction effect of perceived improvement and SBC at the different levels of

self-focus. This revealed a significant perceived improvement x SBC interaction in the self-focus condition ( $b = .01, t = 2.83, p < .01$ ), but not in the other-focus condition ( $|t| < 2, \text{NS}$ ), consistent with a temporal egotism process.

Furthermore, we used the Johnson-Neyman technique (Spiller et al. 2013) to test the simple-simple effects of perceived improvement at the different levels of SBC and self-focus (self vs. other). As predicted, in the self-focus condition, participants who saw themselves as improving (vs. stable) perceived greater improvement in the Samsung Galaxy at any mean-centered SBC score above 17.12 ( $b_{\text{JN}} = .23, t = 1.98, p = .05$ ), which corresponds to a raw SBC score of 54.63 out of 100. That is, at higher levels of SBC, perceived self-improvement increased product improvement judgments. However, in the other-focus condition, participants who saw a friend as improving (vs. stable) did not significantly differ in Samsung Galaxy improvement perceptions at any levels of SBC (i.e., there was no range of SBC values at which the simple-simple effect of perceived improvement was significant). Figure 2 illustrates these results.

*Product Upgrade Intentions.* A similar regression analysis on product upgrade intentions revealed a significant main effect of SBC ( $b = .02, t = 3.17, p < .01$ ) and the predicted three-way improvement x self-focus x SBC interaction ( $b = .02, t = 2.52, p = .01$ ). All other effects were nonsignificant (all  $|t|s < 2, \text{NS}$ ). Underlying the three-way interaction, there was a significant improvement x SBC interaction in the self-focus condition ( $b = .02, t = 2.10, p < .05$ ), but not in the other-focus condition ( $|t| < 2, \text{NS}$ ). Furthermore, we used the Johnson-Neyman technique to test the simple-simple effects of perceived improvement at the different levels of SBC and self-focus. Although the simple-simple effects of improvement were in the predicted direction, at no

level of SBC did the effects reach significance in the self-focus condition (or in the other-focus condition).

*Brand Improvement Mediates Upgrade Intentions.* Additionally, we tested whether the interactive effect of perceived self-improvement, SBC, and self-focus on brand improvement judgments mediated intentions to upgrade from the Samsung Galaxy S4 to the Samsung Galaxy S5. Following bootstrapping procedures, we conducted moderated mediation analysis using Hayes's (2012) PROCESS macro (model 12; 5,000 bootstrapped samples). In the self-focus condition, there was a significant positive indirect effect of self-improvement on upgrade intentions through brand improvement at one standard deviation above the mean of SBC (effect = .39; 95% CI: .11, .68), but a nonsignificant negative indirect effect at one standard deviation below the mean of SBC (effect = -.29; 95% CI: -.81, .08). In the other-focus condition, there were no significant indirect effects through brand improvement, regardless of whether SBC was higher (effect = -.29; 95% CI: -.68, .08) or lower (-.02; 95% CI: -.37, .31). Thus, product improvement judgments mediated upgrade intentions in the self-focus condition, but not in the other focus condition. Among individuals more strongly connected to the brand, perceived improvement in the self (but not in others) increased brand improvement judgments and, consequently, product upgrade intentions.

## Discussion

Consistent with hypothesis 2, study 1 provided evidence of the temporal egotism process underlying brand improvement judgments. Seeing improvement in the self increased perceptions

of improvement in the Samsung Galaxy phone when SBC was high, and these brand improvement judgments subsequently influenced product upgrade intentions. Moreover, these effects disappeared when focusing on improvement in a friend rather than the self. The fact that the assimilation effect arose only in the self-focus condition is consistent with the principle that self-related knowledge holds a privileged position over other potential reference points (Clement and Krueger 2000; Gawronski, Bodenhausen, and Becker 2007; Krueger and Clement 1994). Taking this a step further, here we demonstrate that the personal self on which judgments are anchored can include multiple temporal dimensions. Moreover, the absence of any effects in the friend condition suggests the observed results are not simply due to the priming of incremental implicit theories or the general concept of improvement, both of which could influence brand improvement judgments regardless of self-other condition. Rather, in line with a temporal egotism account, we found that the effects of the self-improvement manipulation occurred only when temporal comparisons focused on the self and when SBC was high.

In study 2 we pursue a more complete understanding of the mechanism driving the obtained temporal egotism effects. In addition to cognitive factors, we proposed that motivational factors such as self-enhancement motives can influence the projection of self-perceptions onto external entities, consistent with prior research (Brendl et al. 2005; Crano 1983; Marks and Miller 1987). If projecting one's highly valued attributes onto the external world satisfies self-enhancement motives, then individuals who strongly value improvement should be more likely to project their self-improvement onto brands. Thus, we examine the moderating role of individual differences in the personal importance of improvement.

## STUDY 2

So far, we have demonstrated that consumers anchor brand improvement evaluations on their own perceptions of self-improvement and provided initial support for the underlying temporal egotism mechanism. In study 2, we seek evidence of both cognitive and motivational components of the temporal egotism mechanism by again manipulating self-focus (i.e., a cognitive factor) and also measuring individual differences in the importance of improvement (i.e., a motivational factor). Specifically, we test whether individuals who highly value improvement will be more likely to project their own salient perceptions of self-improvement onto products with which they identify (hypothesis 3). Finding this pattern of moderation would suggest that egocentric brand improvement judgments may be at least partially motivated.

### Method

*Participants.* One hundred and twenty-six participants (59 females; median age = 32 years) from Amazon's Mechanical Turk panel participated in exchange for a nominal fee.

*Procedure.* Participants were randomly assigned to one of four conditions in a 2 (perceived improvement: improvement vs. stability) x 2 (self-focus: self vs. other) between-subjects design. First, all participants were instructed to identify a highly self-connected mobile phone brand—"a mobile phone brand that you feel very connected to and that represents who you are"—which served as the focal brand in the study. That is, all participants ultimately evaluated a high SBC brand. Next, as in study 1, we manipulated improvement and self-focus.

Specifically, participants either described important, positive ways they have been changing or important, positive ways they have been stable over time. Again, these descriptions were provided either for the self or for a casual friend.

To assess any affective consequences of our manipulations, participants then rated their mood using two 1 (*very bad*) to 7 (*very good*) and 1 (*very unhappy*) to 7 (*very happy*) items ( $\alpha = .96$ ; Fishbach and Labroo 2007). Next, participants rated how much better the mobile phone brand they identified at the beginning of the study is now relative to five years ago on a 1 (*not at all better now*) to 7 (*much better now*) scale, and they rated the extent to which the phone has improved over the past five years on a 1 (*not at all*) to 7 (*very much*) scale. We averaged these two items to form an index of perceived brand improvement ( $\alpha = .90$ ). Participants then rated the likelihood that they would upgrade to a new version of the focal brand's phone, given the opportunity, on a 1 (*unlikely*) to 7 (*likely*) scale.

After this, to assess any role self-esteem may be playing in our effects, participants completed a single-item measure of implicit self-esteem (Gebauer et al. 2008), as well as a subset of items from Heatherton and Polivy's (1991) state self-esteem scale. Specifically, participants responded to the three items with the highest factor loadings for the performance, social, and appearance factors (see Table 1 in Heatherton and Polivy 1991), comprising a nine-item measure ( $\alpha = .81$ ). As a manipulation check, participants then rated their subjective perceptions of self-improvement over the past five years on a 1 (*very little improvement*) to 7 (*a lot of improvement*) scale.

Next, participants reported their age, gender, and whether they currently own a mobile phone made by the brand they evaluated during the study. Finally, they completed a measure of the importance of improvement, the third independent variable. To bolster the practical

usefulness of this factor, we employed a measure that is related to the context of product adoption and that also reflects information readily available to marketers. Specifically, as a proxy for the personal importance of improvement, we measured the importance of having “the most recent electronic products” on a 1 (*not at all*) to 7 (*very much*) scale. We reasoned that consumers who highly desire the most technologically advanced products are also likely to highly value improvement more generally, and we conducted a pretest to verify this. See appendix A3 for all manipulations, stimuli, and measures used in study 2.

*Pretest.* Sixty U.S. participants (22 females; median age = 39) from Amazon’s Mechanical Turk panel completed this pretest in exchange for a nominal fee. Participants responded to two questions in counterbalanced order: “How important is it for you to have the most recent electronic products?” and “To what extent is self-improvement important to you” on 1 (*not at all*) to 7 (*very much*) scales. They then reported their age and gender.

As expected, there was a significant positive correlation between the importance of having the most recent electronic products and the personal importance of self-improvement ( $r = .27, p < .05$ ), suggesting the former is a reasonable proxy for the latter. Notably, most respondents rated the importance of self-improvement highly—88.3% of responses were above the scale midpoint, and the mean importance rating was significantly greater than the scale midpoint ( $M = 5.88, t(59) = 12.21, p < .001$ ). This is consistent with research suggesting that social desirability causes people to exaggerate the importance of self-improvement (Fox and Kahneman 1992) and further supports our use of an indirect measure. Moreover, although marketers may have difficulty inferring which consumers highly value self-improvement, they can easily identify and target those who strongly desire the most technologically advanced

products (e.g., people who frequent tech websites). Thus, from a practical standpoint, this proxy measure is more aligned with the type of information available to marketers. Having verified that the personal importance of having up-to-date products approximates the importance of improvement more generally, we proceed with the main study analyses.

## Results

*Manipulation checks.* A 2 (perceived improvement) x 2 (self-focus) ANOVA on subjective perceptions of self-improvement yielded a significant improvement x self-focus interaction ( $F(1, 122) = 6.27, p = .01$ ), and all other effects were nonsignificant. In the self-focus condition, simple contrasts revealed that those in the improvement (vs. stability) condition reported higher perceptions of self-improvement ( $M = 5.90$  vs.  $4.79, F(1, 122) = 8.56, p < .01$ ). However, in the other-focus condition, there was no significant difference in self-improvement perceptions between those in the improvement and stability conditions ( $M = 4.74$  vs.  $4.94, F(1, 122) < 1, NS$ ). Additionally, we conducted an analysis of brand ownership, which indicated that 94.40% of the participants (119 out of 126 participants) owned the mobile phone brand they identified and evaluated in the study.

To verify that the improvement manipulation was effective in the other-focus condition, a separate group of 60 participants drawn from the same panel completed the same manipulation of their friend's improvement and then rated their friend's improvement on a 1 (*very little improvement*) to 7 (*a lot of improvement*) scale. A one-way ANOVA revealed that those in the other-improvement (vs. other-stability) condition perceived greater improvement in their friend ( $M = 5.68$  vs.  $4.97, F(1, 58) = 5.13, p < .05$ ).

*Brand improvement judgments.* To test our key prediction, we conducted a linear regression of the brand improvement index on perceived improvement (contrast-coded), self-focus (contrast-coded), importance of having up-to-date products (mean-centered), and all two-way and three-way interactions. This analysis revealed a significant interaction between perceived improvement and importance of up-to-date products ( $b = .21, t = 3.50, p < .001$ ), which was qualified by a three-way interaction among perceived improvement, self-focus, and importance of up-to-date products ( $b = .17, t = 2.83, p < .01$ ). All other effects were nonsignificant. To explore the three-way interaction, we tested the simple interaction effect of perceived improvement and self-focus at the different levels of importance of up-to-date products using the Johnson-Neyman technique (Spiller et al. 2013). This revealed that the simple interaction of perceived improvement and self-focus was significant at any level of mean-centered importance of up-to-date products above .19 ( $b_{JN} = .19, t = 1.98, p = .05$ ), corresponding to a raw value of 4.07 out of 7. That is, for people who placed higher value on having the most up-to-date products (i.e., those who strongly value improvement), there was a significant interaction between perceived improvement and self-focus on improvement judgments of a self-connected brand, consistent with a motivational account.

Additionally, we used the Johnson-Neyman technique to test the simple-simple effects of perceived improvement at the different levels of self-focus (self vs. other) and importance of having up-to-date products. In the self-focus condition, participants who saw themselves as improving (vs. stable) perceived greater improvement in the self-connected mobile phone brand at any mean-centered value of importance of up-to-date products above .11 ( $b_{JN} = .28, t = 1.98, p = .05$ ), which corresponds to a raw value of 3.98 out of 7. In the other-focus condition, however,

participants who saw a friend as improving (vs. stable) did not differ in the brand improvement perceptions at any values of importance of up-to-date products (i.e., there was no range of values at which the simple-simple effect of perceived improvement was significant). In sum, participants projected perceptions of self-improvement onto self-connected brands only when the self was accessible, an effect that demonstrates a cognitive component of temporal egotism. Moreover, the projection of self-improvement onto self-connected brands also increased with personal importance of improvement, an effect that indicates that temporal egotism also possesses a motivational component.

To assess whether our improvement manipulation had an effect on mood or self-esteem, both of which could have influenced our findings, we conducted an additional analysis controlling for mood, implicit self-esteem, and explicit self-esteem. First, 2 (perceived self-improvement) x 2 (self-focus) ANOVAs verified that the manipulations did not significantly influence mood (all  $F$ s < 2.50, NS), implicit self-esteem (all  $F$ s < 2.50, NS), or explicit self-esteem (all  $F$ s < 2.70, NS). Next, another regression of brand improvement with the same key predictors from before and mood, implicit self-esteem, and explicit self-esteem included as covariates revealed a significant effect of implicit self-esteem ( $b = -.14$ ,  $t = -1.99$ ,  $p < .05$ ), but no significant effects of explicit self-esteem and mood (all  $|t$ s < 1.50, NS). More importantly, the significant three-way interaction between perceived improvement, self-focus, and importance of up-to-date products on brand improvement judgments persisted when the covariates were included in the analysis ( $b = .18$ ,  $t = 3.00$ ,  $p < .01$ ), suggesting temporal egotism occurred over and above any influence of self-esteem and mood.

*Product upgrade intentions.* We conducted the same set of regression analyses on product upgrade intentions. This revealed a significant main effect of the importance of having the most up-to-date products ( $b = .60, t = 6.77, p < .001$ ), and more importantly, a significant three-way interaction among perceived improvement, self-focus, and the importance of having up-to-date products ( $b = .19, t = 2.13, p < .05$ ). All other effects were nonsignificant. Based on the Johnson-Neyman technique, the simple interaction effect of perceived improvement and self-focus was significant at any mean-centered level of importance of up-to-date products above .75 ( $b_{JN} = .31, t = 1.98, p = .05$ ), corresponding to a raw value of 4.63 out of 7. Among participants who valued having the most up-to-date products, there was a significant perceived improvement x self-focus interaction on intentions to upgrade to the new version of a self-connected brand's phone, consistent with a motivational account.

We also used the Johnson-Neyman technique to test the simple-simple effects of perceived self-improvement. In the self-focus condition, participants who saw themselves as improving (vs. stable) had higher intentions of upgrading to a newer version of the mobile phone at any mean-centered value of importance of up-to-date products above .19 ( $b_{JN} = .42, t = 1.98, p = .05$ ), which corresponds to a raw value of 4.06 out of 7. In the other-focus condition, however, participants who saw a friend as improving (vs. stable) did not differ in product upgrade intentions at any values of importance of up-to-date products (i.e., there was no range of values at which the simple-simple effect of perceived improvement was significant). Consistent with the effects on brand improvement judgments, these findings suggest that the temporal egotism mechanism has both cognitive and motivational components. Figure 3 illustrates these results.

Again, we examined the potential influence of self-esteem and mood by including implicit self-esteem, explicit self-esteem, and mood as covariates in the regression analysis. The

significant three-way interaction persisted ( $b = .19, t = 2.16, p < .05$ ), and there were no significant effects of any of the covariates (all  $|t|s < 2$ , NS). Finally, we tested whether brand improvement judgments mediated the interactive effect of perceived improvement, self-focus, and importance of having up-to-date products on product upgrade intentions. Based on a moderated mediation analysis using Hayes's (2012) PROCESS macro (model 12; 5,000 bootstrapped samples), there was no evidence of an indirect effect through brand improvement judgments (all indirect effect 95% CIs included zero).

## Discussion

As in study 1, we found that perceived improvement in the self, but not in a friend, increased brand improvement judgments as well as product upgrade intentions. Beyond supporting a cognitive, accessibility-based account of our effect, this finding is also inconsistent with alternative explanations based on priming implicit theories of change (Dweck, Chiu, and Hong 1995) or the general concept of improvement (Herr 1986; Srull and Wyer 1979). Moreover, we found that this effect was accentuated among consumers who placed greater value on improvement as an attribute and emerged even when controlling for mood and self-esteem. That is, individuals who could fulfill self-enhancement motives by projecting important personal attributes onto external entities demonstrated increased temporal egotism, an effect supporting a motivational component. Applying these findings to managerial practice, brands can most effectively incorporate temporal egotism in upgrade decisions when target consumers place more importance on having up-to-date products. For example, marketers could create advertising that

evokes thoughts of self-improvement on websites and forums that are frequented by consumers who highly value having the most up-to-date.

Up to this point, we have shown that consumers use the self as an anchor and assimilate brand improvement judgments to their perceived self-improvement when evaluating brands that are self-associated. Moreover, we have demonstrated evidence of both an underlying cognitive component—moderation by the accessibility of self-related information (studies 1 and 2)—and a motivational component—moderation by the desire to see the brand in a manner consistent with self-perceptions of improvement. In study 3, we further explore the motivational component of temporal egotism by testing whether the effect reverses for strongly dissociative brands. Notably, one related study has shown that consumers anchor on the self and contrast from self-perceptions when evaluating brands that are “not me” (Weiss and Johar 2013)—products that should have negative self-connection. Likewise, we expect the desire to see dissociative brands as dissimilar from the self to engender contrastive temporal egotism effects (hypothesis 4).

Analogous to White and Dahl’s (2006) distinction between out-groups and dissociative out-groups, we distinguish between brands that are merely low in self-connection (i.e., a brand that does not strongly symbolize the self but that individuals do not actively avoid) and brands that are dissociative and have negative self-connection (i.e., a brand that individuals actively avoid). In the pilot study and study 1, our measure of SBC did not distinguish between low SBC and negative SBC, and aggregating across these individuals likely tempered any potential contrast effects. Thus, in study 3, we specifically manipulate whether SBC is high and positive or whether it is low and negative. Furthermore, as Weiss and Johar (2013) did, we measure rather than manipulate self-focus using Scheier and Carver’s (1985) trait self-consciousness scale.

### STUDY 3

The objective of study 3 was to delve deeper into the motivational drivers of temporal egotism by testing whether consumers contrast improvement judgments of dissociative brands from their perceived self-improvement, just as they assimilate improvement judgments of self-associated brands to their perceived self-improvement. To that end, we manipulate perceived self-improvement and SBC, and we measure individual differences in private self-consciousness, the tendency to think about and focus on private aspects of the self (Fenigstein, Scheier, and Buss 1975; Scheier and Carver 1985). If temporal egotism has a motivational component, temporal egotism should again encourage assimilation between self-improvement judgments and strongly self-connected brands, but encourage a contrast between self-improvement judgments and brand improvement judgments for strongly dissociative brands.

*Participants.* One hundred and twenty-three participants (39 females; median age = 29) from Amazon's Mechanical Turk panel completed this study in exchange for a nominal fee.

*Procedure.* Participants were randomly assigned to one of four conditions in a 2 (self-improvement: improvement vs. stability) x 2 (SBC: low vs. high) between-subjects design, with trait self-consciousness as a measured independent variable. First, participants completed an initial task to identify either a strongly self-connected brand or a strongly dissociative brand. Specifically, they were instructed to name one of their favorite brands, "a brand that you feel very connected to and that represents who you are" (high SBC condition), or one of their least favorite brands, "a brand that you do not feel very connected to and that does not represent who

you are” (low SBC condition). Next, to manipulate perceived self-improvement, participants completed the same task from the pretest. Following this, participants rated how the brand they named at the beginning of the study has changed over the past five years on two 7-point items anchored with (*not at all different / very different*) and (*not at all similar / very similar*). We reverse-coded the similarity item and averaged the two items to form an index of perceived brand improvement ( $\alpha = .84$ ). Participants then completed the private self-consciousness subscale of the Revised Self-Consciousness Scale (Scheier and Carver 1985;  $\alpha = .80$ ). Next, as manipulation checks participants indicated their agreement with the statements “During the self-assessment task, I was thinking of ways that I have been changing over time” and “During the self-assessment task, I was thinking of ways that I have remained the same over time” on 7-point Likert scales. Finally, participants completed a SBC manipulation check comprising three items from the Escalas and Bettman (2003) scale using a 7-point Likert scale ( $\alpha = .98$ ), and reported their age and gender. See appendix A4 for manipulations, stimuli, and measures used in study 3.

## Results

*Manipulation checks.* A 2 (perceived self-improvement) x 2 (SBC) ANOVA of thoughts about personal change revealed a main effect of perceived self-improvement and no other significant main or interactive effects. As expected, participants in the improvement condition thought about ways they have changed ( $M = 5.82$ ) more than those in the stability condition ( $M = 3.61$ ,  $F(1, 119) = 53.65$ ,  $p < .001$ ). Likewise, a second 2 x 2 ANOVA of thoughts about personal stability revealed only a main effect of perceived self-improvement and no other significant main or interactive effects. Participants in the stability condition thought about ways they have

remained the same ( $M = 5.79$ ) more than those in the improvement condition ( $M = 3.50$ ,  $F(1, 119) = 54.04$ ,  $p < .001$ ).

Lastly, a 2 x 2 ANOVA on the averaged SBC scale items revealed a significant main effect of the SBC manipulation ( $F(1, 119) = 331.07$ ,  $p < .001$ ) and a significant change x SBC interaction ( $F(1, 119) = 8.17$ ,  $p < .01$ ). No other effects were significant. As expected, in aggregate, participants in the high SBC condition reported higher connection ( $M = 5.18$ ) than those in the low condition ( $M = 1.58$ ). Simple contrasts indicated that within the stability condition, participants in the high SBC condition reported higher connection ( $M = 5.49$ ) than those in the low SBC condition ( $M = 1.40$ ,  $F(1, 119) = 223.80$ ,  $p < .001$ ). Importantly, the same pattern held within the improvement condition ( $M_{\text{high}} = 4.68$ ,  $M_{\text{low}} = 1.70$ ,  $F(1, 119) = 116.49$ ,  $p < .001$ ). Furthermore, simple contrasts revealed that within the high SBC condition, participants in the stability condition reported higher SBC ( $M = 5.49$ ) than those in the improvement condition ( $M = 4.68$ ,  $F(1, 119) = 8.34$ ,  $p < .01$ ), but there was no difference within the low SBC condition ( $M_{\text{stability}} = 1.40$ ,  $M_{\text{improvement}} = 1.70$ ,  $F < 2$ , NS).

*Brand improvement judgments.* To test our key prediction, we conducted a linear regression of the brand improvement index on the following independent variables: SBC (contrast-coded), perceived self-improvement (contrast-coded), mean-centered trait self-consciousness, all two-way interactions, and the critical three-way interaction. This analysis revealed a significant main effect of SBC ( $b = .27$ ,  $t = 2.22$ ,  $p < .05$ ) and the predicted three-way perceived self-improvement x SBC x trait self-consciousness interaction ( $b = .81$ ,  $t = 3.65$ ,  $p < .001$ ). All other main and interactive effects were nonsignificant (all  $|t|s < 1.60$ , NS).

To explore the three-way interaction, we applied the Johnson-Neyman technique (Spiller et al. 2013), which indicated that the simple interaction effect of perceived self-improvement and SBC was significant for any mean-centered trait self-consciousness score above .06 ( $b_{JN} = .25, t = 1.98, p = .05$ ), corresponding to a raw trait self-consciousness score of 2.86 out of 4. That is, supporting hypotheses 1a and 2, the predicted self-improvement x SBC interaction was significant among individuals with stronger tendencies to focus on the self.

Furthermore, we used the Johnson-Neyman technique to test the simple-simple effects of perceived self-improvement at the two levels of SBC and different levels of self-consciousness. Supporting hypothesis 4, perceived self-improvement (vs. stability) increased judgments of improvement in self-connected brands at any mean-centered trait self-consciousness score above .08 ( $b_{JN} = .35, t = 1.98, p = .05$ ), which corresponds to a raw self-consciousness score of 2.87 out of 4. Conversely, perceived self-improvement decreased judgments of improvement in self-disconnected brands when mean-centered trait self-consciousness was above .45 ( $b_{JN} = -.45, t = -1.98, p = .05$ ), which corresponds to a raw self-consciousness score of 3.25 out of 4. Thus, at higher levels of trait self-consciousness, we found evidence of not only an assimilation effect for self-associated brands, but also a contrast effect for dissociative brands. Figure 4 illustrates these results.

## Discussion

Study 3 demonstrated that individuals anchor on their own perceived self-improvement when judging the improvement in brands. Specifically, participants who saw themselves as improving over time perceived more improvement in strongly self-connected brands (i.e., an

assimilation effect), but less improvement in strongly self-disconnected brands (i.e., a contrast effect). Departing from most implicit egotism research (e.g., Brendl et al. 2005; Perkins and Forehand 2011), Weiss and Johar uniquely predicted both assimilation to and contrast from current self-perceptions, depending on the valence of self-association. Here, we uncovered similar assimilation and contrast effects resulting from anchoring on a more broadly-defined self comprising multiple temporal dimensions. Importantly, this suggests that motivational factors underlie temporal egotism effects. Moreover, illustrating the cognitive component to temporal egotism, this effect held only at higher levels of trait self-consciousness—i.e., among individuals for whom self-related information was more accessible. Thus, we conceptually replicated the findings of studies 1 and 2 using dispositional rather than situational self-focus, and we also extended these findings by demonstrating when focusing consumers' attention on their self-improvement will actually have a negative effect on brand improvement judgments.

## **GENERAL DISCUSSION**

Encouraging consumers to upgrade to newer versions of products is a critical objective for many companies. Prior research has argued and demonstrated that judgments of improvement and innovativeness in products are key to consumers' upgrade decisions (Okada 2001, 2006; Grewal, Mehta, and Kardes 2004; Zhu, Chen, and Dasgupta 2008). Nevertheless, there is very little understanding of what factors drive these brand improvement perceptions and consequently increase product upgrade behaviors. The present research stands as an initial investigation into this question and shows that drawing attention to consumers' own self-improvement can increase

brand improvement judgments and product upgrade intentions. In doing so, we demonstrate that an expanded conceptualization of the self serves as an input into brand judgments.

Particularly, across four studies we found that when evaluating the improvement in products and brands, consumers anchor on the perceived improvement between their past and present selves. Consistent with prior research on implicit egotism (Brendl et al. 2005; Gawronski, Bodenhausen, and Becker 2007; Jones et al. 2004; Perkins and Forehand 2011) and egocentric biases (Fenigstein and Abrams 1993; Krueger and Zeiger 1993; Naylor, Lambertson, and Norton 2011; Weiss and Johar 2013), perceived self-improvement increased product improvement judgments when self-brand connection was high, but not when self-brand connection was low. In fact, for dissociative brands, we found that perceived self-improvement actually decreased brand improvement judgments (study 3), a contrast effect similar to that obtained by Weiss and Johar (2013).

Furthermore, attesting to the underlying cognitive component of the temporal egotism process, these effects were moderated by self-focus, which influences the accessibility of the self and thus the likelihood of using the self as a reference point (Fenigstein and Abrams 1993; Fenigstein, Scheier, and Buss 1975; Weiss and Johar 2013). We also found evidence of an underlying motivational component to temporal egotism, consistent with prior work (Brendl et al. 2005; Crano 1983; Gramzow and Gaertner 2005; Marks and Miller 1987). Specifically, for self-connected brands, the assimilation effect was stronger among self-focused individuals who highly valued improvement as an attribute—individuals who could self-enhance by projecting their self-improvement onto self-connected brands (study 2). Conversely, a contrast effect arose among self-focused individuals who evaluated dissociative brands—individuals who were motivated to perceive the brand as dissimilar from themselves (study 3). Notably, the effects

obtained in this research were robust to different operationalizations of self-brand connection—measured (pilot study and study 1) and manipulated via participant-generated brands (studies 2 and 3)—and different operationalizations of self-focus—dispositional (study 1) and situational (study 2 and 3). Furthermore, the fact that we examined three-way interactions and used different combinations of measured and manipulated predictors across studies reduces the likelihood that our effects were due to demand characteristics.

We also considered the likelihood that our effects may be partly driven by priming implicit theories of change (Dweck, Chiu, and Hong 1995) or priming the general concept of improvement (Srull and Wyer 1979). We directly tested these possibilities by manipulating self-focus in studies 1 and 2, which allowed us to simultaneously test a temporal egotism account. Neither of these studies yielded findings supporting the alternative explanations. Whereas the alternative explanations would predict a positive effect of perceived self-improvement on brand improvement judgments regardless of SBC and self-focus, only a temporal egotism account predicts the observed three-way interaction with SBC and self-focus.

Altogether, this research extends previous work on the effects of identity on judgment (Gawronski, Bodenhausen, and Becker 2007; Naylor, Lambertson, and Norton 2011; Perkins and Forehand 2011; Weiss and Johar 2013) by showing how the various temporal dimensions of the self (i.e., the past and present selves) enter into evaluations of brands and products. Although prior work has documented that self-evaluations influence brand and product evaluations, this research has primarily focused on the present “actual” self, and has not yet examined the role of different temporal dimensions of the self. Here, we fill this gap in the literature by demonstrating the influence of self-evaluations involving past and present selves. Ultimately, these findings provide initial evidence of the role of the multifaceted self—comprising past and present

selves—in product evaluations and call for a more broadly defined self in consumer research. Additionally, this research extends the literature on temporal self-evaluations (Albert 1977; Wilson and Ross 2001; Zell and Alicke 2009) by providing one of the first demonstrations of its particular influence on consumer behavior. Despite the conceivable influence of temporal self-judgments on behavior, scant consumer research has investigated the possible effects and mechanisms through which they arise. Here, we demonstrated that temporal self-evaluations can influence temporal evaluations of brands through a temporal egotism process.

From a more managerial perspective, our work suggests that cuing thoughts of improvement in the self may be a successful tool in heightening perceptions of improvement in brands and encouraging product upgrade behavior. For example, evoking temporal comparisons with one's "awkward teenage years" or similar undesirable archetypes of one's past may promote perceptions of self-improvement that carry over to the advertised brand. According to the boundary condition we demonstrated, such tactics may be particularly effective among consumers who place greater importance on having the most up-to-date products. Thus, brands could target these consumers by advertising new versions of products in various tech-related outlets (e.g., Wired Magazine, cnet.com) that attract consumers who most strongly value cutting-edge technology. Likewise, evoking thoughts of consumers' own self-improvement may be particularly effective in increasing product upgrades in those industries where consumers tend to desire and expect improvement in brands (e.g., video games; mobile phones; computers and software; athletic goods). Ultimately, however, such tactics must be used with caution—although perceived self-improvement might encourage favorable perceptions of self-connected brands, it could have the opposite effect for dissociative brands strongly.

Regarding these potential contrast effects, a question that may naturally arise is whether consumers realistically consider upgrading products from dissociative brands (i.e., when might contrast effects arise in the real world?). One common situation in which this is likely is when consumers have recently undergone major life events, such as college graduation. At these junctures, consumers often reassess the external markers of their identity and decide whether to continue patronizing certain brands, some of which are linked to identities that they no longer wish to signal. For example, when new Beats by Dre headphones are released, a recent graduate who associates Beats by Dre with his former undergraduate identity—an identity that he now wishes to shed—faces the decision of whether to replace his older pair of Beats by Dre headphones with the new version. In this situation, Beats by Dre, a formerly self-representative brand, is now dissociative, and the student might judge the improvement in the headphones in contrast to his own perceived self-improvement. Thus, when undergoing major life events that render formerly self-representative brands dissociative, consumers may judge the newly dissociative brand's products in contrast to their own perceived self-improvement.

Beyond these practical implications, this work also opens up several directions for future research. As discussed earlier, the self-concept also contains how individuals expect to be in the future (Albert 1977; Markus and Wurf 1987); however, we did not explore whether consumers also anchor their brand improvement judgments on self-evaluations of expected change between the present and future selves. Indeed, prior research suggests that egocentric social judgments can reflect future expected selves as well as present selves (McElwee and Dunning 2005). Future research could test whether similar effects of expected future selves hold for brand judgments.

A second possibility for future research concerns testing the effects of perceived self-improvement on particular attributes. For example, will focusing on one's self-improvement in

environmental consciousness heighten perceptions of self-associated brands as increasing in eco-friendliness as well? In the present research, participants focused on their general improvement or stability over time, rather than focusing on a particular self-attributes and specific dimension of change. Although we posited that similar effects should arise for specific dimensions of improvement, we did not expressly test this, but such an insight could be of similar value to marketers. More generally, this could contribute to the development of an overarching framework for understanding when and how self-evaluations influence brand judgments.

A final avenue for future research involves exploring the factors outside of the self that influence brand and product improvement perceptions. For example, it is not uncommon for brands to make only superficial changes to their products (e.g., new color options) but still herald them as “new and improved.” Understanding when such seemingly negligible changes are sufficient in fostering perceptions of improvement in products—versus when more substantial change is required to arrive at the same judgment—is a question of both theoretical and practical importance.

### **Chapter III. When Comparisons Collide: Interactive Effects of Temporal and Social Comparisons on the Pursuit of Self-Improvement**

Consumers' preferences and choices can reflect several self-evaluative motives, one of which is self-improvement, or the desire to improve one's skills, abilities, traits, or general well-being (Sedikides and Strube 1997). This drive for improvement appears to be particularly pervasive in our society, as evidenced by the roughly \$10 billion Americans spend on self-improvement products and services annually (Marketdata Enterprises 2015). One major factor that motivates the pursuit of self-improvement is the perception of inadequacy (Carver and Scheier 1982; Higgins 1987; Watkins 2008), which can result from self-comparisons to two standards—past selves (i.e., temporal comparisons, Albert 1977) and other people (i.e., social comparisons, Festinger 1954).

Although prior consumer research has investigated the effects of self-comparisons on self-perceptions and self-regulatory behaviors (e.g., Burson 2007; Gershoff and Burson 2011; McFerran et al. 2010a, 2010b; Schultz et al. 2007; Shalev and Morwitz 2012; White, Simpson, and Argo 2014), very little research has directly examined the consequences for self-improvement efforts and purchases. Moreover, the preponderance of self-comparison research focuses on social comparisons, with temporal comparisons being largely neglected. Further still, most prior research has investigated temporal and social comparisons independently of one another, despite consumers often having both types of comparisons at their disposal at a given time. For example, people know how their current fitness level compares to when they were in high school, and they also know how their fitness level compares to that of their peers. However, such instances of simultaneous social and temporal comparisons have remained unexamined in the consumer behavior literature. This calls for a more holistic investigation of the effects of

temporal and social comparisons—one that considers their joint impact on the pursuit of self-improvement.

We propose that temporal and social comparisons will have an interactive effect on the pursuit of self-improvement. Specifically, temporal decline (vs. improvement or stability) will spur self-improvement efforts only when social standing is relatively high—that is, when there is something to lose. Central to this prediction is the notion that social standing is a primary determinant of satisfaction with various aspects of life (Emmons and Diener 1985; Fox and Kahneman 1992), and individuals generally desire to be better than others on valued dimensions (Alicke 1985; Brickman 1975; Brown 1986; Tesser 1988; Wills 1981). Here, we posit that when people are of high social standing, salient temporal decline (i.e., getting worse over time) poses a threat to their standing, thus encouraging self-improvement efforts. However, when social standing is low, temporal decline will not increase self-improvement efforts, as individuals tend to have diminishing marginal sensitivity to negative outcomes (Kahneman and Tversky 1979).

Five experiments investigate the interactive effect of simultaneous temporal and social comparisons on the pursuit of self-improvement in the contexts of physical fitness and cognitive performance. Study 1 provides an initial test of the predicted interaction between temporal and social comparison feedback on self-improvement pursuit. To illuminate the underlying mechanism, we take two complementary approaches. First, based on the notion that temporal decline heralds a loss of social standing, we examine the moderating role of factors that should influence the pain or threat of a loss of social standing—namely, goal orientation (study 2), self-other perspective (study 4), and regulatory focus (study 5). Secondly, based on the notion that perceived deficiencies motivate remedial effort, we test whether self-reported need for

improvement mediates the effect of temporal decline on self-improvement pursuit when social standing is high (study 3).

To the best of our knowledge, this research is the first to examine the joint effects of temporal and social comparisons on the pursuit of self-improvement, thereby enriching the understanding of self-comparison processes in self-regulation specifically and consumer behavior more generally. Additionally, departing from most prior research that emphasizes the maladaptive outcomes of self-enhancement motives—e.g., defensive processing (Raghubir and Menon 1998; Reed and Aspinwall 1998), prejudice and intergroup bias (Fein and Spencer 1997; Rudman, Dohn, and Fairchild 2007), and materialism and conspicuous consumption (Chaplin and John 2010; Sivanathan and Pettit 2010)—we demonstrate that self-enhancement motives can also yield adaptive outcomes (Kim and Gal 2014), namely self-improvement pursuit. Finally, this research has practical implications for the marketing of self-improvement products. Marketers often attempt to encourage purchase of self-improvement products by drawing attention to consumers' decline over time (e.g., “get back to your high school weight”). Our findings suggest that such an approach should be used with caution, as highlighting temporal decline may be ineffective if consumers perceive themselves to be of low social standing.

## **CONCEPTUAL DEVELOPMENT**

### **Joint Investigations of Temporal and Social Comparisons**

Although no known research has specifically tested the effects of simultaneous temporal and social comparisons on self-improvement intentions and behaviors, some joint investigations

of the two types of comparisons do exist. For example, Zell and Alicke (2009, 2010) examined the effects of simultaneous temporal and social comparisons on self-evaluations. Specifically, they manipulated whether people were above or below average in social sensitivity, as well as whether they improved or declined over time and then measured subjective ability and performance. These studies revealed additive effects of temporal and social comparisons on judgments of ability and performance—lower social standing decreased self-evaluations, and temporal decline further decreased self-evaluations.

Another stream of research has explored the relative frequency of and preference for temporal and social comparisons. According to one account, the frequency of temporal versus social comparisons follows an inverted-U shaped path over the lifespan, with temporal comparisons dominating early childhood and old age, while social comparisons dominate from adolescence until middle age (Suls 1986). In contrast, more recent work found that temporal comparisons arose at least as frequently as social comparisons when people were describing themselves (Wilson and Ross 2000).

Lastly, some prior research considering both temporal and social comparisons has focused on how performance feedback influences engagement in the different types of self-comparisons. For example, Ruble and Flett (1988) explored the relative preference for social and temporal comparisons after receiving performance feedback on an arithmetic test, and found that preference for temporal comparisons increases with age and ability. In a slightly different vein, Levine and Green (1984) investigated the effect of temporal comparison feedback on preferences for different directions of social comparison. They found that students who had improved were indifferent between making upward and downward social comparisons, whereas those who had declined subsequently preferred downward social comparisons.

Ultimately, although some joint investigations of temporal and social comparisons do exist, they stop short of assessing the implications for self-improvement efforts and corresponding consumption-related outcomes. The present research fills this gap by testing whether temporal comparisons interact with social comparisons to influence the pursuit of self-improvement. In the following sections, we explain our rationale for expecting such an interaction and develop our specific hypotheses.

### The Desire for High Social Standing

A manifestation of fundamental self-enhancement motives (Dunning 2007; Greenwald 1980), people generally prefer to be better than others (Alicke 1985; Brickman 1975; Brown 1986; Wills 1981), especially on personally relevant dimensions (Tesser 1988; Tesser, Millar, and Moore 1988). In fact, prior research has identified social comparisons as a principal driver of life satisfaction (Emmons and Diener 1985; Fox and Kahneman 1992). Specifically, Emmons and Diener (1985) found that social standing, but not objective circumstances, positively predicted satisfaction in numerous domains, including social life, physical attractiveness, grades, and standard of living. Similarly, Klein (1997) demonstrated that people's performance relative to others outweighs objective performance when making self-evaluations. Further reflecting the widespread drive for high social standing, substantial research has demonstrated a self-serving bias whereby people generally perceive themselves as better than others (Alicke 1985; Brown 1986, 2012) and at lower risk of negative outcomes (Klein 1996; Klein and Kunda 1993; Lin, Lin, and Raghurir 2003; Raghurir and Menon 1998). The foremost explanation for these

findings is that high social standing has positive implications for overall self-regard (Taylor and Brown 1988)—that is, it fulfills self-enhancement motives.

### Temporal Decline: A Threat to Social Standing

Given the influence of social comparisons on self-evaluations and overall self-regard, individuals should be motivated to maintain high social standing (Klein 1996; Klein and Kunda 1993). Therefore, threats to social standing should encourage remedial efforts, such as the purchase of products that enable self-improvement. We propose that one such threat to social standing can take the form of temporal comparison information. When social and temporal comparisons in a given domain are simultaneously salient, temporal decline indicates a potential or realized loss of social standing. For example, if a person's fitness is getting worse over time, it is likely that his social standing in fitness will fall (unless, of course, everyone else is also declining at a similar rate). According to foundational self-regulation theories that hold that people are motivated to minimize personal deficiencies and negative deviations from relevant standards (Carver and Scheier 1981, 1982; Higgins 1987), this decline should motivate self-improvement efforts.

Refining this basic premise, we argue that the effect of temporal decline on self-improvement pursuit will depend on the level of social standing, which reflects how much individuals have at stake. Consistent with the principle that people display diminishing marginal sensitivity to negative outcomes (Kahneman and Tversky 1979), temporal decline should be more threatening to individuals of higher social standing (who have more at stake) than individuals of lower social standing (who have less at stake). Returning to our earlier example, if

the person's fitness were high to begin with, then a loss of standing should be especially aversive, consistent with the pervasive desire to maintain high standing (Klein 1996; Klein and Kunda 1993). Consequently, temporal decline should encourage self-improvement behaviors. In contrast, if his fitness were low to begin with, then he should be relatively insensitive to a loss of social standing, and temporal decline should not encourage self-improvement behaviors. This leads to the following hypothesis:

**H1:** Simultaneous temporal and social comparisons will have an interactive effect on the pursuit of self-improvement. Specifically, temporal decline will increase self-improvement pursuit when social standing is high, but not when social standing is low.

#### Examining the Underlying Mechanism: Moderation by Sensitivity to Loss

We propose that temporal decline heralds a loss of social standing, which should be especially threatening to individuals who are of relatively high standing; consequently, they should be motivated to pursue self-improvement. If the threat of a loss of social standing can account for the predicted effect, then factors that accentuate or attenuate the sense of loss should moderate the effect. One such factor is goal orientation (Ames 1992; Butler 1993; Dweck 1986; Elliott and Dweck 1988)—whether people are primarily concerned with demonstrating superior abilities and gaining favorable judgments of competence (performance goal orientation) or primarily concerned with improving their abilities and developing their competence (mastery/learning goal orientation). By definition, individuals with a stronger performance goal orientation care more about maintaining high social standing. Thus, the loss of social standing

presaged by temporal decline should be more threatening, and consequently more motivating, to individuals with a stronger performance (vs. mastery) goal orientation. Stated formally:

**H2:** Goal orientation will moderate the effect of simultaneous temporal and social comparisons on self-improvement pursuit. Specifically, the interactive effects of temporal and social comparisons will be attenuated among individuals with stronger mastery (vs. performance) goal orientations.

A second factor that should influence the pain of a loss of social standing is whether the loss occurs for the self or for others. Prior research investigating decision making for the self versus others has found that losses loom larger for the self than for others (Polman 2012). This is generally explained by the increase in psychological distance when taking the perspective of an other (vs. the self), which tempers the aversiveness of loss (Malkoc & Zauberman 2006; Polman & Emich 2011). Analogous to the interpersonal empathy gap for psychological pain whereby people underestimate the pain others experience from social exclusion (Nordgren, Banas, and MacDonald 2011), we expect people to underestimate the pain others experience from a loss of social standing. Accordingly, if the proposed interaction between temporal and social comparisons is driven by the threat of a loss of social standing, then the effects should be attenuated when that threat is less acute—that is, when considering how someone else (vs. the self) would respond to comparison feedback. Formally, we hypothesize the following:

**H3:** Self-other perspective will moderate the effect of simultaneous temporal and social comparisons on self-improvement pursuit. When social standing is high, temporal decline will increase self-improvement pursuit when taking the perspective of the self, but not that of an other.

Finally, a third factor that should influence the pain of a loss of social standing is regulatory focus (Higgins 1997)—the extent to which people focus on approaching positive outcomes (promotion focus) or avoiding negative outcomes (prevention focus). Research exploring the implications of regulatory focus for prospect theory suggests that promotion-focused (vs. prevention-focused) individuals have a steeper value function in the positive domain, and vice versa in the negative domain (Chernev 2004). Thus, when starting from a positive reference point, losses are more painful for promotion-focused individuals than for prevention-focused individuals. Applying this logic to the context at hand, a loss of high social standing should be more painful when promotion focus is high. Inasmuch as the pain of a loss of high social standing underlies the predicted effect of temporal and social comparisons on self-improvement efforts, then the effect should be stronger for promotion-focused individuals. This leads to the following hypothesis:

**H4:** Regulatory focus will moderate the effect of simultaneous temporal and social comparisons on self-improvement pursuit. Specifically, the interactive effects of temporal and social comparisons will be attenuated among individuals with weaker promotion focus.

#### Examining the Underlying Mechanism: Mediation by Need for Improvement

At the root of our predictions is the notion that individuals are motivated to minimize deficiencies in the self and reduce discrepancies between themselves and relevant standards (Carver and Scheier 1982; Higgins 1987; see also Allard and White 2015). Specifically, we posit that temporal decline (which signals a loss of social standing) will heighten the perception of

deficiency in the self, given the desire to maintain high social standing (Alicke 1985; Klein and Kunda 1993). Consequently, individuals will have greater interest in products and behaviors that can help them ameliorate this deficiency, particularly when social standing is high. Insofar as such a discrepancy-reducing motivation drives our effects, when social standing is high, temporal decline should increase the subjective need for improvement. In turn, this should increase the pursuit of self-improvement. Stated formally,

**H5:** Need for improvement will mediate the effect of temporal decline on self-improvement pursuit when social standing is high, but not when social standing is low.

## STUDY 1

The objective of study 1 was to provide an initial test of the predicted interactive effect of temporal and social comparisons on the pursuit of self-improvement. In a scenario-based experiment, we manipulated whether people's academic performance had improved or declined over time, as well as whether their performance was above or below average. We operationalized self-improvement pursuit as purchase intentions for pretested products that facilitate self-improvement (Allard and White 2015).

### Pretests

We conducted a pretest to verify the effectiveness of the temporal and social comparison manipulations we use in studies 1 and 3. One hundred and nineteen undergraduates (68 females;

median age = 20) participated for partial course credit. Participants were randomly assigned to one of four conditions in a 2 (temporal comparison: improving vs. declining) x 2 (social comparison: high vs. low standing) between-subjects design. All participants were instructed to imagine that they are enrolled in a course for their major and recently received a grade report summarizing their performance so far. Beneath this was a table with their scores on each of five tests, their average score, and the class average (see appendix B1). For the temporal comparison manipulation, participants either saw a report in which their scores strictly improved or declined on each subsequent test. Importantly, all participants saw the same five scores in increasing or decreasing order, thereby holding the average score constant across all conditions. For the social comparison manipulation, participants read that their average score was either above or below the class average. After answering a series of filler questions, participants rated how their grades were changing over time in the scenario on a 7-point scale anchored by “my grades decreased over time” and “my grades increased over time.” Next, they rated how their average grade compared to the class average on a 7-point scale anchored by “my grade was lower than average” and “my grade was higher than average.” Finally, they reported their age and gender.

As expected, a 2 x 2 ANOVA of the temporal comparison measure revealed a significant main effect of temporal comparison ( $F(1, 115) = 405.98, p < .001$ )—participants in the improving condition ( $M = 6.37$ ) reported greater self-improvement than those in the declining condition ( $M = 1.58$ ). Likewise, a 2 x 2 ANOVA on the social comparison measure revealed a significant main effect of social comparison ( $F(1, 115) = 253.51, p < .001$ )—participants in the above average condition ( $M = 6.55$ ) reported higher social standing than those in the below average condition ( $M = 2.14$ ). This indicates that our manipulations were effective.

We conducted a second pretest to verify that people perceive the focal products that we use as stimuli in study 1 as effective in facilitating improvement (see appendix B1 for stimuli). Forty U.S. participants (21 females; median age = 33) from Amazon's Mechanical Turk panel participated in exchange for a nominal fee. Participants viewed images and descriptions of three mobile applications and two books in counterbalanced order. These products were designed to help improve study skills and academic performance. After viewing the information about each product, participants rated the effectiveness of the product in improving academic performance on 1 (*useless/ineffective/unhelpful*) to 9 (*useful/effective/helpful*) scales ( $\alpha > .97$  for each product), and then they rated their attitude toward the product on 1 (*dislike/unfavorable/negative*) to 9 (*like/favorable/positive*) scales ( $\alpha > .98$  for each product). We averaged the effectiveness ratings across all five products ( $\alpha = .91$ ) and did the same for the attitude ratings ( $\alpha = .90$ ) to form product evaluation indices. One-sample *t* tests revealed that mean effectiveness ratings ( $M = 6.54, t(39) = 5.23, p < .001$ ) and mean attitude ratings ( $M = 6.31, t(39) = 4.19, p < .001$ ) were significantly higher than the midpoint of the scale. Thus, the products we selected were indeed perceived as useful for self-improvement and viewed favorably in general. We now proceed to the main study.

## Methods

*Participants.* 143 participants (66 females; median age = 35) from Amazon's Mechanical Turk panel completed this study in exchange for a nominal fee.

*Procedure.* Participants were randomly assigned to one of eight conditions in a 2 (temporal comparison: improving vs. declining) x 2 (social comparison: high vs. low standing) x 2 (order: temporal comparison first vs. social comparison first) design. To manipulate temporal and social comparisons, we followed the same procedures from the pretest with two minor changes. First, to increase the personal relevance of the scenario to the non-student sample, participants imagined that they were enrolled in a course as part of a job (rather than school) requirement. Secondly, we counterbalanced the order in which the temporal and social comparison feedback was presented.

After viewing the hypothetical performance report, participants responded to two questions measuring their improvement self-efficacy. We included these items to test and control for any effects our manipulation might have on self-efficacy—the belief in one’s ability to successfully execute behaviors to achieve desired outcomes (Bandura 1977)—which prior research suggests performance feedback can influence (Gist and Mitchell 1992). Next, as the key dependent measures, participants were presented with images and product descriptions of the five pretested self-improvement products and rated their interest in these products. Specifically, participants reported how relevant each product was to them and how much they would consider buying each product on 1 (*not at all*) to 7 (*very much*) scales. Finally, participants completed demographic measures and reported their involvement on 1 (*not at all*) to 7 (*very much*) scales. See appendix B1 for all manipulations, stimuli, and measures used in study 1.

## Results

*Self-Efficacy.* We averaged the two self-efficacy items ( $\alpha = .80$ ) and subjected this measure to a 2 (temporal comparison) x 2 (social comparison) x 2 (order) ANOVA. This analysis revealed no significant order effects ( $F(1, 135) = 2.37, NS$ ), so we collapsed across this variable. The resulting 2 x 2 ANOVA yielded no significant main or interactive effects on the self-efficacy measure (all  $F_s(1, 139) < 1.5, NS$ ). Making favorable (vs. unfavorable) temporal and social comparisons had no effect on perceived ability to improve one's academic performance ( $M_{TC} = 6.09$  vs. 6.26;  $M_{SC} = 6.13$  vs. 6.22).

*Product Evaluations.* We averaged the product evaluations across the five self-improvement products ( $\alpha = .88$ ). A 2 x 2 x 2 ANOVA on this index revealed no interaction with order ( $F(1, 135) = 1.04, p > .30$ ), so we collapsed across this variable. The resulting 2 x 2 ANOVA yielded a significant temporal comparison x social comparison interaction ( $F(1, 139) = 4.67, p < .05$ ). All other effects were nonsignificant (all  $F_s(1, 139) < 2.20, NS$ ). Supporting hypothesis 1, simple contrasts indicated that when participants were above average, temporal decline (vs. improvement) increased interest in products that could improve study skills ( $F(1, 139) = 6.17, p = .01$ ). However, when participants were below average, temporal decline (vs. improvement) had no effect on evaluations of the self-improvement products ( $F(1, 139) = .26, NS$ ). Figure 5 illustrates these results.

To further assess the role of self-efficacy, we conducted a 2 x 2 ANCOVA, including self-efficacy as a covariate. This revealed a significant effect of self-efficacy ( $F(1, 138) = 5.50, p < .05$ ), and the temporal comparison x social comparison interaction persisted ( $F(1, 138) = 4.35,$

$p < .05$ ). Thus, the interactive influence of temporal and social comparisons on self-improvement product evaluations held over and above any effects of self-efficacy.

## Discussion

The results of study 1 provided preliminary support for the prediction that temporal and social comparisons will have an interactive effect on self-improvement pursuit. Consistent with hypothesis 1, we found that temporal decline increased evaluations of self-improvement products only when social standing was high—that is, when there was something to lose. Notably, our manipulation did not affect self-efficacy, and the interaction remained significant even when we controlled for the effects of self-efficacy, suggesting that self-efficacy cannot account for the obtained effects.

Having established initial evidence that simultaneous temporal and social comparisons interact to influence self-improvement pursuit, we explore the underlying mechanism in study 2. Specifically, we test the moderating role of individual differences in goal orientation (Ames 1992; Dweck 1986), which determines the personal importance of high social standing and, by extension, the painfulness of a loss of social standing. To the extent that the obtained interaction is driven by a desire to maintain high social standing, then the effect should be stronger among individuals with a performance goal orientation—those who are chiefly concerned with demonstrating their superior abilities.

## STUDY 2

The primary goal of study 2 was to investigate the process by which simultaneous temporal and social comparisons influence self-improvement pursuit. We again manipulated temporal and social comparisons; however, rather than using a scenario, participants themselves identified personally important dimensions on which they had improved or declined and were also of high or low social standing. Additionally, we measured goal orientation to investigate its moderating effect. As in study 1, we operationalized the key dependent variable as evaluations of self-improvement products. If the desire to maintain high social standing can explain the interactive effects of temporal and social comparisons, then this effect should be stronger among performance-oriented individuals—those who are more concerned with social standing (Butler 1993; Dweck 1986).

### Methods

*Participants.* Two hundred and eighty-two participants (136 females; median age = 33) from Amazon's Mechanical Turk panel completed this study in exchange for a nominal fee.

*Procedure.* Participants were randomly assigned to one of four conditions in a 2 (temporal comparison: improving vs. declining) x 2 (social comparison: high vs. low standing) between-subjects design, with goal orientation as a measured predictor variable. Participants first completed the temporal and social comparison manipulations, ostensibly a survey on personal change over time. Specifically, to manipulate temporal comparisons, participants were instructed

to name a personally significant dimension (i.e., a skill or attribute) on which they had either improved or declined over time. To manipulate social comparisons, participants were further instructed that this should be a dimension on which they were either better or worse than most of their peers. As a manipulation check, participants rated themselves on the focal dimension using three 1 (*very bad/very weak/very dissatisfied*) to 7 (*very good/very strong/very satisfied*) measures.

Participants then proceeded to a purportedly unrelated product evaluation task that constituted the dependent measures. As in study 1, they viewed images and product descriptions of one self-improvement mobile application and one self-improvement book and rated their attitudes toward these products on 1 (*dislike/negative*) to 7 (*like/positive*) scales and their purchase intentions for these products on 1 (*unlikely/improbable*) to 7 (*likely/probable*) scales. Because participants focused on different attributes, we selected products that claim to facilitate self-improvement on a variety of dimensions, rather than products that target a specific dimension. Participants then completed a three-item measure of goal orientation based on VandeWalle's (1997) scale ( $\alpha = .79$ ). Lastly, participants reported their age, gender, and involvement. See appendix B2 for all manipulations, stimuli, and measures used in study 2.

## Results

*Manipulation Checks.* We created a self-perception index by averaging the ratings across the three measures ( $\alpha = .93$ ). A 2 (temporal comparison) x 2 (social comparison) ANOVA on this index revealed a significant main effect of temporal comparison ( $F(1, 278) = 74.86, p < .001$ ) and a significant main effect of social comparison ( $F(1, 278) = 224.54, p < .001$ ). As

expected, participants in the improvement (vs. decline) condition judged their current selves more favorably ( $M = 4.59$  vs.  $3.40$ ); likewise participants in the high (vs. low) social standing condition judged their current selves more favorably ( $M = 5.07$  vs.  $3.02$ ).

*Attitude toward Self-Improvement Products.* To test our key prediction, we averaged attitude ratings for the two products ( $\alpha = .86$ ) and conducted a linear regression of this index using the following independent variables: temporal comparison (contrast-coded), social comparison (contrast-coded), mean-centered goal orientation (higher scores = mastery orientation), all two-way interactions, and the critical three-way interaction. This analysis revealed the predicted three-way temporal comparison x social comparison x goal orientation ( $b = -.23$ ,  $t = -2.68$ ,  $p < .01$ ). All other main and interactive effects were nonsignificant (all  $|t|s < 1.30$ , NS).

To explore the three-way interaction, we applied the Johnson-Neyman technique (Spiller et al. 2013), which indicated that the simple interaction effect of temporal and social comparisons was significant for any mean-centered goal orientation score below  $-.38$  ( $b_{JN} = .24$ ,  $t = 1.97$ ,  $p = .05$ ), corresponding to a raw goal orientation score of  $5.24$  out of  $7$ . That is, supporting hypothesis 2, the predicted temporal comparison x social comparison interaction was attenuated among individuals with a strong mastery orientation—those who care less about high social standing.

Furthermore, we tested the simple-simple effects of temporal comparisons at the two levels of social comparisons and different levels of goal orientation. As expected, among performance-oriented consumers (mean  $- 1$  SD), temporal decline (vs. improvement) increased self-improvement product attitudes when social standing was high ( $b = .53$ ,  $t = 2.15$ ,  $p < .05$ ), but

marginally decreased self-improvement product attitudes when social standing was low ( $b = -.41$ ,  $t = -1.83$ ,  $p < .10$ ). Among mastery-oriented consumers (mean + 1 SD), temporal decline did not significantly influence product attitudes, regardless of social standing (all  $|t|s < 1.5$ , NS). Figure 6 illustrates these results.

*Purchase Intentions for Self-Improvement Products.* We also conducted the same set of analyses on average purchase intentions for the two self-improvement products ( $\alpha = .86$ ). This revealed a significant temporal comparison x social comparison interaction ( $b = .28$ ,  $t = 2.16$ ,  $p < .05$ ), qualified by a significant three-way interaction with goal orientation ( $b = -.28$ ,  $t = -2.93$ ,  $p < .01$ ). All other main and interactive effects were nonsignificant (all  $|t|s < 1$ , NS). The Johnson-Neyman technique indicated that the simple interaction effect of temporal and social comparisons was significant for any mean-centered goal orientation score below .09 ( $b_{JN} = .24$ ,  $t = 1.97$ ,  $p = .05$ ), corresponding to a raw goal orientation score of 5.71 out of 7. Thus, as hypothesized, the interaction on self-improvement purchase intentions was eliminated among individuals who are less concerned with high social standing.

Furthermore, we tested the simple-simple effects of temporal comparisons at the two levels of social comparisons and different levels of goal orientation. Among performance-oriented consumers (mean - 1 SD), temporal decline (vs. improvement) increased self-improvement product purchase intentions when social standing was high ( $b = .70$ ,  $t = 2.59$ ,  $p = .01$ ), but decreased purchase intentions when social standing was low ( $b = -.62$ ,  $t = -2.51$ ,  $p = .01$ ). Among mastery-oriented consumers (mean + 1 SD), temporal decline did not significantly influence product attitudes, regardless of social standing (all  $|t|s < 1$ , NS). Figure 6 illustrates these results

## Discussion

Supporting hypothesis 2, study 2 demonstrated that the interactive effect of temporal and social comparisons on the pursuit of self-improvement is moderated by goal orientation. Specifically, among individuals with at least moderate performance orientation, temporal decline increased self-improvement product evaluations when social standing was high, but decreased product evaluations when social standing was low. Notably, this negative effect of decline when social standing is low is consistent with prior research showing helplessness responses among performance-focused individuals with low ability (Elliott and Dweck 1986). More importantly, the fact that the core effect was attenuated for strongly mastery-oriented people—that is, people who are unconcerned with social standing (Butler 1993; Dweck 1986)—suggests that a desire to maintain high social standing may account for the effects.

In study 3, we seek additional evidence of the underlying mechanism by examining the mediating role of subjective need for improvement. Central to our theorizing is the idea that people generally want to reduce discrepancies between themselves and desired standards (Carver and Scheier 1982; Higgins 1987). If temporal decline signals a loss of social standing, then it should increase subjective perceptions of deficiency, which in turn encourage remedial efforts. Importantly, this should only occur for individuals with high social standing, as they should be more sensitive to a loss of social standing (Kahneman and Tversky 1979)—that is, we predict moderated mediation. To test this, we manipulate temporal and social comparisons using a scenario about physical fitness and measure subjective need for improvement as well as intentions to engage in healthy behaviors.

Notably, in studies 1 and 2, our temporal comparison manipulation had two levels, improvement and decline, and we treated improvement as the control condition. We reasoned that regarding improvement as the default mirrors reality, given that people generally perceive themselves as improving over time (Ross and Wilson 2003; Wilson and Ross 2001; Woodruff and Birren 1972). However, it is still possible that our effects were due to temporal improvement licensing a decrease in self-improvement pursuit (Fishbach and Dhar 2005; Khan and Dhar 2006), rather than temporal decline motivating an increase in self-improvement pursuit. Thus, in study 3, we replace the temporal improvement condition with a no-feedback control condition in order to ascertain that temporal decline actually increases self-improvement pursuit relative to a neutral condition.

### **STUDY 3**

In study 3 we seek mediational evidence of the proposed underlying process. Specifically, we predict that subjective need for improvement should mediate the effects of temporal decline on self-improvement pursuit when social standing is high, but not when social standing is low. Such a pattern of moderated mediation would support the notion that the desire to maintain high social standing drives the obtained effects.

#### **Methods**

*Participants.* One hundred and twenty-four participants (44 females; median age = 28) from Amazon's Mechanical Turk panel completed this study in exchange for a nominal fee.

*Procedure.* Participants were randomly assigned to one of four conditions in a 2 (temporal comparison: none vs. declining) x 2 (social comparison: high vs. low standing) design. All participants read a scenario describing a trip to the doctor for a routine check-up during which they received feedback about their weight. To manipulate temporal comparison, the doctor mentioned that their weight had increased over the past year or the doctor did not mention any change in their weight. To manipulate social comparison, the doctor mentioned that they weighed more or less than average for a person of their age, gender, and height.

After reading the scenario, participants complete a series of measures. First, in order to assess the potential role of affect, participants rated their mood using the PANAS scale (Watson, Clark, and Tellegen 1988). Next, they reported their subjective need for improvement, the proposed mediator, by responding to four items (e.g., “To what extent do you think you need to lose weight?”) on 1 (*not at all*) to 7 (*very much*) scales. Following this, as the first dependent variable, participants rated their intentions to engage in four fitness-related behaviors (e.g., “look for diet and exercise tips online”) on 1 (*very unlikely*) to 7 (*very likely*) scales. As a second dependent variable, participants viewed an image and description of a mobile application designed to help improve physical fitness and rated how relevant the product was to them and how much they would consider buying the product on 1 (*not at all*) to 7 (*very much*) scales. They then completed two true/false manipulation checks to test their recall of the feedback they received in the scenario: “In the scenario you read, the doctor said your weight was increasing” and “In the scenario you read, the doctor said your weight was less than average.” Finally, participants completed demographic measures and reported their involvement (how “interested”

and “engaged” they were in the survey) on 1 (*not at all*) to 7 (*very much*) scales. See appendix B3 for all manipulations, stimuli, and measures used in study 3.

## Results

*Manipulation Checks.* To test the effectiveness of the temporal and social comparison manipulations, we conducted chi-square analyses of participants’ responses to the true/false questions about the scenario. For the temporal comparison manipulation check, recall of weight change in the scenario was significantly better than chance levels (50%), with 73.39% of participants responding correctly ( $\chi^2(1) = 27.13, p < .001$ ). Likewise, for the social comparison manipulation check, recall of social standing in weight was significantly better than chance levels (50%), with 87.90% of participants responding correctly ( $\chi^2(1) = 71.26, p < .001$ ). Thus, evidence suggests that our manipulations were generally effective.

*Mood.* We averaged the ten positive items and the ten negative items from the PANAS separately to form two mood scales ( $\alpha_{\text{positive}} = .94; \alpha_{\text{negative}} = .96$ ) and subjected these to 2 (temporal comparison) x 2 (social comparison) ANOVAs. This analysis revealed no significant main or interactive effects of temporal and social comparisons on positive mood (all  $F_s(1,120) < 1.70$ , NS) or on negative mood (all  $F_s(1,120) < 2.30$ , NS). Reading a scenario in which you make a negative (vs. no) temporal comparison and a negative (vs. positive) social comparison had no effect on positive mood ( $M_{\text{TC}} = 2.45$  vs. 2.64;  $M_{\text{SC}} = 2.51$  vs. 2.58) or negative mood ( $M_{\text{TC}} = 1.59$  vs. 1.55;  $M_{\text{SC}} = 1.62$  vs. 1.51).

*Need for Improvement.* A 2 x 2 ANOVA on the average of the four need for improvement items ( $\alpha = .98$ ) revealed a significant main effect of social comparison ( $F(1, 120) = 41.49, p < .001$ )—in general, those who read that they weighed more (vs. less) than average reported a higher need for improvement ( $M = 5.42$  vs.  $3.23$ )—but no main effect of temporal comparison ( $M_{\text{decline}} = 4.55, M_{\text{none}} = 4.11, F(1, 120) = 2.25, \text{NS}$ ). Importantly, this was qualified by a significant temporal comparison x social comparison interaction ( $F(1, 120) = 3.95, p < .05$ ). Simple contrasts revealed that when participants weighed less than average, temporal decline (vs. no temporal comparison) increased subjective need for improvement ( $F(1, 120) = 6.09, p < .05$ ). However, when participants weighed more than average, temporal decline (vs. no temporal comparison) had no effect on subjective need for improvement ( $F(1, 120) = .12, \text{NS}$ ). Figure 7 illustrates these results.

*Fitness Intentions.* A 2 x 2 ANOVA on the average of the four fitness intention items ( $\alpha = .88$ ) yielded a significant main effect of temporal comparisons—participants who gained weight (vs. made no comparison) reported higher intentions to engage in fitness-related behaviors ( $M = 5.34$  vs.  $4.80, F(1,120) = 5.38, p < .05$ )—and a significant main effect of social comparison—participants who weighed more (vs. less) than average reported higher intentions to engage in fitness-related behaviors ( $M = 5.69$  vs.  $4.44, F(1,120) = 25.55, p < .001$ ). Notably, this was qualified by a significant temporal comparison x social comparison interaction ( $F(1,120) = 9.64, p < .01$ ). Simple contrasts indicated that when participants weighed less than average, temporal decline (vs. no temporal comparison) increased fitness intentions ( $F(1, 120) = 14.74, p < .001$ ). However, when participants weighed more than average, temporal decline (vs. no

temporal comparison) had no effect on fitness intentions ( $F(1, 120) = .31, NS$ ). Figure 7 illustrates these results.

Additionally, we tested whether the interactive effect of temporal and social comparisons on fitness intentions were mediated by need for improvement. Specifically, following bootstrapping procedures, we conducted moderated mediation analysis using Hayes's (2012) PROCESS macro (model 8; 5,000 bootstrapped samples). This analysis revealed a significant positive indirect effect of temporal comparisons on fitness intentions through need for improvement when weight was lower than average (effect = .30; 95% CI: .05, .74), but a nonsignificant indirect effect when weight was higher than average (effect = -.04; 95% CI: -.29, .16). That is, when social standing on the dimension of weight was high, temporal decline increased the need for improvement, which consequently increased intentions to engage in fitness-improving behaviors.

*Product Evaluations.* We averaged the two product evaluation measures ( $\alpha = .90$ ) and subjected this to a 2 x 2 ANOVA, which revealed only a marginally significant main effect of social comparison—participants who weighed more (vs. less) than average reported marginally higher intentions to engage in fitness-related behaviors ( $M = 4.60$  vs.  $4.00$ ,  $F(1,120) = 3.35$ ,  $p < .10$ ). All other main and interactive effects were nonsignificant (all  $F_s(1, 120) < 1$ , NS).

Although temporal and social comparisons did not have a direct interactive effect on self-improvement product evaluations, this does not preclude the possibility that they operate indirectly through need for improvement (Zhao, Lynch and Chen 2010). Thus, following bootstrapping procedures, we conducted moderated mediation analysis using Hayes's (2012) PROCESS macro (model 8; 5,000 bootstrapped samples). This yielded a significant positive

indirect effect of temporal comparisons on self-improvement app evaluations through need for improvement when weight was lower than average (effect = .28; 95% CI: .04, .77), but a nonsignificant indirect effect when weight was higher than average (effect = -.05; 95% CI: -.93, .84). That is, when social standing was high, temporal decline increased need for improvement, which consequently increased evaluations of the mobile app for improving fitness.

## Discussion

Supporting hypothesis 5, study 3 demonstrated that the interactive effect of temporal and social comparisons on self-improvement pursuit was mediated by need for improvement in the context of physical fitness. Specifically, temporal decline heightened the perceived need for improvement, which in turn boosted fitness intentions and fitness product evaluations when social standing was high, but not when social standing was low. Notably, the fact that need for improvement (i.e., perceived deficiency in the self) drove fitness intentions and evaluations of fitness-related products is consistent with prominent self-regulation theories demonstrating that people are motivated to reduce self-discrepancies (Carver and Scheier 1982; Higgins 1987). Furthermore, consistent with the principle of diminishing sensitivity (Kahneman and Tversky 1979), although low (vs. high) social standing generally increased the subjective need for improvement (hence the main effect of social comparisons), temporal decline did not additionally increase need for improvement for individuals of low social standing. Altogether, these results further inform the process by which temporal and social comparisons interact to influence self-improvement pursuit.

Of note, the fact that we conceptually replicated the findings of studies 1 and 2 using a no temporal comparison condition (instead of an improving condition) as the control group supports our decision to treat the improving condition as the control group in studies 1 and 2. Also worth mention, although we did not find a significant direct interactive effect of temporal and social comparisons on evaluations of the fitness mobile app, we did find a significant indirect effect through need for improvement. This suggests that there might be countervailing forces at work which we have not identified. For example, feedback about temporal decline in one's health could conceivably cause defensiveness (Lieberman and Chaiken 1992; Sherman, Nelson, and Steele 2000), which would ultimately undermine self-improvement pursuit. As another possibility, processing self-threatening health-related feedback may have depleted self-regulatory resources (Agrawal and Wan 2009), which could hinder the pursuit of self-improvement.

In study 4, we seek additional evidence of the underlying mechanism by examining the moderating role of self-other perspective. Given that losses loom larger for the self than for others (Polman 2012), people should underestimate the pain others experience from a loss of social standing. Thus, if the obtained effects of temporal and social comparisons are driven by a motive to counter losses of social standing, then the effects should be mitigated when predicting other people's (vs. one's own) reactions to self-comparison feedback—that is, when the sense of loss is less pronounced.

## **STUDY 4**

Study 4 further explores whether the core effect is driven by an aversion to a loss of social standing and a desire to remedy such losses. To test this, participants read a scenario in

which they or someone else receives temporal and social comparison feedback about their weight and report how they personally would respond in that scenario or how they believe someone else would respond in that scenario. We predict that when social standing is high, temporal decline will increase self-improvement pursuit when individuals are deciding for themselves, but not when they are deciding for others. Furthermore, we expect this to be mediated by need for improvement, as in study 3.

## Methods

*Participants.* One hundred and eleven participants (43 females; median age = 30) from Amazon's Mechanical Turk panel completed this study in exchange for a nominal fee.

*Procedure.* Participants were randomly assigned to one of four conditions in a 2 (temporal comparison: improving vs. declining) x 2 (perspective: self vs. other) between-subjects design. As in study 3, participants read a scenario about a visit to the doctor in which a patient received feedback about their weight. To manipulate perspective, participants were instructed to imagine that they were the patient visiting the doctor ("Imagine that you are getting a routine check-up...") or someone else was the patient visiting the doctor ("Imagine that a person is getting a routine check-up..."). To manipulate temporal comparison, the doctor mentioned that the patient's weight had increased or decreased over the past year. Importantly, in this study all participants read that social standing was high (i.e., weight was lower than average) in order to simplify the design.

Next, participants complete a series of measures, responding either for themselves (self condition) or making judgments and predictions about the person in the scenario (other condition). First, they reported their own or the other person's need for improvement using the same four items from study 3. Following this, as the first dependent variable, participants rated intentions or predicted the other's intentions to engage in six fitness-related behaviors (e.g., "take the stairs instead of the elevator more") on 1 (*very unlikely*) to 7 (*very likely*) scales. As a second dependent variable, participants viewed an advertisement for a free seven-day pass for a national gym chain and rated how relevant the offer was to them (or the other person) and how much they (or the other person) would consider using the offer on 1 (*not at all*) to 7 (*very much*) scales. They then completed the same true/false manipulation checks from study 3. Finally, participants completed demographic measures and reported their involvement (how "interested" and "engaged" they were in the survey) on 1 (*not at all*) to 7 (*very much*) scales. See appendix B4 for all manipulations, stimuli, and measures used in study 4.

## Results

*Manipulation Checks.* To assess the effectiveness of the temporal and social comparison feedback, we conducted chi-square analyses of participants' responses to the true/false questions about the scenario. For the temporal comparison manipulation check, recall of weight change in the scenario was significantly better than chance levels (50%), with 96.40% of participants responding correctly ( $\chi^2(1) = 95.58, p < .001$ ). Likewise, for the social comparison check, recall of social standing in weight was significantly better than chance levels (50%), with 87.39% of

participants responding correctly ( $\chi^2(1) = 62.06, p < .001$ ). Thus, evidence suggests that our manipulations were generally effective.

*Need for Improvement.* A 2 (temporal comparison) x 2 (self-other perspective) ANOVA on the average of the four need for improvement items ( $\alpha = .93$ ) revealed a significant main effect of temporal comparison ( $F(1, 107) = 9.47, p < .01$ )—in general, those who read that the above-average patient gained (vs. lost) weight reported a higher need for improvement ( $M = 3.38$  vs.  $2.38$ )—but no main effect of perspective ( $M_{\text{self}} = 2.85, M_{\text{other}} = 2.92, F(1, 107) = .29, \text{NS}$ ). Importantly, this was qualified by a significant temporal comparison x self-other perspective interaction ( $F(1, 107) = 4.98, p < .05$ ). Simple contrasts revealed that when participants were deciding for themselves, temporal decline (vs. improvement) increased subjective need for improvement ( $F(1, 107) = 14.75, p < .001$ ). However, when participants were making judgments about others, temporal decline (vs. improvement) had no effect on need for improvement ( $F(1, 107) = .34, \text{NS}$ ). Figure 8 illustrates these results.

*Fitness Intentions.* A 2 x 2 ANOVA on the average of the six fitness intention items ( $\alpha = .89$ ) yielded a significant main effect of temporal comparisons—participants who read that the above-average patient gained (vs. lost) weight reported higher intentions to engage in fitness-related behaviors ( $M = 4.47$  vs.  $3.72, F(1,107) = 6.87, p = .01$ )—but no main effect of perspective ( $M_{\text{self}} = 4.24, M_{\text{other}} = 3.95, F(1, 107) = .66, \text{NS}$ ). Although the temporal comparison x self-other perspective interaction did not reach significance ( $F(1, 107) = 2.34, p = .13$ ), it is worth noting that the main effect of temporal comparisons was largely driven by the self condition. Specifically, simple contrasts indicated a significant effect of gaining (vs. losing)

weight in the self condition ( $M = 4.74$  vs.  $3.62$ ,  $F(1, 107) = 9.02$ ,  $p < .01$ ), but not in the other condition ( $M = 4.11$  vs.  $3.82$ ,  $F(1, 107) = .57$ , NS).

We also tested whether temporal comparison and self-other perspective have an interactive indirect effect on fitness intentions through need for improvement (i.e., moderated mediation). Using Hayes's (2012) PROCESS macro (model 8, 5,000 bootstrapped samples), we conducted moderated mediation analysis that revealed a significant positive indirect effect of temporal comparisons on fitness intentions through need for improvement in the self condition (effect =  $.76$ ; 95% CI:  $.39, 1.24$ ), but a nonsignificant indirect effect in the other condition (effect =  $.12$ ; 95% CI:  $-.32, .56$ ). That is, when deciding for the self, but not when making judgments and predictions about others, temporal decline increased the need for improvement, which consequently increased intentions to engage in fitness-improving behaviors.

*Gym Evaluations.* We averaged the two gym evaluation measures ( $\alpha = .88$ ), and a 2 x 2 ANOVA on this index revealed only a marginally significant main effect of self-other perspective—gym evaluations were marginally higher in the other condition ( $M = 3.97$ ) than in the self condition ( $M = 3.36$ ,  $F(1,107) = 3.45$ ,  $p < .10$ ). All other main and interactive effects were nonsignificant (all  $F_s(1, 107) < 1.2$ , NS).

Furthermore, we tested whether temporal comparison and self-other perspective have an interactive indirect effect on gym evaluations through need for improvement (i.e., moderated mediation). Using Hayes's (2012) PROCESS macro (model 8, 5,000 bootstrapped samples), we conducted moderated mediation analysis that revealed a significant positive indirect effect of temporal comparisons on gym evaluations through need for improvement in the self condition (effect =  $.79$ ; 95% CI:  $.34, 1.45$ ), but a nonsignificant indirect effect in the other condition (effect

= .13; 95% CI: -.29, .64). That is, when deciding for the self, but not when making judgments and predictions about others, temporal decline increased the need for improvement, which consequently increased evaluations of the gym offer.

## Discussion

Supporting hypotheses 3 and 5, Study 4 demonstrated that when social standing was high, temporal decline in physical fitness increased the perceived need for improvement, which increased self-improvement intentions. Importantly, this held when reporting one's own response to temporal and social comparison feedback, but not when making predictions about someone else's response, aligned with the notion that losses loom larger for the self than for others (Polman 2012). Given that decline should seem less grave when it happens to someone else (vs. the self), we reasoned that it should be less likely to engender perceptions of deficiency and remedial efforts when predicting others' behavior. Indeed, akin to an interpersonal empathy gap (Nordgren et al. 2011), participants demonstrated a bias when judging how others (vs. the self) would react to a loss of social standing, with the motivational influence of self-discrepancies all but disappearing when predicting other people's self-improvement efforts. Notably, although we found a significant indirect interactive effect through need for improvement, the direct interactive effect of temporal comparisons and self-other perspective on fitness pursuit was not significant. Again, this suggests that there might be countervailing forces at play, such as defensive processing (Lieberman and Chaiken 1992; Sherman, Nelson, and Steele 2000). Nevertheless, the findings of study 4 support the idea that a desire to maintain high social

standing, and an aversion to losses of social standing, can account for the interactive effects of temporal and social comparisons on self-improvement pursuit.

Thus far, studies 1 through 4 have manipulated self-comparisons using scenarios or idiosyncratic dimensions of self-evaluation. In study 5, we test our predictions in a more externally valid manner by manipulating the temporal and social comparison feedback participants receive on a real task. Furthermore, we assess the moderating effect of regulatory focus, as promotion-focused individuals have a steeper value function in the positive domain (Chernev 2004) and thus should be more sensitive to a loss of high social standing. To the extent that our proposed process is valid, the interaction between temporal and social comparisons should be stronger among promotion-focused individuals.

## **STUDY 5**

The objectives of study 5 are twofold. First, we seek to strengthen the evidence for the proposed underlying mechanism by testing the moderating effect of regulatory focus, which should influence sensitivity to losses (Chernev 2004). Secondly, we bolster the external validity of our findings by providing participants with temporal and social comparison feedback on a task that they actually complete rather than using a scenario or instructing them identify idiosyncratic dimensions of self-comparison. Specifically, participants complete an attention regulation test (Ophir, Nass, and Wagner 2009) and receive false feedback about how their performance changed across the different sections of the test, as well as how their performance compared to the average for their age group. As the dependent variable, they evaluate a meditation app that can purportedly help improve cognitive performance. We predict a three-way temporal

comparison x social comparison x regulatory focus interaction: among more promotion-focused individuals, temporal decline will encourage self-improvement pursuit when social standing is high, but not when social standing is low.

## Methods

*Participants.* Two hundred and one participants (95 females; median age = 32) from Amazon's Mechanical Turk panel completed this study in exchange for a nominal fee.

*Procedure.* Participants were randomly assigned to one of four conditions in a 2 (temporal comparison: improving vs. declining) x 2 (social comparison: high vs. low standing) between-subjects design. Under the guise of a study on attention and focus skills among adults in the U.S., all participants completed an attention regulation test based on Ophir, Nass, and Wagner's (2009) task switching test. In each trial, the word "number" or "letter" was flashed briefly, followed by an alphanumeric pair (e.g., "u4"). Participants were instructed to focus on the number (letter) in the alphanumeric pair if the word "number" ("letter") flashed across the screen. Furthermore, they were instructed to press the left arrow key if the number (letter) was odd (a vowel) and to press the right arrow key if the number (letter) was even (a consonant). Importantly, they were told to respond as quickly as possible, as this was supposedly a timed task. Participants first completed five practice trials followed by 30 "scored" trials divided into three sections (10 trials per section).

After completing the test, participants were randomly assigned to receive false feedback. To bolster the credibility of the feedback, participants first entered their age and then waited for

15 seconds while the system supposedly prepared their performance report. After the delay, participants were automatically advanced to a screen with their performance report, which detailed their score on each of the three sections of the test, their overall score, and the mean score for their age group. To manipulate temporal comparisons, participants were informed that their score either strictly increased or decreased between the first section and the final section. Importantly, in order to hold the participants' overall scores constant, all participants saw the same three scores in increasing or decreasing order. To manipulate social comparisons, participants were informed that their score was either higher or lower than the average for their age group. Specifically, the age group mean was either 13 points higher or 13 points lower than the participants' overall score of 76.

Participants then proceeded to an ostensibly unrelated product evaluation task. Specifically, they read that a team of researchers were developing a new mobile application for meditation and that regular meditation can improve cognitive functioning. They then listened to a 5 minute guided meditation recording, described as one of the exercises available in the app, and completed a series of measures. First, participants rated their attitude toward the guided meditation session they completed on 1 (*dislike/negative/bad*) to 7 (*like/positive/good*) scales. Next, they rated the likelihood that they would download the meditation app, the likelihood that they would spend more time meditating in general, and the likelihood that they would seek out more information about meditation on 1 (*very unlikely/impossible/improbable*) to 7 (*very likely/possible/probable*) scales.

Following this, participants responded to two manipulation checks. Specifically, they rated how their performance on the attention regulation test compared to their age group's mean on a 1 (*much worse than average*) to 9 (*much better than average*) scale and how their

performance changed between the first and final sections of the test on a 1 (*major decline*) to 9 (*major improvement*) scale. After the manipulation checks, participants rated the extent to which they believe that meditation can help improve cognitive skills using a 1 (*not at all*) to 7 (*very much*) measure, completed basic demographic measures, and finally completed the 11-item Regulatory Focus Questionnaire (RFQ; Higgins et al. 2001). See appendix B5 for all manipulations, stimuli, and measures used in study 5.

## Results

*Manipulation Checks.* A 2 (temporal comparison) x 2 (social comparison) ANOVA of the temporal comparison manipulation check revealed a significant main effect of temporal comparison ( $F(1, 197) = 238.04, p < .001$ )—as expected, participants in the improving condition ( $M = 6.80$ ) reported more self-improvement than those in the declining condition ( $M = 3.87$ ). Unexpectedly, there was a marginally significant effect of social comparison, with participants in the above average condition ( $M = 5.46$ ) reporting directionally more self-improvement than those in the below average condition ( $M = 5.16, F(1, 197) = 3.10, p < .10$ ). Lastly, there was no temporal comparison x social comparison interaction ( $F(1, 197) = .21, NS$ ).

A 2 x 2 ANOVA on the social comparison manipulation check revealed a significant main effect of social comparison ( $F(1, 197) = 304.23, p < .001$ )—as expected, participants in the above average condition ( $M = 7.00$ ) reported higher social standing than those in the below average condition ( $M = 3.73$ ). All other effects were nonsignificant (all  $F_s(1, 197) < 1, NS$ ).

Finally, a one-sample  $t$  test indicated that average perceptions of the efficacy of meditation in improving cognitive skills ( $M = 4.68$ ) were significantly higher than the midpoint

of the scale ( $t(200) = 6.18, p < .001$ ), suggesting that people generally believed that meditation was an effective means of self-improvement. Importantly, a 2 x 2 ANOVA revealed no significant effects of our manipulations on the perceived efficacy measure (all  $F_s(1, 197) < 2.20$ , NS).

*Attitude Toward the Guided Meditation.* We averaged the three attitude items ( $\alpha = .95$ ) and regressed this measure on temporal comparison (contrast-coded), social comparison (contrast-coded), the promotion focus subscale of the RFQ (mean-centered;  $\alpha = .72$ ), and all two-way and three-way interactions. This revealed a significant main effect of promotion focus ( $b = .29, t = 2.45, p < .05$ ), qualified by a significant temporal comparison x social comparison x promotion focus interaction ( $b = .31, t = 2.62, p < .01$ ). All other effects were nonsignificant (all  $|t|s < 1$ , NS).

To decompose the three-way interaction, we applied the Johnson-Neyman technique (Spiller et al. 2013), which revealed a significant temporal comparison x social comparison interaction at any mean-centered value of promotion focus above .44 ( $b_{JN} = .23, t = 1.97, p = .05$ ), corresponding to a raw value of 5.02 out of 7. In other words, only among more promotion-focused individuals did temporal and social comparisons have an interactive effect on attitudes toward the guided meditation session.

Furthermore, we tested the simple-simple effects of temporal comparisons at the different levels of social comparisons and one standard deviation above and below the mean of promotion focus. Among more promotion-focused participants (mean + 1 SD), temporal decline increased attitudes towards the guided meditation exercise when social standing was high ( $b = .53, t = 2.55, p = .01$ ), but not when social standing was low ( $b = -.22, t = -1.00$ , NS). Among less

promotion-focused participants (mean - 1 SD), temporal decline had no effects on attitudes at any level of social standing (all  $|t|s < 1$ , NS). Figure 9 illustrates these results.

*Intentions to Download Meditation App.* A similar regression analysis of intentions to download the meditation app ( $\alpha = .96$ ) revealed a significant main effect of promotion focus ( $b = .31, t = 2.11, p < .05$ ), qualified by a significant temporal comparison x social comparison x promotion focus interaction ( $b = .36, t = 2.42, p < .05$ ). All other effects were nonsignificant (all  $|t|s < 1.50$ , NS).

To explore the three-way interaction, we applied the Johnson-Neyman technique, which revealed a significant temporal comparison x social comparison interaction at any mean-centered value of promotion focus above .93 ( $b_{JN} = .38, t = 1.97, p = .05$ ), corresponding to a raw value of 5.51 out of 7. As expected, temporal and social comparisons only had an interactive effect on intentions to download the meditation app among more promotion-focused individuals.

Further decomposing the interaction, we tested the simple-simple effects of temporal comparisons at the different levels of social comparisons and one standard deviation above and below the mean of promotion focus. Among more promotion-focused participants (mean + 1 SD), temporal decline marginally increased intentions to download the meditation app when social standing was high ( $b = .44, t = 1.67, p < .10$ ), but not when social standing was low ( $b = -.30, t = -1.10$ , NS). Among less promotion-focused participants (mean - 1 SD), temporal decline had no effects on intentions at any level of social standing (all  $|t|s < 1.50$ , NS).

*Intentions to Spend More Time Meditating.* A regression of participants' intentions to spend more time meditating ( $\alpha = .96$ ) using the same predictor variables as the previous analyses

yielded a marginally significant main effect of promotion focus ( $b = .24, t = 1.69, p < .10$ ), a marginally significant social comparison x promotion focus interaction ( $b = -.25, t = -1.81, p < .10$ ), and a significant temporal comparison x social comparison x promotion focus interaction ( $b = .33, t = 2.37, p < .05$ ). All other effects were nonsignificant (all  $|t|s < 1.70$ , NS).

Decomposing the three-way interaction, we applied the Johnson-Neyman technique, which revealed a significant temporal comparison x social comparison interaction at any mean-centered value of promotion focus above 1.43 ( $b_{JN} = .47, t = 1.97, p = .05$ ), corresponding to a raw value of 6.01 out of 7. As predicted, temporal and social comparisons only had an interactive effect on intentions to download the meditation app among more promotion-focused individuals.

Further decomposing the interaction, we tested the simple-simple effects of temporal comparisons at the different levels of social comparisons and one standard deviation above and below the mean of promotion focus. Among more promotion-focused participants (mean + 1 SD), temporal decline increased intentions to spend more time meditating when social standing was high ( $b = .55, t = 2.22, p < .05$ ), but not when social standing was low ( $b = -.03, t = -.13$ , NS). Among less promotion-focused participants (mean - 1 SD), temporal decline had no significant effects at any level of social standing (all  $|t|s < 1.80$ , NS).

*Intentions to Seek More Information about Meditation.* A regression of intentions to seek more information about meditation ( $\alpha = .96$ ) using the same predictor variables as the previous analyses yielded a marginally significant main effect of promotion focus ( $b = .24, t = 1.68, p < .10$ ), a marginally significant temporal comparison x promotion focus interaction ( $b = .25, t = 1.78, p < .10$ ), and a significant temporal comparison x social comparison x promotion focus interaction ( $b = .35, t = 2.41, p < .05$ ). All other effects were nonsignificant (all  $|t|s < 1.6$ , NS).

To decompose the three-way interaction, we applied the Johnson-Neyman technique, which revealed a significant temporal comparison x social comparison interaction at any mean-centered value of promotion focus above .61 ( $b_{JN} = .31, t = 1.97, p = .05$ ), corresponding to a raw value of 5.19 out of 7. As predicted, temporal and social comparisons only had an interactive effect on intentions to download the meditation app among more promotion-focused individuals.

Moreover, we tested the simple-simple effects of temporal comparisons at the different levels of social comparisons and one standard deviation above and below the mean of promotion focus. Among more promotion-focused participants (mean + 1 SD), temporal decline increased intentions to spend more time meditating when social standing was high ( $b = .72, t = 2.83, p < .01$ ), but not when social standing was low ( $b = -.10, t = -.37, NS$ ). Among less promotion-focused participants (mean - 1 SD), temporal decline had no significant effects at any level of social standing (all  $|t|s < 1.50, NS$ ). Figure 9 illustrates these results.

## Discussion

Supporting hypothesis 4, study 5 demonstrated that the interactive effects of temporal and social comparisons were moderated by regulatory focus. Specifically, among promotion-focused individuals, temporal decline led to greater pursuit of self-improvement products when social standing was high, but not when social standing was low. Given that individuals with stronger promotion focus are especially sensitive to negative deviations from positive reference points (Chernev 2004), this pattern of moderation stands as additional evidence of the proposed underlying process based on a desire to maintain high social standing. Here, high social standing

corresponds to a positive reference point, and temporal decline corresponds to the negative deviation.

Importantly, these effects arose as a result of feedback that participants received on a real task—and attention regulation test—that they completed. Furthermore, these effects were obtained on evaluations of a self-improvement product—a meditation app—that participants actually tried out before rating. Both of these features of study 5 lend greater external validity to our findings. Of additional note, the predicted interaction arose on various measures reflecting participants' interest in improving their cognitive functioning, from their attitudes toward the guided meditation session to their intentions of learning more about meditation and its benefits.

## **GENERAL DISCUSSION**

The present research sought to provide a more holistic understanding of how self-comparisons influence the pursuit of self-improvement, a drive that fuels a billion dollar self-help industry. Despite a modest but growing social psychology literature on temporal comparisons, consumer research has largely disregarded this topic, giving the lion's share of attention to social comparisons instead. Here, we considered the situation in which both temporal and social comparison information is available, and we proposed that the two types of self-comparisons can interact to drive behaviors enacted and purchases made in pursuit of self-improvement.

Reasoning that people generally wish to maintain high social standing in service of self-enhancement motives (Alicke 1985; Baumeister 1988; Brown 2012), and temporal decline threatens a loss of social standing, we predicted that temporal decline should encourage self-

improvement efforts among individuals who are of high social standing. When individuals are already of low standing, temporal decline—an additional loss of standing—will be less threatening, consistent with the principle of diminishing marginal sensitivity (Kahneman and Tversky 1979). Integral to these predictions is the idea that people are motivated to reduce discrepancies between themselves and desired standards—a notion espoused by self-discrepancy theory (Higgins 1987) and control theory (Carver and Scheier 1981, 1982).

To test this, we conducted five experiments, each of which examined a different component of the process. Study 1 provided initial evidence of the core interactive effect of temporal and social comparisons on self-improvement pursuit. Study 2 showed that the effect was stronger for individuals with a performance (vs. mastery) goal orientation, which has direct bearing on the personal importance of high social standing (Butler 1993; Dweck 1986), and thus sensitivity to a loss of high social standing. Study 3 directly measured the motivational component of the process and established that need for improvement mediated the effect of temporal decline on self-improvement pursuit, consistent with the idea that people wish to reduce salient deficiencies in the self (Carver and Scheier 1981; Higgins 1987). Study 4 found that the mediating effect of need for improvement was eliminated when making judgments and predictions about someone else, reflecting the idea that losses loom larger for the self than others (Polman 2012) and consequently should have greater impact on decisions for the self versus others. Finally, study 5 demonstrated that the interactive effect of temporal and social comparison was accentuated for individuals with stronger promotion focus—those who should be more sensitive to losses when starting from a positive reference point (Chernev 2004).

Taken together, these five experiments suggest that the motivation to maintain high social standing and to remedy a loss of high social standing accounts for the interactive effect of

temporal and social comparisons on the pursuit of self-improvement. Notably, the core effect replicated across two substantive domains—academic performance/cognitive skills and health/physical fitness—and was robust to different self-comparison manipulations—scenarios (studies 1, 3, and 4), idiosyncratic domains (study 2), and false feedback (study 5). In demonstrating these effects, this research contributes to the literature on self-comparisons (Gershoff and Burson 2011; McFerran et al. 2010a, 2010b; Shalev and Morwitz 2012; White, Simpson, and Argo 2014), which has largely examined social comparisons independently of temporal comparisons. Here, we consider their joint influence and demonstrate a novel interactive effect on self-improvement pursuit.

This research also advances the literature on self-threats and self-enhancement processes in consumer behavior. The majority of prior research in this area focuses on the adverse personal outcomes, such as defensiveness (Menon, Block, and Ramanathan 2002; Raghurir and Menon 1998), conspicuous consumption (Chaplin and John 2010; Rucker and Galinsky 2008; Sivanathan and Pettit 2010), and overeating (Dubois, Rucker, and Galinsky 2012). In contrast, like recent work by Kim and Gal (2014), we demonstrate a beneficial outcome of self-threats—the pursuit of self-improvement. Lastly, from a practical standpoint, the results of this research suggest that marketers of self-improvement products and services should be careful when evoking unfavorable temporal comparisons to encourage purchase of their products, as this may actually backfire if consumers are of low social standing.

Finally, this research provides several directions for future inquiry. For example, how do social comparisons of the rate of temporal change (i.e., a meta-comparison) influence self-evaluations and self-improvement pursuit? If a person has been improving over time, but to a lesser extent than his peers, when will he be satisfied by the mere fact that he is improving, and

when will he be dissatisfied by the fact that others' improvement exceeds his own? Future research should identify moderating factors that determine when either outcome will prevail. Another promising avenue for additional research concerns the possibility that one type of comparison may crowd out the other. In the experiments we presented, participants were relatively free of distractions and could elaborate on the two sources of self-comparison feedback. In reality, consumers are usually under some degree of cognitive load, and thus may not always be able to deeply process and integrate two sources of self-comparison feedback. Given the fundamental drive for self-enhancement and high social standing (Brickman 1975; Brown 1986; Tesser 1988;), it is possible that social comparisons may dominate under cognitive load; however, given research suggesting that people are more sensitive to change than static levels (Kahnman and Tversky 1979), it is also possible that temporal comparisons will dominate under cognitive load. Future research should attempt to reconcile these opposing predictions.

In closing, there is a dearth of consumer research exploring how temporal self-comparisons influence self-regulation, an issue of unarguable relevance to the field. The present work stands as an initial investigation of this question—one that will hopefully catalyze a more vigorous exploration of the fertile, largely uncharted territory that is the topic of temporal comparisons.

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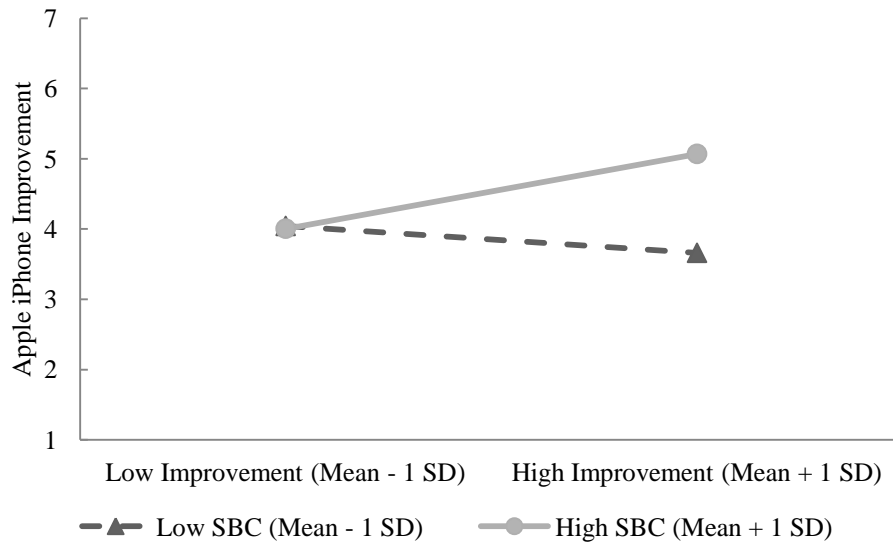
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**FIGURE 1**

**EFFECTS OF PERCEIVED SELF-IMPROVEMENT AND SBC ON BRAND  
IMPROVEMENT EVALUATIONS (CH. II, PILOT STUDY)**

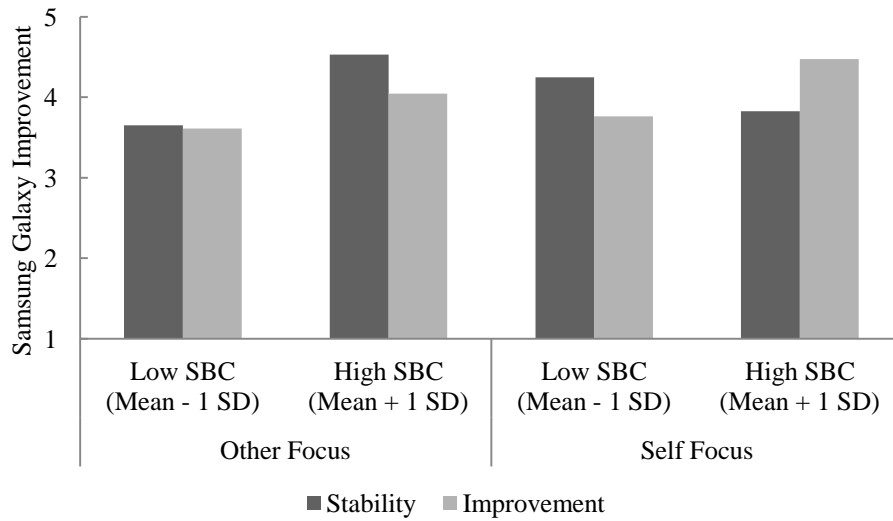


Note.—Figure 1 depicts the predicted values of brand improvement at the different levels of perceived self-improvement and SBC (mean  $\pm$  1 SD).

**FIGURE 2**

EFFECTS OF PERCEIVED SELF-IMPROVEMENT, SBC, AND SELF-FOCUS ON BRAND

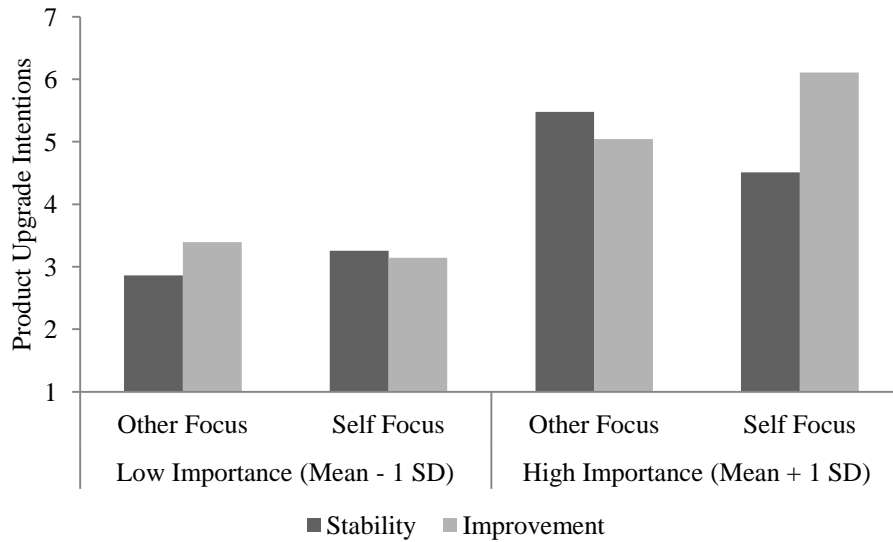
IMPROVEMENT EVALUATIONS (CH. II, S1)



Note.—Figure 2 depicts the predicted values of brand improvement at the different levels of perceived improvement (stability vs. improvement), self-focus (self vs. friend), and SBC (mean  $\pm$  1 SD).

**FIGURE 3**

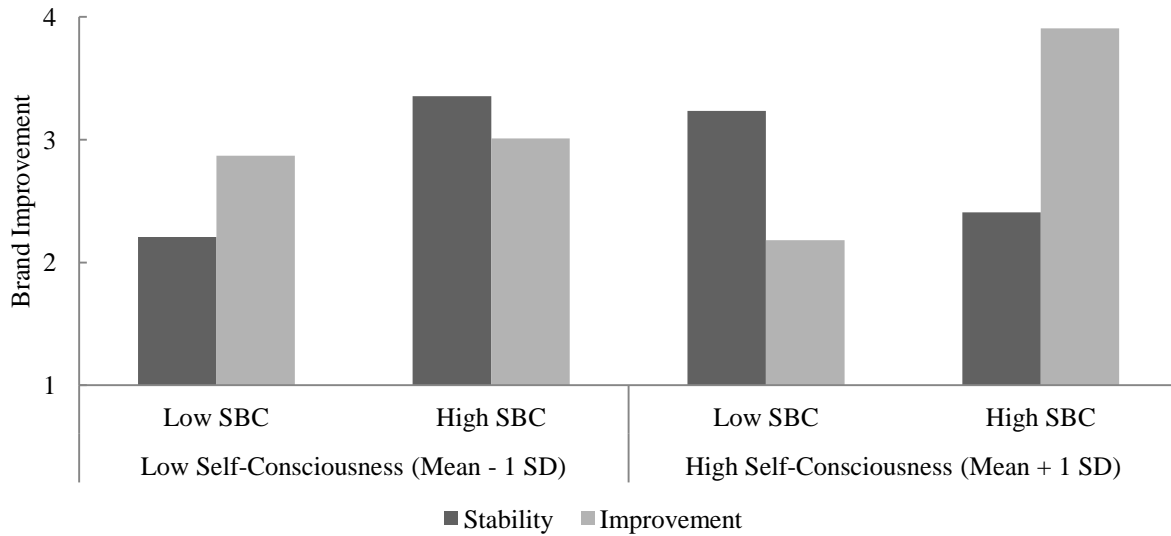
EFFECTS OF PERCEIVED IMPROVEMENT, SELF-FOCUS, AND IMPORTANCE OF UP-TO-DATE PRODUCTS ON PRODUCT UPGRADE INTENTIONS (CH. II, S2)



Note.—Figure 3 depicts the predicted values of product upgrade intentions at the different levels of perceived improvement (stability vs. improvement), self-focus (self vs. friend), and importance of up-to-date products (mean  $\pm$  1 SD).

**FIGURE 4**

EFFECTS OF PERCEIVED SELF-IMPROVEMENT, SBC, AND TRAIT SELF-CONSCIOUSNESS ON BRAND IMPROVEMENT EVALUATIONS (CH. II, S3)

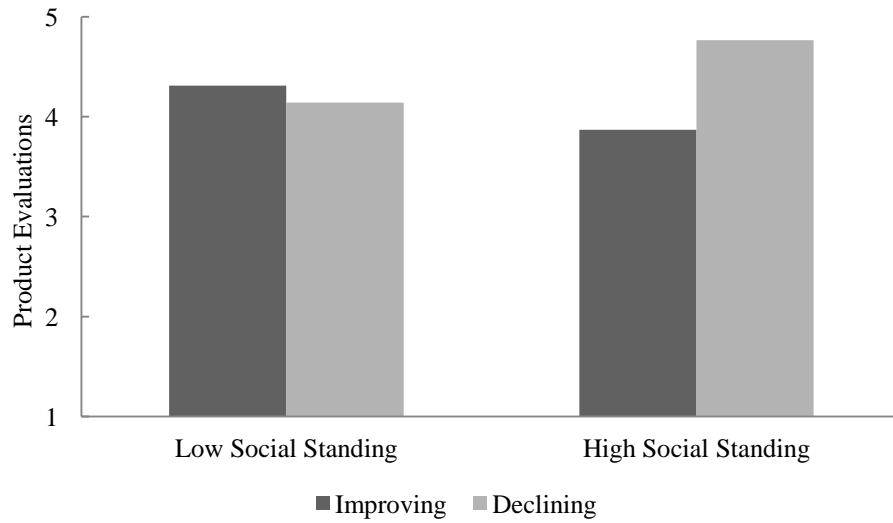


Note.—Figure 4 depicts the predicted values of brand improvement for high and low SBC brands at the different levels of self-improvement (stability vs. improvement) and trait self-consciousness (mean  $\pm$  1 SD).

**FIGURE 5**

EFFECTS OF TEMPORAL AND SOCIAL COMPARISONS ON SELF-IMPROVEMENT

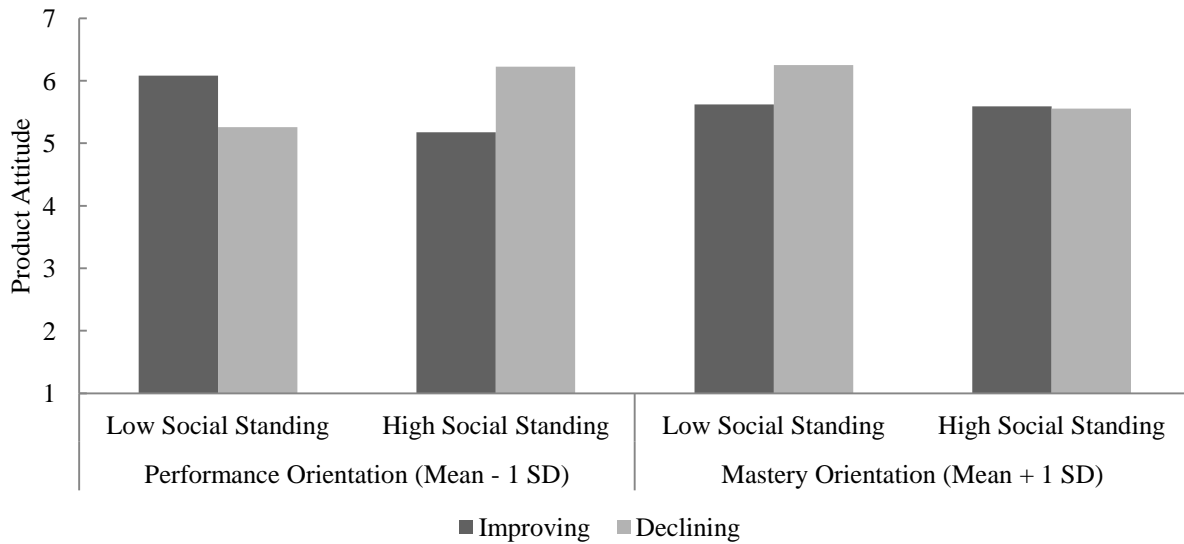
PRODUCT EVALUATIONS (CH. III, S1)



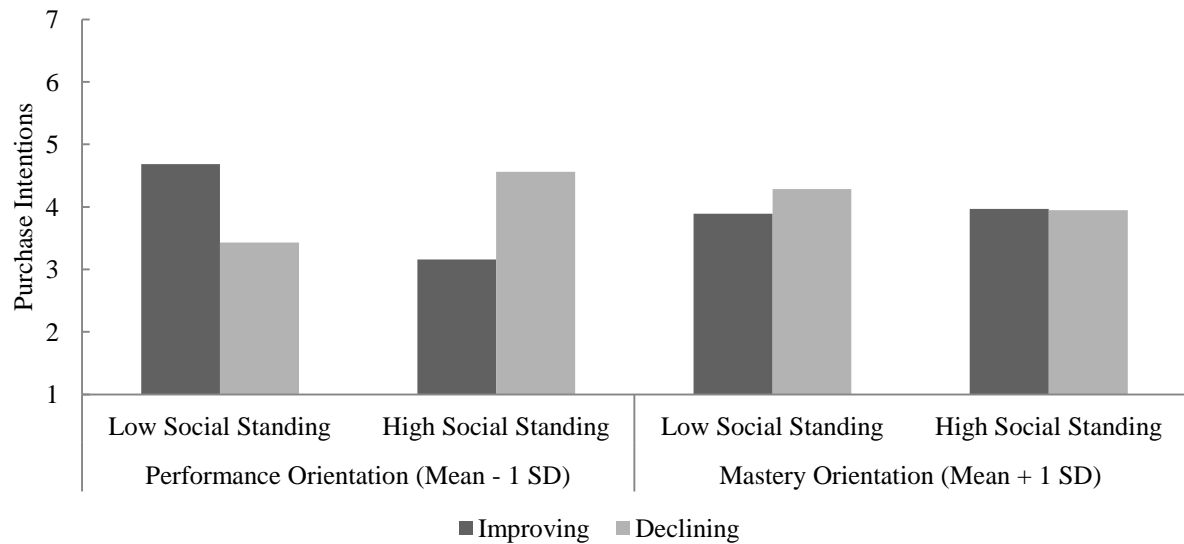
**FIGURE 6**

EFFECTS OF TEMPORAL COMPARISONS, SOCIAL COMPARISONS, AND GOAL ORIENTATION ON SELF-IMPROVEMENT PRODUCT EVALUATIONS (CH. III, S2)

A



B

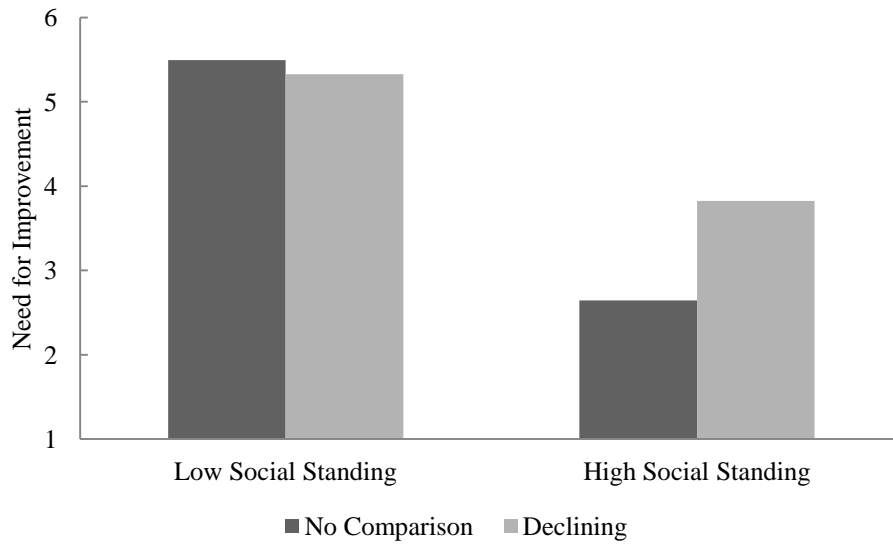


Note.—Panel A depicts the predicted values of self-improvement product attitudes at the different levels of temporal comparison, social comparison, and goal orientation (mean  $\pm$  1 SD). Panel B depicts the same information for self-improvement product purchase intentions.

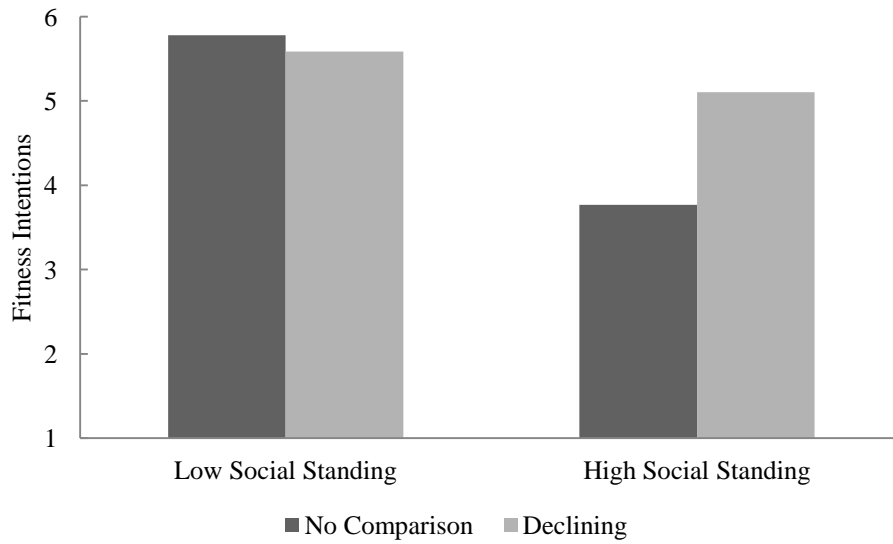
**FIGURE 7**

**EFFECTS OF TEMPORAL AND SOCIAL COMPARISONS ON NEED FOR IMPROVEMENT AND FITNESS INTENTIONS (CH. III, S3)**

A



B

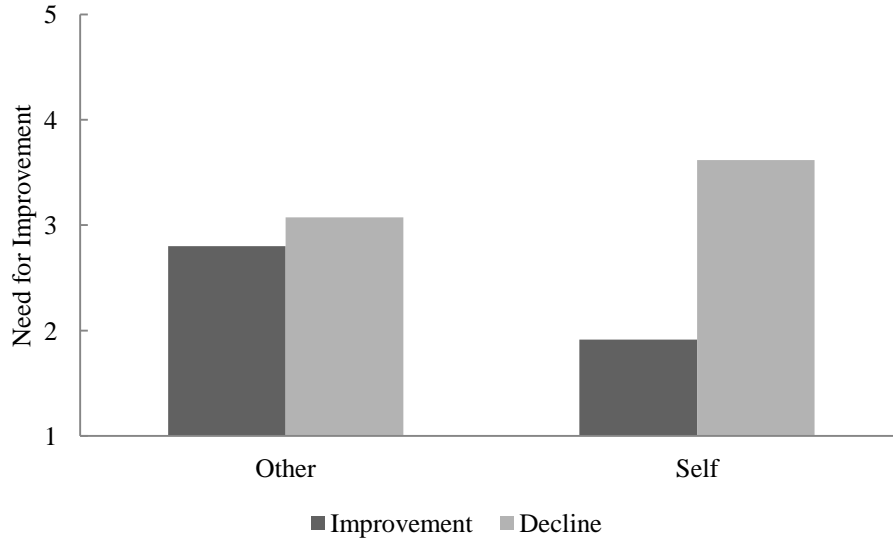


**FIGURE 8**

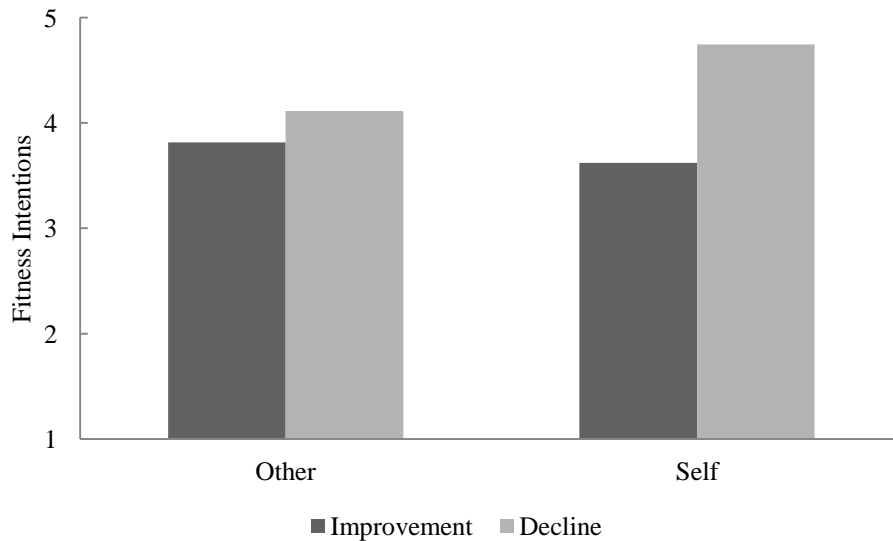
EFFECTS OF TEMPORAL COMPARISONS AND SELF-OTHER PERSPECTIVE ON NEED

FOR IMPROVEMENT AND FITNESS INTENTIONS (CH. III, S4)

A



B

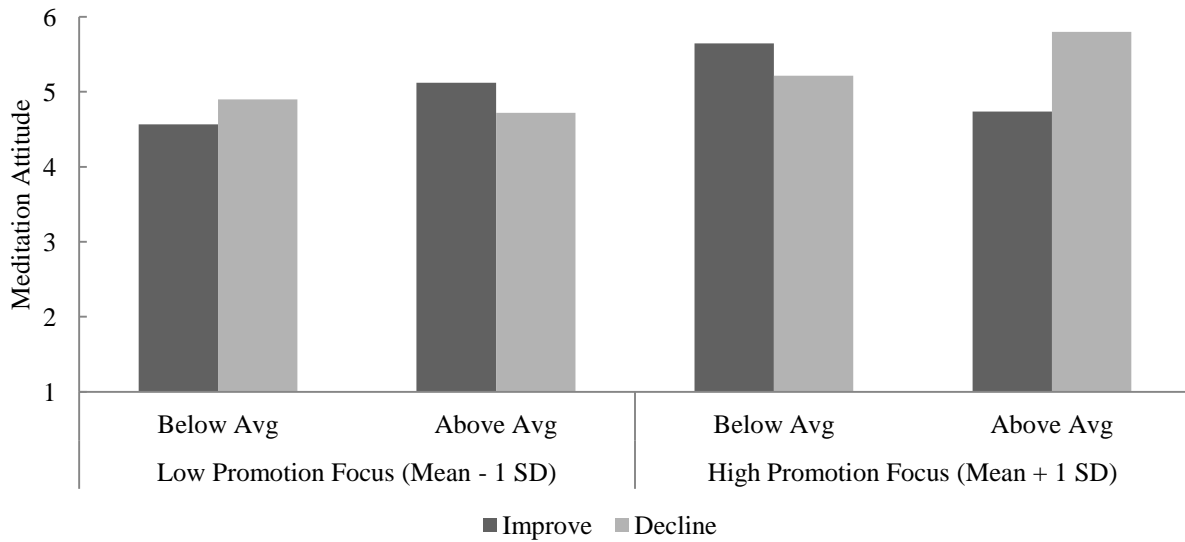


Note.—The direct temporal comparison x self-other perspective interaction on fitness intentions is not significant (panel B;  $p = .13$ ), but the indirect effect through need for improvement is significant.

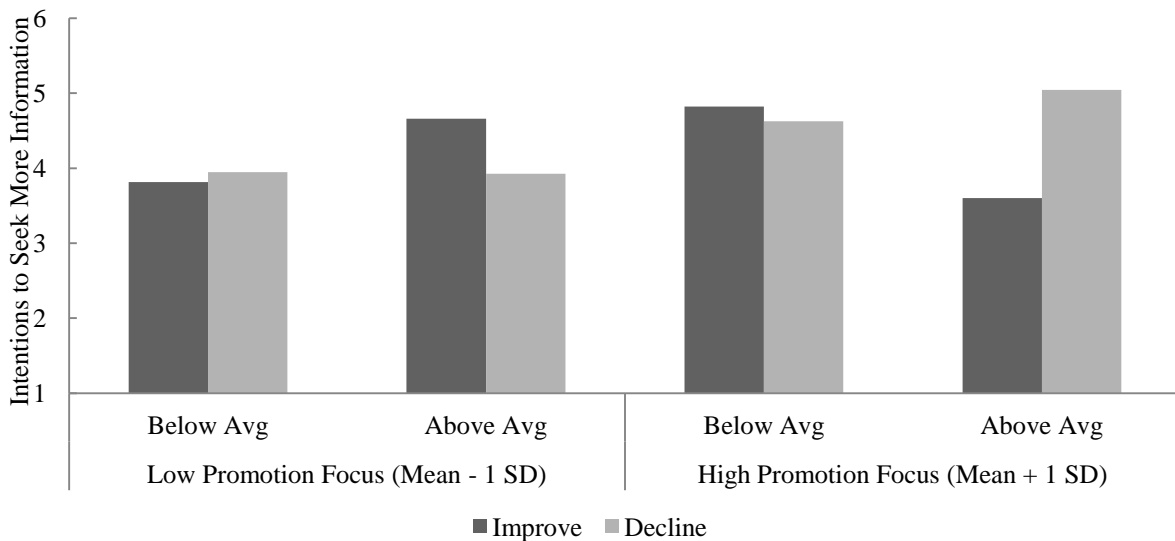
**FIGURE 9**

**EFFECTS OF TEMPORAL COMPARISONS, SOCIAL COMPARISONS, AND REGULATORY FOCUS ON MEDITATION EVALUATIONS (CH. III, S5)**

**A**



**B**



Note.—Panel A depicts the predicted values of attitudes toward the guided meditation at the different levels of temporal comparison, social comparison, and promotion focus (mean  $\pm$  1 SD). Panel B depicts the same information for intentions to seek more information about meditation and its benefits.

## APPENDIX A

### A1. Chapter II Pilot Study Stimuli and Measures

#### Instructions

Thank you for your participation. This research consists of two unrelated studies. The first study is a short self-assessment survey. The second study is a product evaluation task.

#### Self-Improvement Writing Task (“Self-Assessment Survey”)

Sometimes people hope to change over time, because change can reflect positively on them. In the spaces below, please list three personally important positive ways in which you have changed over the past ten years.

#### Product Evaluation Instructions

Please view the following information comparing the Apple iPhone 5 and the Apple iPhone 6 and answer the questions that follow.

#### Dependent Measures

- To what extent is the iPhone 6 an improvement over the iPhone 5?
  - 1 (not at all) – 7 (very much)
- How much would you be willing to pay to upgrade from the iPhone 5 to the iPhone 6?
  - \$0 – \$500 sliding scale

#### Perceived Self-Improvement (Independent Variable)

- In general, how much improvement have you experienced over the past five years?
  - 1 (very little improvement) – 7 (a lot of improvement)
- In general, to what extent have you changed over the past five years?
  - 1 (not at all) – 7 (very much)

#### Self-Brand Connection (Escalas & Bettman 2003)

- How strongly do you identify with Apple?
  - 1 (not at all) – 7 (very strongly)
- How connected are you to Apple?
  - 1 (not at all) – 7 (very much)
- How much does Apple represent who you are?
  - 1 (not at all) – 7 (very much)

## Demographics Measures

- Age (open-ended)
- Gender (male/female)

## Product Evaluation Stimuli



	<b>iPhone 5</b>	<b>iPhone 6</b>
<b>Color and Finish</b>	Silver Gold Space Gray	Silver Gold Space Gray
<b>Weight and Dimensions</b>	Height: 4.87 in. Width: 2.31 in. Depth: 0.30 in. Weight: 3.95 oz.	Height: 5.44 in. Width: 2.64 in. Depth: 0.27 in. Weight: 4.55 oz.
<b>Chips</b>	A7 chip (64-bit) M7 motion coprocessor	A8 chip (64-bit) M8 motion coprocessor
<b>Touch ID</b>	Fingerprint identity sensor	Fingerprint identity sensor
<b>Display</b>	4-inch Retina display 1136 x 640 resolution 326 ppi	4.7-inch Retina display 1334 x 750 resolution 326 ppi
<b>Cellular and Wireless</b>	GSM/EDGE UMTS/HSPA+ DC-HSDPA CDMA EV-DO Rev. A & B LTE Bluetooth 4.0 GPS and GLONASS Wi-Fi (802.11a/b/g/n)	GSM/EDGE UMTS/HSPA+ DC-HSDPA CDMA EV-DO Rev. A & B LTE Bluetooth 4.0 GPS and GLONASS Wi-Fi (802.11a/b/g/n/ac)
<b>iSight Camera</b>	8 megapixels f/2.2 aperture Sapphire crystal lens cover Autofocus Auto image stabilization True Tone flash Slo-mo video Face detection	8 megapixels f/2.2 aperture Sapphire crystal lens cover Autofocus w/ Focus Pixels Auto image stabilization True Tone flash Slo-mo video Improved Face detection
<b>Power and Battery</b>	Talk time: Up to 10 hrs. Standby time: Up to 250 hrs Web use: Up to 10 hrs Video play: Up to 10 hrs Audio play: Up to 40 hrs	Talk time: Up to 14 hrs. Standby time: Up to 250 hrs Web use: Up to 11 hrs Video play: Up to 11 hrs Audio play: Up to 50 hrs
<b>SIM Card</b>	Nano-SIM	Nano-SIM

## A2. Chapter II Study 1 Manipulations, Stimuli, and Measures

### Pretest Instructions

Thank you for your participation. On the next screen, you will complete a short self-assessment task in which you will answer a prompt about how you see yourself. This will be followed by basic demographics.

### Pretest Self-Improvement Manipulation

#### *Improvement Condition*

Sometimes people hope to change over time, because change can reflect positively on them. In the spaces below, please list three personally important positive ways in which you have changed over the past five years.

#### *Stability Condition*

Sometimes people hope to remain the same over time, because stability can reflect positively on them. In the spaces below, please list three personally important positive ways in which you have remained the same over the past five years.

### Pretest Dependent Measures

- In general, how much improvement have you experienced over the past five years?
  - 1 (very little improvement) – 7 (a lot of improvement)
- How difficult was it for you to generate the three things you listed at the beginning of this survey?
  - 1 (very easy) – 7 (very difficult)

### Pretest Demographics

- Age (open-ended)
- Gender (male/female)

## Self-Improvement and Self Focus Manipulations

### *Improvement – Self Focus Condition*

Sometimes people hope to change over time, because change can reflect positively on them. In the spaces below, please list three personally important positive ways in which you have changed over the past five years.

### *Stability– Self Focus Condition*

Sometimes people hope to remain the same over time, because stability can reflect positively on them. In the spaces below, please list three personally important positive ways in which you have remained the same over the past five years.

### *Improvement–Other Focus Condition*

Sometimes people hope to change over time, because change can reflect positively on them. Think of a friend and in the spaces below, please list three personally important positive ways in which your friend has changed over the past five years.

### *Stability–Other Focus Condition*

Sometimes people hope to remain the same over time, because stability can reflect positively on them. Think of a friend and in the spaces below, please list three personally important positive ways in which your friend has remained the same over the past five years.

## Product Evaluation Instructions

Please view the following information about the Samsung Galaxy S4 and the Samsung Galaxy S5 and answer the questions that follow.

### Dependent Measures

- How similar are the Samsung Galaxy S4 and the Samsung Galaxy S5?
  - 1 (not at all similar) – 7 (very similar)
- How different are the Samsung Galaxy S4 and the Samsung Galaxy S5?
  - 1 (not at all different) – 7 (very different)
- How much better or worse is the Samsung Galaxy S5 than the Samsung Galaxy S4?
  - 1 (the S5 is much worse than the S4) – 7 (the S5 is much better than the S4)
- To what extent is the Samsung Galaxy S5 and improvement on the Samsung Galaxy S4?
  - 1 (not at all) – 7 (very much)
- Which picture best describes the relationship between the Samsung Galaxy S4 and the Samsung Galaxy S5?



- What is the likelihood that you would upgrade from the Samsung Galaxy S4 to the Samsung Galaxy S5?
  - 1 (unlikely) – 7 (likely)

## Improvement Manipulation Checks

- During the writing task, I was thinking of ways that I have been changing over time.
- During the writing task, I was thinking of ways that I have remained the same over time.
- During the writing task, I was thinking of ways that my friend has been changing over time.
- During the writing task, I was thinking of ways that my friend has remained the same over time.
  - 1 (strongly disagree) – 7 (strongly agree) for all items

## Suspicion Measure

- What do you think this was the purpose of this study? (open-ended)

## Product Evaluation Stimuli



	Samsung Galaxy S4	Samsung Galaxy S5
<b>Power and Battery</b>	Talk time: max 17 hrs. Music play: max 69 hrs. Web use: max 10 hrs. Video play: max 11 hrs.	Talk time: max 29 hrs. Music play: max 70 hrs. Web use: max 13 hrs. Video play: max 14 hrs.
<b>Size</b>	Height: 5.38 in. Width: 2.74 in. Depth: 0.31 in.	Height: 5.59 in. Width: 2.85 in. Depth: 0.31 in.
<b>Memory</b>	Up to 64 GB w/external drive	Up to 128 GB w/external drive
<b>Processor Chip</b>	Qualcomm Snapdragon 600 1.9 GHz	Qualcomm Snapdragon 801 2.5 GHz
<b>Display</b>	5.0-inch Super AMOLED 1080 x 1920 pixels	5.1-inch Super AMOLED 1080 x 1920 pixels
<b>Security</b>	--	Fingerprint reader
<b>Camera</b>	13 megapixels -- --	16 megapixels Selective Focus HDR Live Mode Embedded heart rate sensor
<b>Color</b>	Black White Blue Brown	Black White Blue Gold

### **A3. Chapter II Study 2 Manipulations, Stimuli, and Measures**

#### **Pretest Instructions**

Thank you for your participation. On the following page, you will begin a survey on self-perceptions. This will be followed by basic demographics.

#### **Pretest Measures**

- To what extent is self-improvement important to you?
  - 1 (not at all important) – 7 (very important)
- How important is it for you to have the most recent electronic products?
  - 1 (not at all) – 7 (very much)
- Age (open-ended)
- Gender (male/female)

#### **Instructions**

This survey consists of two unrelated tasks. In one part of the survey, you will complete a writing task in which you describe either yourself or a friend. In another part of the survey, you will complete a brand evaluation task. Lastly, you will complete some brief personality scales and provide basic demographic information.

#### **Brand Selection Instructions**

In the space below, please enter your favorite mobile phone brand. This should be a mobile phone brand that you feel very connected to and that represents who you are.

#### **Self-Improvement and Self-Focus Manipulations**

Same as study 1. See appendix A2

#### **Mood Measure (Fishbach and Labroo 2007)**

- How do you feel right now?
  - 1 (very bad) – 7 (very good)
  - 1 (very unhappy) – 7 (very happy)

### Dependent Measures

- How much better are mobile phones made by the brand [insert brand name] now compared to five years ago?
  - 1 (not at all better now) – 7 (much better now)
- To what extent have mobile phones made by the brand [insert brand name] improved over the past five years?
  - 1 (not at all) – 7 (very much)
- Imagine that the brand [insert brand name] just released a new version of their mobile phone. What is the likelihood that you would upgrade to the new phone?
  - 1 (unlikely) – 7 (likely)

### State Self-Esteem Scale (Heatherton and Polivy 1991)

- I feel confident about my abilities. (P)
- I feel as smart as others. (P)
- I feel confident that I understand things. (P)
- I am worried about what other people think of me. (S)
- I feel concerned about the impression I am making. (S)
- I am worried about looking foolish. (S)
- I feel satisfied with the way my body looks right now. (A)
- I am pleased with my appearance right now. (A)
- I am dissatisfied with my weight. (A)
  - 1 (not at all) – 5 (extremely) for all items
  - P = performance subscale; S = social subscale; A = appearance subscale

### Implicit Self-Esteem (Gebauer et al. 2008)

- How much do you like your name, in total?
  - 1 (not at all) – 7 (very much)

### Improvement Manipulation Checks

- In general, how much improvement have you experienced over the past five years?
- In general, how much improvement has your friend experienced over the past five years?
  - 1 (very little improvement) – 7 (a lot of improvement) for all items

### Brand Ownership Measure

- Do you currently own a mobile phone made by [insert brand here]? (yes/no)

### Personal Importance of Improvement (Moderator)

- How important is it for you to have the most recent electronic products?
  - 1 (not at all important) – 7 (very important)

## A4. Chapter II Study 3 Manipulations, Stimuli, and Measures

### Instructions

This survey consists of two unrelated tasks. In one part of the survey, you will complete a self-assessment writing task. In another part of the survey, you will complete a brand evaluation task. Lastly, you will complete some brief personality scales and provide basic demographic information.

### Self-Brand Connection Manipulation

#### *High SBC Condition*

In the space below, please enter one of your favorite brands. This should be a brand that you feel very connected to and that represents who you are.

#### *Low SBC Condition*

In the space below, please enter one of your least favorite brands. This should be a brand that you do not feel very connected to and that does not represent who you are.

### Self-Improvement Manipulation

#### *Improvement Condition*

Sometimes people hope to change over time, because change can reflect positively on them. In the spaces below, please list three personally important positive ways in which you have changed over the past five years.

#### *Stability Condition*

Sometimes people hope to remain the same over time, because stability can reflect positively on them. In the spaces below, please list three personally important positive ways in which you have remained the same over the past five years.

### Dependent Measures

- How similar is the brand [insert brand name] now compared to five years ago?
  - 1 (not at all similar) – 7 (very similar)
- How different is the brand [insert brand name] name compared to five years ago?
  - 1 (not at all different) – 7 (very different)

### Private Self-Consciousness (Scheier and Carver 1985)

- I'm always trying to figure myself out.
- I think about myself a lot.
- I often daydream about myself.
- I never take a hard look at myself. (reverse-coded)
- I generally pay attention to my inner feelings.
- I'm constantly thinking about my reasons for doing things.
- I sometimes step back (in my mind) in order to examine myself from a distance.
- I'm quick to notice changes in my mood.
- I know the way my mind works when I work through a problem.
  - 1 (not at all like me) – 4 (a lot like me) for all items

### Self-Improvement Manipulation Check

- During the self-assessment task, I was thinking of ways that I have been changing over time.
- During the self-assessment task, I was thinking of ways that I have remained the same over time.
  - 1 (strongly disagree) – 7 (strongly agree) scale for all items

### SBC Manipulation Check (Escalas and Bettman 2003)

- I feel a personal connection to the brand [insert brand name]
- I can identify with the brand [insert brand name]
- The brand [insert brand name] reflects who I am
  - 1 (strongly disagree) – 7 (strongly agree)

## APPENDIX B

### B1. Chapter III Study 1 Manipulations, Stimuli, and Measures

#### Self-Comparison Manipulation Pretest Instructions

We would like to better understand how students manage their academic life and evaluate their academic performance. On the following page, you will read a brief scenario about school and then answer some questions about what you would think and how you would respond in that situation.

#### Self-Comparison Pretest Manipulations

Imagine that you are enrolled in an important class for your major. It is the middle of the quarter, and you have completed five tests for the class. The professor gives you the following grade report, summarizing your performance in the class:

#### *Declining – High Social Standing Condition*

GRADE REPORT				
Test 1	Test 2	Test 3	Test 4	Test 5
93	85	80	75	72

Your Average: 81  
Class Average: 74

Summary: Your test grades have been declining over time, and your overall grade is higher than average.

*Declining – Low Social Standing Condition*

GRADE REPORT				
Test 1	Test 2	Test 3	Test 4	Test 5
93	85	80	75	72

Your Average: 81  
Class Average: 88

Summary: Your test grades have been declining over time, and your overall grade is lower than average.

*Improving – High Social Standing Condition*

GRADE REPORT				
Test 1	Test 2	Test 3	Test 4	Test 5
72	75	80	85	93

Your Average: 81  
Class Average: 74

Summary: Your test grades have been improving over time, and your overall grade is higher than average.

*Improving – Low Social Standing Condition*

GRADE REPORT				
Test 1	Test 2	Test 3	Test 4	Test 5
72	75	80	85	93

Your Average: 81  
Class Average: 88

Summary: Your test grades have been improving over time, and your overall grade is lower than average.

### Self-Comparison Pretest Dependent Measures

- In the scenario you read, how were your grades changing over time?
  - 1 (my grades decreased over time) – 7 (my grades increased over time)
- In the scenario you read, how did your average grade compare to the class average?
  - 1(my grade was lower than average) – 7 (my grade was higher than average)

### Self-Comparison Manipulation Pretest Demographics

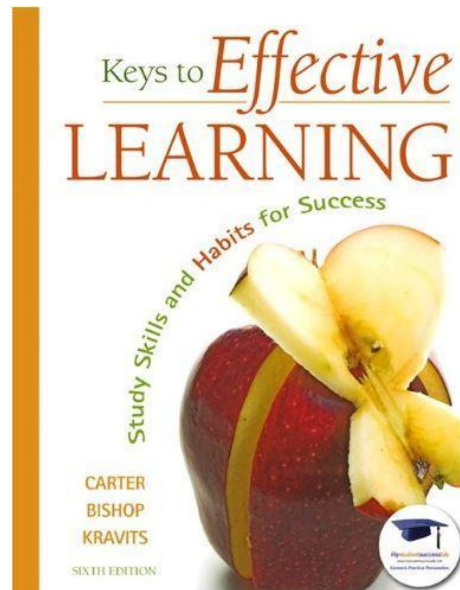
- Age (open-ended)
- Gender (male/female)

### Self-Improvement Product Pretest Instructions

Please evaluate each of the following products on the scales provided.

### Self-Improvement Product Stimuli

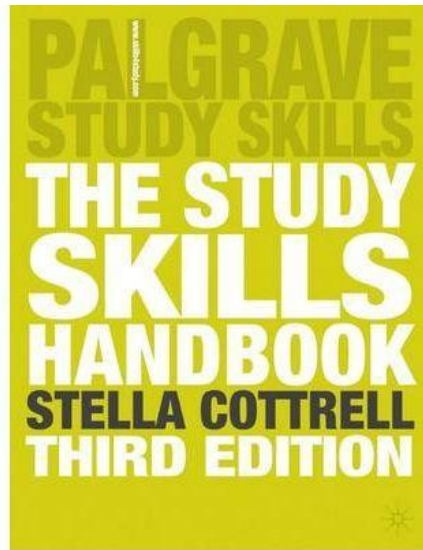
#### *Self-Improvement Book 1*



Keys to Effective Learning  
by Carol J. Carter, Joyce Bishop, and Sarah Lyman Kravits

The sixth edition of *Keys to Effective Learning* text helps students build habits for success and develop the thinking, self-management, and study skills they need to succeed both academically and professionally. This edition is streamlined to focus more on essential study skills, with greater coverage of memory, studying, reading, and test-taking. Recognizing that the first step in developing the independent thinking skills needed for success is understanding *how* you think, this revision builds students' and professionals' self-awareness in three ways: embedded in-chapter self-assessments, “powerful question” features, and learning preferences grids that asks them to think about how they learn in a variety of situations. The text offers a pre- and post-course assessment.

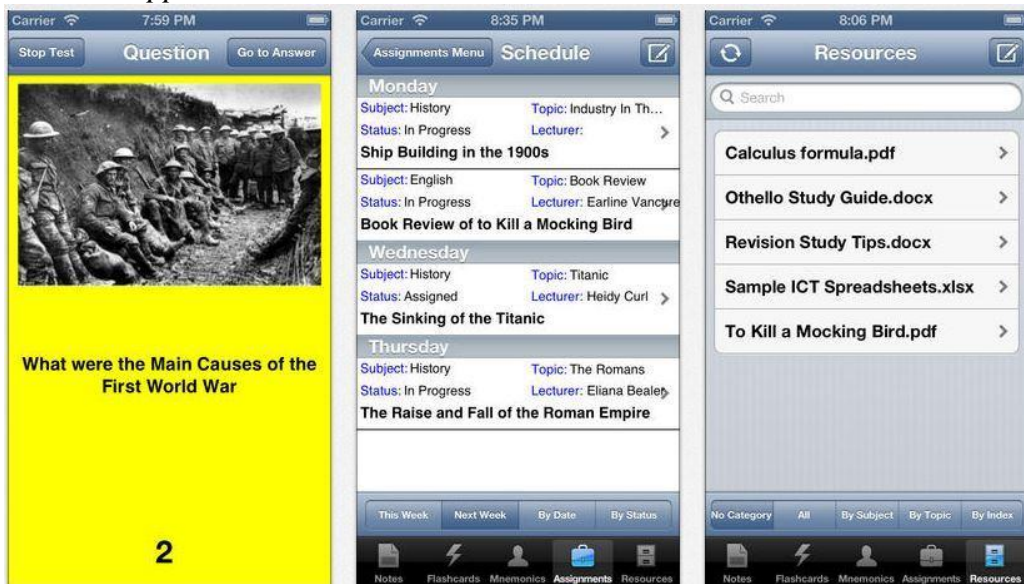
## Self-Improvement Book 2



The Study Skills Handbook, Third Edition  
by Stella Cottrell

If you are serious about succeeding in your course, The Study Skills Handbook is your essential companion. Based on over 20 years' experience of working with students, bestselling author Stella Cottrell helps you develop the skills you need to improve your grades, build your confidence and plan for the future you want. Her tried and trusted approach recognizes that we each have a unique formula for success and that finding it is the key to reaching our potential. This book will help you to (1) use your learning style and existing skills effectively, (2) develop core study skills in time management, academic writing, and critical thinking, (3) discover how to make learning easier and faster, and (4) improve your grades and make studying more enjoyable. Whether you are a student or a professional, this handbook is your passport to success.

## Self-Improvement App 1



The key to successful results from studying is good organization. MyStudyPal has been designed to help any student organize their studying. MyStudyPal contains the following features:

#### Notes

- Use MyStudyPal to create rich text lecture or class notes
- Organize notes by subject, topic, lecturer, or index keyword
- Highlight key words or passages of text in your notes
- Sync or e-mail notes to your PC/Mac as a Word document
- Print notes directly from your mobile device

#### Flashcards

- Use MyStudyPal to create rich text flashcards
- Insert pictures from your camera roll, or taken directly with your phone camera
- Create flashcard tests and customize question duration

#### Mnemonics

- Create mnemonics to help remember a list of items like key points to mention in an essay

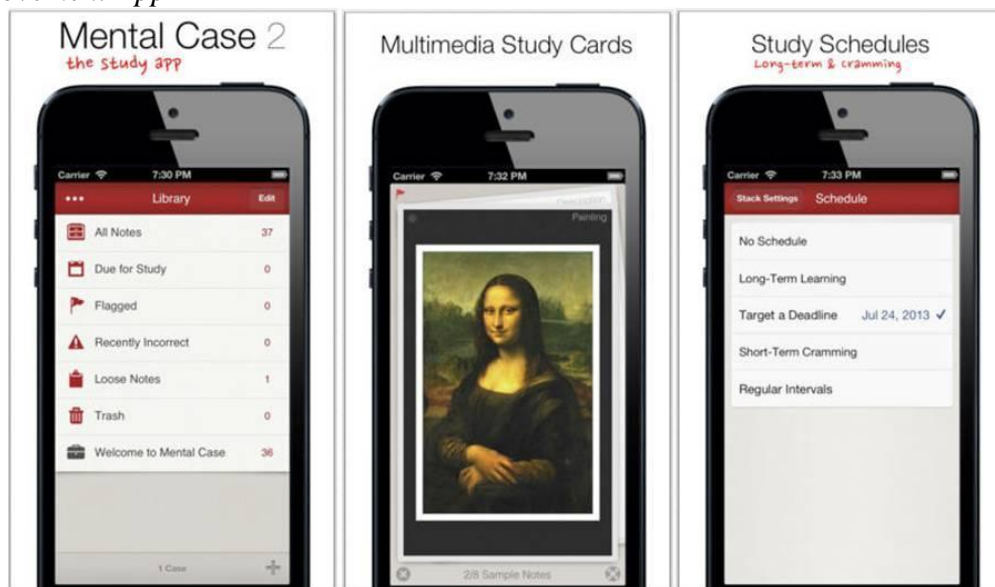
#### Assignments

- Use MyStudyPal to create, manage, and organize assignments by subject, topic, lecturer, or index keyword
- Mark assignments as “Assigned,” “In Progress,” or “Complete”
- Sync or e-mail assignments to your PC/Mac as a Word document

#### Resources

- Store all your e-books, Word documents, spreadsheets, PDFs, videos, and images all in one place for easy access
- Many document formats supported including MS Word, Excel, Powerpoint, PDFs, and various video formats

### *Self-Improvement App 2*



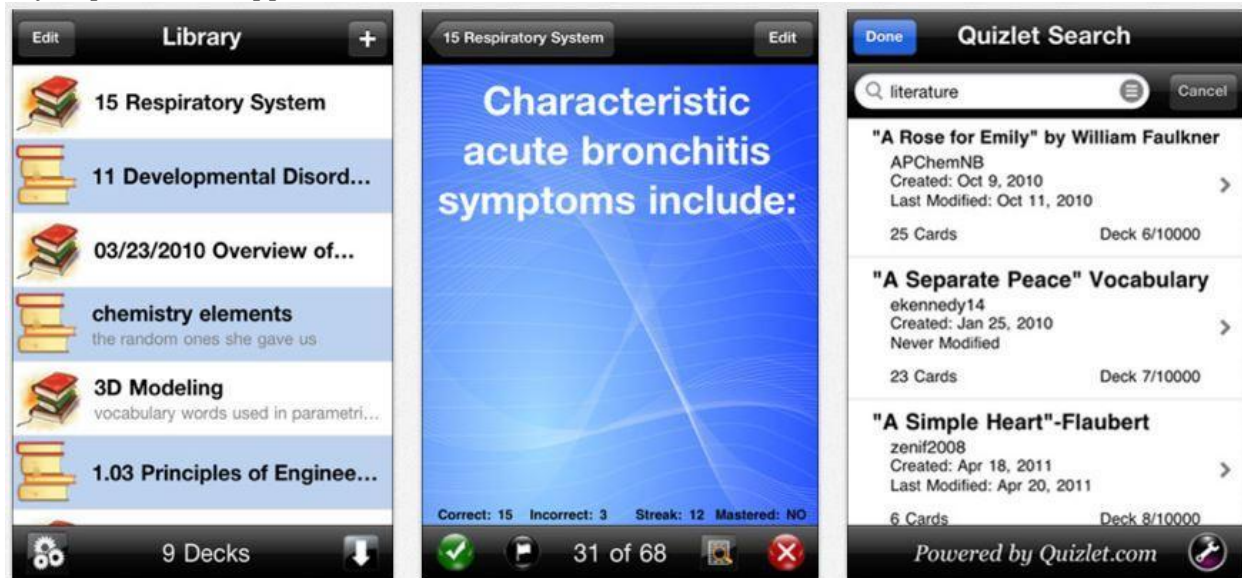
Mental Case 2 is THE study app. With multimedia flashcards, iCloud sync, and advanced study scheduling, it's the best way to get stuff in into your head. Whether you're preparing for a driving test or cramming for the Bar exam, Mental Case can help you achieve your goals. Prepare your own flashcards with text, image, audio, and video, or download from websites like Quizlet.com and Flashcardexchange.com. Study in beautifully-presented slideshows on your mobile device.

#### Features:

- Multi-faceted study cards with text, images, audio, and video

- Organize your cards into stacks
- Interactive slideshows for studying
- Prepare multiple-choice quizzes
- Schedule cards for optimal long-term memory recall
- Extensive built-in help pages
- Import from file sharing apps like Dropbox

### Self-Improvement App 3



StudyBuddy is a mobile electronic flashcard system perfect for students of all ages as well as professionals who must maintain proficiency with large amounts of information. StudyBuddy allows you to create new flashcard decks wherever you are. Individual cards can be added, deleted, and edited on the fly while browsing any deck. Study at your convenience, and save session statistics so you can continue your study session at a later time.

You can grade your knowledge of each card on the front or back of the card. Study session statistics are summarized on the bottom of each card so you can easily track your progress through the deck. Study session statistics can be displayed at any time while studying a deck. The deck can be filtered based upon session statistics, allowing you to display only those cards you need to study further. In short, this application combines a sophisticated study system with great ease of use.

### Self-Improvement Product Pretest Measures

- How useful do you think this book/app is for improving academic performance?
  - 1 (useless/ineffective/unhelpful) – 7 (useful/effective/helpful)
- What is your attitude toward this book/app?
  - 1(dislike/unfavorable/negative) – 7(like/favorable/positive)

## Instructions

We are conducting a survey about learning and education among the U.S. adult population. On the following screen, you will read a brief scenario and then answer some questions about what you would think and how you would respond in that situation.

### Self-Comparisons Manipulation

Imagine that your job has required you to enroll in an evening course at the local university. It is the middle of the quarter, and you have completed five tests for the class. The professor gives you the following grade report, summarizing your performance in the class:

\*Grade reports are the same used in pretest above.

### Self-Efficacy Measures

Please answer the following questions based on the scenario you read.

- How much personal control do you think you have over your grades?
  - 1 (very little) – 7 (very much)
- How capable do you think you are of improving your grades?
  - 1 (not at all) – 7 (very much)

### Product Evaluation Dependent Measures

Please answer the following questions based on the scenario you read.

- How relevant is this app/book to you?
  - 1 (not at all) – 7 (very much)
- How much would you consider buying this app/book?
  - 1 (not at all) – 7 (very much)

\*Both questions were repeated for each of the five pretested products (see above).

### Involvement Measures

- How engaged were you in this survey?
  - 1 (not at all) – 7 (very much)
- How interested were you in this survey?
  - 1 (not at all) – 7 (very much)

## B2. Chapter III Study 2 Manipulations, Stimuli, and Measures

### Instructions

Thank you for your participation. In this survey, we would like to understand how people view themselves at different points in time. This will be followed by an unrelated product evaluation task.

### Self-Comparisons Manipulation

#### *Declining – High Social Standing Condition*

Think of a personally significant dimension on which you have been declining over time and are currently better than most of your peers. This should be an important way that you are not only worse than you were in the past, but also better than most other people (e.g., physical fitness, financial responsibility). Type the dimension in the space below.

#### *Declining – Low Social Standing Condition*

Think of a personally significant dimension on which you have been declining over time and are currently worse than most of your peers. This should be an important way that you are not only worse than you were in the past, but also worse than most other people (e.g., physical fitness, financial responsibility). Type the dimension in the space below.

#### *Improving – High Social Standing Condition*

Think of a personally significant dimension on which you have been improving over time and are currently better than most of your peers. This should be an important way that you are not only better than you were in the past, but also better than most other people (e.g., physical fitness, financial responsibility). Type the dimension in the space below.

#### *Improving – Low Social Standing Condition*

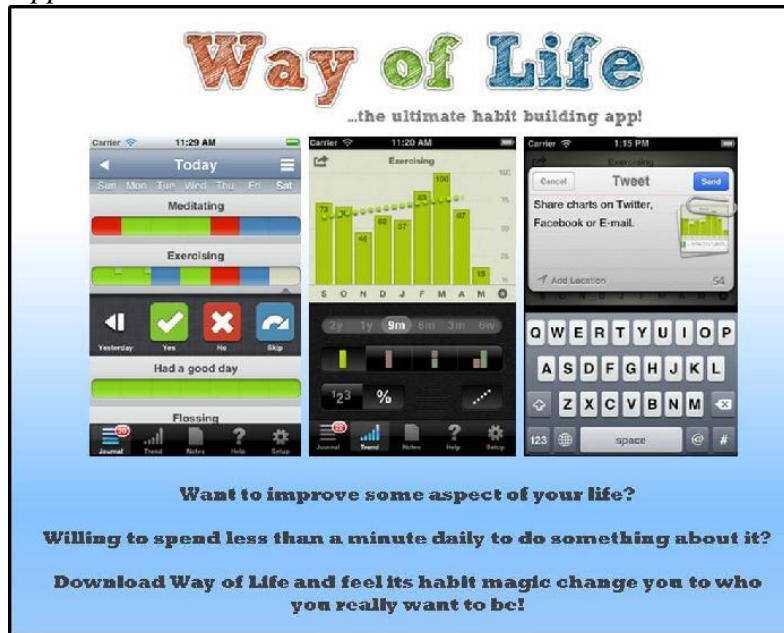
Think of a personally significant dimension on which you have been improving over time and are currently worse than most of your peers. This should be an important way that you are not only better than you were in the past, but also worse than most other people (e.g., physical fitness, financial responsibility). Type the dimension in the space below.

### Manipulation Check

- Please rate how bad or good you currently are on this dimension.
  - 1 (very bad) – 7 (very good)
- Please rate how weak or strong you currently are on this dimension.
  - 1 (very weak) – 7 (very strong)
- Please rate your satisfaction with your current standing on this dimension.
  - 1 (very dissatisfied) – 7 (very satisfied)

## Self-Improvement Product Stimuli

### *Self-Improvement App 1*

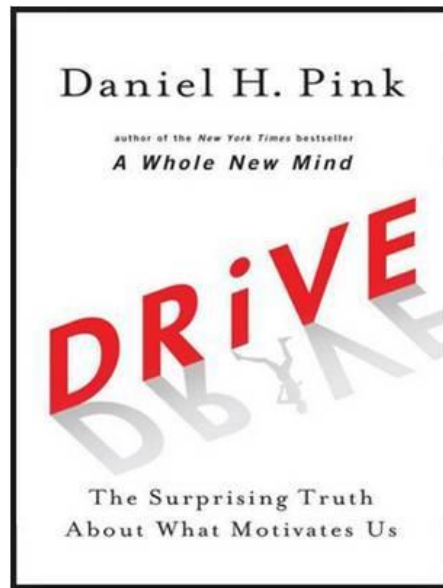


Way of Life is the ultimate good-habit building app. Invest less than a minute daily to track, identify, and change your ways with Way of Life's unique color system.

As you collect more and more information you will easily be able to spot positive and negative trends in your lifestyle using the trend chart. This will help you answer questions like:

- Am I spending enough time with family?
- Exercising as much as I thought?
- Flossing daily?
- Spending too much money?
- Watching too many bad movies?
- Getting the fruits and vegetables I need?
- Sleeping well?

...or whatever is important to you. **There are no restrictions on how Way of Life can help you improve!**



In this provocative and persuasive new book, Daniel H. Pink asserts that the secret to high performance and satisfaction--at work, at school, and at home--is the deeply human need to direct our own lives, to learn and create new things, and to do better by ourselves and our world. Drawing on four decades of scientific research on self-improvement and human motivation, Pink offers smart and surprising techniques for changing how we behave and transforming how we live.

#### Product Evaluation Dependent Measures

- What is the likelihood that you would purchase this app/book?
  - 1 (unlikely/improbable) – 7 (likely/probable)
- What is your attitude toward this app/book?
  - 1 (dislike/negative) – 7 (like/positive)

\*All questions were repeated for the two products.

#### Goal Orientation Measure (based on VandeWalle 1997)

- Please rate how you feel regarding the dimension you listed at the beginning of the survey.
  - 1 (I want people to believe that I possess this skill/attribute) – 7 (I want to improve on this skill/attribute)
- Regarding the dimension you listed at the beginning of the survey, what is more important to you?
  - 1 (demonstrating my ability on this dimension) – 7 (improving my ability on this dimension)
- Regarding the dimension you listed at the beginning of this survey, what is your goal?
  - 1 (to show others that I have this skill/attribute) – 7 (to further develop this skill/attribute)

### B3. Chapter III Study 3 Manipulations, Stimuli, and Measures

#### Instructions

We are conducting a survey about weight and fitness perceptions among the American adult population. On the next screen, you will read a brief scenario about a visit to the doctor and then answer the questions that follow.

#### Self-Comparison Manipulations

Imagine that you are getting a routine check-up and receive the following feedback from your doctor:

##### *Declining – High Social Standing Condition*

- Weight is a key indicator of fitness and health
- Excess weight heightens the risk of heart disease, diabetes, and osteoarthritis
- Your weight has been increasing over the past year
- You currently weigh less than average for a person of your age, gender, and height

##### *Declining – Low Social Standing Condition*

- Weight is a key indicator of fitness and health
- Excess weight heightens the risk of heart disease, diabetes, and osteoarthritis
- Your weight has been increasing over the past year
- You currently weigh more than average for a person of your age, gender, and height

##### *Improving – High Social Standing Condition*

- Weight is a key indicator of fitness and health
- Excess weight heightens the risk of heart disease, diabetes, and osteoarthritis
- Your weight has been decreasing over the past year
- You currently weigh less than average for a person of your age, gender, and height

##### *Improving – Low Social Standing Condition*

- Weight is a key indicator of fitness and health
- Excess weight heightens the risk of heart disease, diabetes, and osteoarthritis
- Your weight has been decreasing over the past year
- You currently weigh more than average for a person of your age, gender, and height

#### PANAS Scale (Watson, Clark, and Tellegen 1988)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then select the appropriate answer next to that word. Indicate to what extent you feel this way right now, that is, at the present moment.

- Positive Items: proud, strong, inspired, attentive, alert, active, interested, enthusiastic, excited, determined
- Negative Items: distressed, irritable, scared, afraid, nervous, hostile, upset, jittery, guilty, ashamed
  - 1 (very slightly or not at all) – 5 (extremely) for all items

### Need for Improvement Measure

Please answer the following questions based on the scenario you read.

- To what extent do you think you need to lose weight?
- How important would it be for you to lose weight?
- To what extent do you want to lose weight?
- How much do you desire losing weight?
  - 1 (not at all) – 7 (very much) for all items

### Fitness Intentions Dependent Measures

In this scenario, what is the likelihood that you would engage in each of the following behaviors?

- Create or update a personal fitness schedule
- Keep track of weight change
- Look for exercise and diet tips online
- Spend more time exercising
  - 1 (very unlikely) – 7 (very likely) for all items

### Self-Improvement Product Stimulus

#### Self-Improvement App



**Digifit**  
By Digifit



Digifit is a complete health and fitness solution. When you are serious about tracking calories burned and consumed, it can't be beat. Use a heart monitor to record workouts with real-time heart rate and calories elegantly displayed on bright and colorful charts. Keep track of weight, blood pressure, sleep, and more to see the connection between health and fitness. Check out the Digifit Fitness Assessments to track your fitness level over time and get an even more accurate caloric burn. When combined with MyFitnessPal, you get the most accurate calories in – calories out tracking ever!

### Self-Improvement Product Evaluation Dependent Measures

- How relevant is this app to you?
  - 1 (not at all) – 7 (very much)
- How much would you consider buying this app?
  - 1 (not at all) – 7 (very much)

## B4. Chapter III Study 4 Manipulations, Stimuli, and Measures

### Instructions

We are conducting a survey about weight and fitness perceptions among the American adult population. On the next screen, you will read a brief scenario about a visit to the doctor and then answer the questions that follow.

### Self-Other Perspective Manipulation

#### *Self Perspective Condition*

Imagine that you are getting a routine check-up and receive the following feedback from your doctor:

#### *Other Perspective Condition*

Imagine that a person is getting a routine check-up and receives the following feedback from the doctor:

### Self-Comparison Manipulations

#### *Declining – High Social Standing Condition*

- Weight is a key indicator of fitness and health
- Excess weight heightens the risk of heart disease, diabetes, and osteoarthritis
- Your weight has been increasing over the past year
- You currently weigh less than average for a person of your age, gender, and height

#### *Improving – High Social Standing Condition*

- Weight is a key indicator of fitness and health
- Excess weight heightens the risk of heart disease, diabetes, and osteoarthritis
- Your weight has been decreasing over the past year
- You currently weigh less than average for a person of your age, gender, and height

### Need for Improvement Measure

Please answer the following questions based on the scenario you read.

- To what extent do you think you need to [the person needs to] lose weight?
- How important would it be for you [the person] to lose weight?
- To what extent do you want to [do you think the person wants to] lose weight?
- How much do you desire [do you think the person desires] losing weight?
  - 1 (not at all) – 7 (very much) for all items

### Fitness Intentions Dependent Measures

In this scenario, what is the likelihood that you [the person] would engage in each of the following behaviors?

- Spend more time exercising

- Take the stairs instead of the elevator more
- Walk/ride a bike instead of drive to nearby locations
- Eat more fruits and vegetables
- Decrease sugar intake
- Eat smaller portions of food
  - 1 (very unlikely) – 7 (very likely) for all items

### Self-Improvement Product Stimulus



### Self-Improvement Product Evaluation Dependent Measures

- How relevant is this offer to you [the person]?
  - 1 (not at all) – 7 (very much)
- How much would you [do you think the person would] consider taking this offer?
  - 1 (not at all) – 7 (very much)

### Manipulation Checks

- In the scenario you read, the doctor said your [the person's] weight was increasing.
- In the scenario you read, the doctor said you weigh [the person weighs] less than average.
  - True/False for all items

## B5. Chapter III Study 5 Manipulations, Stimuli, and Measures

### Instructions

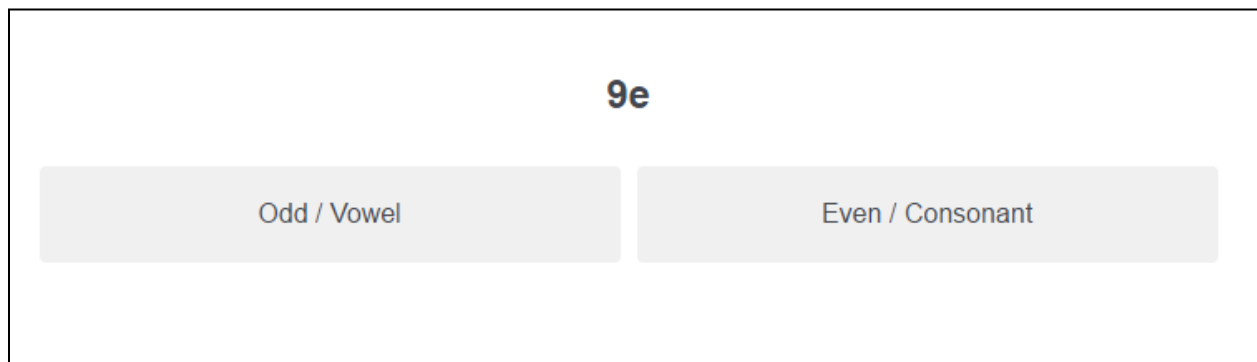
We are conducting research on attention and focus among adults in the U.S. Prior research has suggested that attention regulation (i.e., the ability to control the focus of one's attention) can change noticeably over short periods of time, so we would like to track any changes in your ability to sustain attention and focus over time. On the following screens, you will complete an attention regulation test that was developed by a team of psychologists and cognitive scientists. After you have finished the test, you will receive a performance report. In a second unrelated part of this study, you will complete a product evaluation survey.

### Attention Regulation Test Instructions (Ophir, Nass, & Wagner 2009)

In each round, the word "LETTER" or "NUMBER" will flash briefly, followed by a letter-number pair (e.g., "a5"). If the word "LETTER" flashed, focus on the letter in the letter-number pair, and press the LEFT arrow on your keyboard if the letter is a vowel, and the RIGHT arrow if the letter is a consonant. If the word "NUMBER" flashed, focus on the number in the letter-number pair, and press the LEFT arrow if the number is odd, and the RIGHT arrow if the number is even. **THIS IS A TIMED TASK SO RESPOND AS QUICKLY AS YOU CAN.**

We will begin with five practice examples so you can get accustomed to the task. This will be followed by three test sections.

### Attention Regulation Test Example Item



## Self-Comparison Manipulations

### *Declining – High Social Standing Condition*

#### **ATTENTION REGULATION TEST - PERFORMANCE REPORT**

<b>SECTION 1</b>	<b>SECTION 2</b>	<b>SECTION 3</b>
82	75	71
<b>AGE GROUP MEAN:</b> 63		
<b>YOUR AVERAGE:</b> 76		

The table above presents your Section 1 score, your Section 2 score, your Section 3 score, your average score [(Part 1 score + Part 2 score + Part 3 score) / 3], and the average score for the past 200 people in your age group who have completed this test.

Your attention regulation score reflects both the accuracy and the speed of your responses. Possible scores range from 0 to 100.

**SUMMARY: Your performance on the attention regulation test declined from Section 1 to Section 3, and your average score is higher than the mean for people in your age group.**

### *Declining – Low Social Standing Condition*

#### **ATTENTION REGULATION TEST - PERFORMANCE REPORT**

<b>SECTION 1</b>	<b>SECTION 2</b>	<b>SECTION 3</b>
82	75	71
<b>AGE GROUP MEAN:</b> 89		
<b>YOUR AVERAGE:</b> 76		

The table above presents your Section 1 score, your Section 2 score, your Section 3 score, your average score [(Part 1 score + Part 2 score + Part 3 score) / 3], and the average score for the past 200 people in your age group who have completed this test.

Your attention regulation score reflects both the accuracy and the speed of your responses. Possible scores range from 0 to 100.

**SUMMARY: Your performance on the attention regulation test declined from Section 1 to Section 3, and your average score is higher than the mean for people in your age group.**

*Improving – High Social Standing Condition*

ATTENTION REGULATION TEST - PERFORMANCE REPORT		
SECTION 1	SECTION 2	SECTION 3
71	75	82
<b>AGE GROUP MEAN:</b> 63		
<b>YOUR AVERAGE:</b> 76		

The table above presents your Section 1 score, your Section 2 score, your Section 3 score, your average score [(Part 1 score + Part 2 score + Part 3 score) / 3], and the average score for the past 200 people in your age group who have completed this test.

Your attention regulation score reflects both the accuracy and the speed of your responses. Possible scores range from 0 to 100.

**SUMMARY: Your performance on the attention regulation test improved from Section 1 to Section 3, and your average score is higher than the mean for people in your age group.**

*Improving – Low Social Standing Condition*

ATTENTION REGULATION TEST - PERFORMANCE REPORT		
SECTION 1	SECTION 2	SECTION 3
71	75	82
<b>AGE GROUP MEAN:</b> 89		
<b>YOUR AVERAGE:</b> 76		

The table above presents your Section 1 score, your Section 2 score, your Section 3 score, your average score [(Part 1 score + Part 2 score + Part 3 score) / 3], and the average score for the past 200 people in your age group who have completed this test.

Your attention regulation score reflects both the accuracy and the speed of your responses. Possible scores range from 0 to 100.

**SUMMARY: Your performance on the attention regulation test improved from Section 1 to Section 3, and your average score is lower than the mean for people in your age group.**

Product Evaluation Instructions

A substantial body of research has found that a few minutes of meditation every day can have a major positive impact on various cognitive functions, from concentration to creativity. Based on this research, a team of neuroscientists and mindfulness experts are developing a meditation app that consists of a series of guided meditation exercises (audio recordings) specifically designed to help improve cognitive performance.

On the following page, we would like you to try out one of the guided meditation sessions that will be included in the app and share your opinion of it. Feel free to listen to as little or as much of the 5-minute recording as you would like and then rate it on the scales provided.

### Guided Meditation Recording

Available at [http://marc.ucla.edu/mpeg/01\\_Breathing\\_Meditation.mp3](http://marc.ucla.edu/mpeg/01_Breathing_Meditation.mp3)

### Product Evaluation Dependent Measures

- Please rate the guided meditation on the scales below.
  - 1 (dislike/negative/bad) – 7 (like/positive/good)
- What is the likelihood that you would download the meditation app when it becomes available?
  - 1 (very unlikely/impossible/improbable) – 7 (very likely/possible/probable)
- What is the likelihood that you will spend more time meditating, in general?
  - 1 (very unlikely/impossible/improbable) – 7 (very likely/possible/probable)
- How likely are you to seek out more information about meditation and its benefits?
  - 1 (very unlikely/impossible/improbable) – 7 (very likely/possible/probable)

### Manipulation Checks

- How did your performance on the attention regulation test compare to the average for your age group?
  - 1 (much worse than average) – 9 (much better than average)
- How did your performance on the attention regulation test change between Section 1 and Section 3?
  - 1 (major decline) – 9 (major improvement)
- To what extent do you believe that meditating regularly can help you improve your cognitive skills?
  - 1 (not at all) – 7 (very much)

### Regulatory Focus Questionnaire (Higgins et al. 2001)

This set of questions asks you about specific events in your life. Please indicate your answer to each question by selecting the appropriate response using the scale provided.

- Compared to most people, are you typically unable to get what you want out of life?\*
- 1 (never/seldom) – 7 (very often)
- Growing up, would you ever “cross the line” by doing things that your parents would not tolerate?
  - 1 (never/seldom) – 7 (very often)
- How often have you accomplished things that got you “psyched” to work even harder?\*
- 1 (never/seldom) – 7 (many times)
- Did you get on your parents' nerves often when you were growing up?
  - 1 (never/seldom) – 7 (very often)

- How often did you obey rules and regulations that were established by your parents?
  - 1 (never/seldom) – 7 (always)
- Growing up, did you ever act in ways that your parents thought were objectionable?
  - 1 (never/seldom) – 7 (very often)
- Do you often do well at different things that you try?\*
- 1 (never/seldom) – 7 (very often)5
- Not being careful enough has gotten me into trouble at times.
  - 1 (never/seldom) – 7 (very often)
- When it comes to achieving things that are important to me, I find that I don't perform as well as I ideally would like to do.\*
  - 1 (never true) – 7 (very often true)
- I feel like I have made progress toward being successful in my life.\*
  - 1 (certainly false) – 7 (certainly true)
- I have found very few hobbies or activities in my life that capture my interest or motivate me to put effort into them.\*
  - 1 (certainly false) – 7 (certainly true)

\*Promotion focus subscale