Self and Identity

Beyond Cause to Consequence: The Road from Possible to Core Self-Revision

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Two studies addressed the ultimate consequences and pathways running from repeated possible self-revisions to gradual revisions in core selves over time. As hypothesized, greater prior experiences of downward possible self-revision ultimately predicted greater subsequent declines in core self-integrity (e.g., greater self-doubt, lower self-esteem). However, also as hypothesized, this effect was mediated by the relative use of defensive versus remedial attributions for past downward self-revision experiences. In closing, we unpack how the present work extends prior work by situating possible selves and motivated self-attributions as complementary systems that can slowly undermine as well as expand the integrity of core selves over time.

Keywords: Possible selves; Motivated self-attributions; Core selves; Self-revision.

From John Lennon to Martin Luther King to Kurt Lewin, poets, prophets, and even scientists can *all* agree on at least one thing—people can use the power of imagination to go past the present to prepare for the possibilities of the future. Indeed, the weight of empirical evidence as well as popular wisdom converges to support the claim that humans have a unique ability to imagine, anticipate, and prepare for the distant future (Gilbert, 2006; Roberts, 2002; Tulving, 1983, 1985). More recently, scholars have proposed the motivation—preparedness—that drives the uniquely human ability to prepare for uncertain future possibilities (Carroll, 2010; Carroll, Sweeny, & Shepperd, 2006; Sweeny, Carroll, & Shepperd, 2006). *Preparedness* is an adaptive goal state of readiness to respond to uncertain future outcomes. It can involve a readiness to seize possible opportunities, avoid possible threats, or simply adjust to possible changes before they actually emerge (Carroll et al., 2006; Galak & Mayvis, 2011).

Of course, preparedness for most future possibilities—threat, opportunity, or simply change—requires the construction of a *specific* possible self (PS) that is prepared for each future possibility (Markus & Ruvolo, 1989). Although the self is not necessary for all

self-regulated processes (e.g., involuntary shivering to regulate body temperature), it is likely the most significant tool of self-regulation because it is the only constant of life experience (Epstein, 1973; Higgins, 1996). That is, you can always leave people, jobs, or cities. But, you can't just break-up with, quit, or move away from *yourself* for a fresh start. Although self-permanence may seem stifling, individuals can make the best of the situation by continually revising and updating the self in response to new life experiences given that it is the only tool that remains— throughout life—to advance self-regulatory preparedness.

This paper explores this process of revising core present and possible future selves over time. Of note, self-revision is not just a matter of adding new representations. Rather, it is the continual process of changing *existing* self-representations to improve their fit with environmental feedback. For example, a student experiences downward possible self-revision when she abandons an unrealistic dream to become a psychologist in response to threatening feedback from a professor that she does not have the grades to make it in psychology.

Of course, people can also experience revisions in core selves. For example, the student may hold the core self that she is smart early in life but may increasingly come to believe that she is not as smart as she once thought after a string of downward possible self-revisions later in life. Broadly defined, then, self-revision refers to qualitative changes in possible or core selves (Carroll, McCaslin, & Norman, 2011). Importantly, though, this paper addresses (1) if and, if so and (2) how repeated *possible self*-revisions induce *core self*-revisions over time.

The Separate Selves of One Personal Narrative

Possible selves are personalized goal representations of the self in desired or undesired future end states (Markus & Ruvolo, 1989). Although people can imagine any possible self, evidence suggests that possible selves are more likely to be realized when they are (vs. are not) generalized from core self-schemas (Markus, Cross, & Wurf, 1990). Core self-schemas are representations developed from one's repeated early life experiences that confer a sense of identity by defining one's particular domains of personal competence (e.g., academics, relationships, athletics, etc.) (Markus, 1977). Once formed, core self-schemas provide powerful and "chronically accessible" (Higgins, 1997; Markus, 1977) mental structures that summarize past knowledge and allow one to "go beyond the information given" to generate realistic and positive possible selves in domains of perceived competence (Markus et al., 1990). Desired selves are the adaptive subset of possible selves that are realistic and positive generalizations (e.g., famous scientist) from one's core self-competencies (science) rather than wild fantasies (e.g., famous musician) that are positive but unrealistic generalizations from core competencies (science not music).

Desired selves serve two functions—they provide (1) standards for core self-schema evaluation as well as and (2) potent incentives that guide the pursuit and acquisition of realistic opportunities (Ruvolo & Markus, 1992). Importantly, both of these functions serve preparedness (Carroll et al., 2011). For example, desired selves enhance preparedness to capitalize on potential opportunities by providing a vivid mental model of personal success replete with concrete plans, intentions, and scripts that help bridge the gap between the present self (undergraduate student) and desired self (professor) (Markus & Ruvolo, 1989). Of course, people also revise possible selves to prepare for new opportunities, threats, and changes at different life phases (e.g., college vs. retirement). Moreover, evidence suggests that experiences of possible self-revision—like possible self-formation—affect well-being by enhancing or diminishing preparedness (Carroll, Shepperd, & Arkin, 2009; Carroll et al.,

2006; Gollwitzer, Parks-Stamm, Jaudas, & Sheeran, 2008; Oyserman, 2009; Oyserman & James, 2009).

Given the importance of possible selves for preparedness, it seems important to understand the consequences of repeated possible self-revisions for core self-revisions later in life. That is, if revising one possible self affects preparedness, what are the consequences of accumulating possible self-revisions (5, 6, or 7) for subsequent revisions in core self-integrity? For example, relative to someone who has held fast to their dreams, would the young man who has repeatedly abandoned possible selves ultimately be less prepared to maintain or enhance core self-integrity later in life and, if so, why? Broadly defined, core self-integrity is the phenomenal experience of the self as adaptively and morally adequate (Sherman & Cohen, 2006; Steele, 1988). After reviewing prior work, we introduce the present work on the consequences and pathways from repeated downward possible self-revisions to broader changes in core self-integrity over time.

Theories of Self-Theories

We begin with Epstein's (1973, 1987) classic Cognitive Experiential Self-Theory (CEST). This model recast the self as a theory rather than concept in order to resolve the Jamesian paradox of the self as not really "the self" but, instead, two different selves within a duplex consisting of the "I"—the subject—and the "Me"—the object— of self-awareness. Among other benefits, recasting the self as a theory redeemed the scientific utility of self by resolving the apparent disunity of the "I" and "Me" to re-frame each as two complementary functions of any theory (Dynamic-"I"; Stable-"Me"). In addition, it provided a ready-made structure that could explain the *exact* sources of both self-stability and change. As a theory, the self was hierarchically organized with general core self-schemas ("I'm good at science") subsuming specific "empirical selves" at progressively lower levels of abstraction ("I'm good in biology or chemistry"). As in science, their generalized level of abstraction functioned to insulate core selves from isolated invalidations in empirical selves.[1] Despite their relative immunity to isolated failure, Epstein (1973, 1987) did suggest that core selves could gradually decay under repeated empirical self-failure. However, he did not say much more about the kinds of "empirical selves" that can repeatedly fail nor the temporal process that could translate those repeated failures into the gradual decay of core self-schemas.

In our view, these questions can still be resolved by framing self-theories as simply a special case of theories in general. Doing so allows us to draw further parallels between self and scientific theories from contemporary scientific models, just as Epstein and others had done (Dweck, 1999; Epstein, 1973), to generate new hypotheses regarding how other, complementary, self-variables are shaped by core self-theories and, in turn, shape those core self-theories over time.

In particular, we advance a new model of the consequences and temporal pathways that run from repeated downward possible self-revisions to broader core self-revisions. First, possible selves provide the natural equivalent of empirical predictions. Like scientific predictions, possible selves are more vulnerable to failure given that they are merely plausible generalizations without any direct support from parent core self-schemas (Cross & Markus, 1994). Thus, possible selves exemplify the type of "empirical selves" that could repeatedly fail. However, like scientific predictions, the failure of any one (or two) possible selves cannot directly implicate the core self-schema it derived from because one can attribute any failure to some *temporary* personal or situational problem other than innate core self-incompetence.

Second, motivated self-attributions provide the explanatory solutions that protect and improve self-theories. For example, self-serving attributions protect core self-theories by

attributing possible self-failures to some *temporary* situational or personal handicap rather than core self-incompetence. Consistent with their proposed protective motivation basis, evidence confirms that self-threat consistently amplifies self-serving attributions (Campbell & Sedikides, 1999). Thus, although we agree with Epstein that the abstract representation of core selves serves a protective function, we further propose that self-attributions provide a *motivated* protective system that mediates failure responses by *actively* blocking specific possible self-failures from implicating core self-incompetence. That is, although people could take the cost of the doubt by attributing possible self-failure to core self-incompetence, they typically take the *benefit* of the doubt by using *motivated* self-attributions that attribute failure to some temporary error in the situation or translation of core self-competencies into possible selves.

Although most self-attributions serve self-protection motives, they may differ in how effectively they serve other motives, like self-improvement. If effective, self-attributions should mediate the link between core selves and possible self-failures to not only protect core selves from initial failure but, also, improve the translation of core self-competencies into more realistic new possible selves to prevent future failures that would further threaten core self-integrity. Thus, self-attributions should improve as well as protect the core self by resolving any deeper self-assessment errors that may have set up early possible self-failure and—if left unresolved—may lead to later ones that can build up to slowly undermine core self-integrity over time (Sherman & Cohen, 2006).[2] Importantly, mental simulation research also supports the important mediating role of effective initial attribution responses to failure. This work shows that the attribution for initial failure guides the simulation of expectations regarding how to successfully attain a better possible self (Malle & Tate, 2006; Markman & McMullen, 2003; Wells & Gavanski, 1989). Importantly, though, the usefulness (i.e., efficacy) of these self-attributions for learning and improvement determined the strength of the new possible self.

The Dynamic Pathways of Core Self-Revision

We begin by clarifying how the motivational priorities of preparedness shape the extension and revision of past, present, and future possible selves over time. Preparedness sometimes requires people forego defensive self-attributions that merely dismiss failure to satisfy immediate needs (protecting self-esteem) in favor of attributions that serve long-term need fulfillment. Applied to the present discussion, we propose that—before resorting to defensive self-attributions—effective attribution responses *first* attempt to generate remedial self-attributions (Nussbaum & Dweck, 2008; Oettingen & Kappes, 2009). Unlike defensive attributions, remedial attributions involve the (1) initial encoding of negative feedback, (2) optimistic causal attributions that protect a core belief of competence in the short-term while, and (3) extracting critical self-improvement information (identifying early self-assessment errors) to satisfy long-term goals of learning and growth from early failure (Nussbaum & Dweck, 2008; Oettingen & Kappes, 2009). The initial tendency to generate remedial (vs. defensive) attributions enables one to identify and resolve early self-assessment errors to improve the translation of one's true core competencies into realistic new possible selves that one is prepared to seize in an upward spiral of success and core self-growth over time (Nussbaum & Dweck, 2008; Oettingen & Kappes, 2009).

To illustrate, consider the young man with the core self-schema of having general scientific competencies who is forced to abandon his dream of becoming a medical scientist (possible self) when he is rejected from medical schools. The young man can generate a remedial attribution that reveals an early self-assessment error. For example, he may realize that his scientific competencies are not general but, instead, limited to mathematical and

computer sciences.[3] Having identified the early error, he can resolve it to improve the translation of his true core self-competencies into stronger new desired selves (e.g., Biostatistician) that he can realistically achieve. Importantly, increasing feelings of confidence, pride, flow, efficacy, and momentum may result from the effective resolution of an old self-assessment error (Csikszentmihalyi & Nakamura, 1989; Markman, Lindberg, Kray, & Galinsky, 2007). Of course, these positive emotional experiences would roll over to compound the positive emotions evoked by new possible self-success in an upward spiral of growth (Fredrickson, 2001, 2000). But, the important point is this—this upward spiral of later personal *success* and growth often begins with an early failure that is transformed by remedial attributions into a positive learning experience that fosters long-term improvement and growth. Thus, the effective use of remedial attributions does more than just set up future possible self-success—it is the *first* success that paves the road to all subsequent ones.

In contrast to the above scenario, the young student encounters problems when he primarily depends on defensive attributions to dismiss a string of early possible self-failures as all due to some situational handicap (e.g., bad professor, break-up, illness, etc.) rather than any personal error or handicap. Automatic defensive attributions are not bad simply because they risk ignoring deeper errors that may have caused the early failures. They are bad because, by ignoring those deeper self-assessment errors, they may extend them into new possible self-failures that will ultimately require new defensive attributions to explain. As possible self-failures increase and ultimately outnumber successes, he will experience rising doubt and anxiety as it becomes increasingly difficult to explain every new and old failure as *all* due to some common situational handicap rather than the *one* thing they *all* had in common—the *core self* that inspired them. In this way, just as the effective attribution response initiates an upward spiral of success, the ineffective attribution response does more than just set up future personal failure—it *is* the *first* failure that all new and old ones stem from. In the end, his ineffective attribution response extends (vs. resolves) early errors from old to new possible self-failures that slowly converge over time into a broader pattern of personal failure that ultimately undermines the integrity of his core self-schemas.

Empirical Overview and Predictions

The foregoing logic gives rise to two hypotheses. First, with respect to the consequences, greater downward possible self-revision experiences would predict lower core self-integrity. Specifically, we predicted that participants who report higher prior experiences of downward self-revision would report higher self-doubt, lower self-esteem, and lower well-being. Second, with respect to the hypothesized pathways, the relative use of defensive versus remedial self-serving attributions would mediate the effect of prior possible self-revisions on broader changes in core self-integrity measures. That is, we predicted that the relatively greater use of defensive attributions would mediate the total effect of prior experiences of downward self-revision on subsequent differences in self-doubt, self-esteem, and well-being over time. Two studies tested these hypotheses using the same survey but two different designs.

Study 1 Methods

Participants and Procedure

We recruited 91 psychology students ($M = 34$; $F = 57$) to participate in exchange for course credit. A retrospective survey was used to test key predictions. To test the hypothesized consequences, the survey asked participants to report the number of times

they had to change a career possible self and complete a measure of chronic self-doubt. To isolate the unique effect of possible self-change on chronic self-doubt, we included control measures to assess other transitional life experiences (e.g., break-ups, job changes, or moving). Finally, to test the hypothesized mediation model, the survey asked participants to rate their level of agreement with several different attribution statements for each prior experience of possible self-change reported. In particular, Study 1 examined the role of relative defensive versus non-defensive attribution use in mediating the link from prior downward self-revisions to current self-doubt.

Downward possible self-revision experiences. The survey asked participants to indicate the number of times they had to give up and change their career goals. To help isolate the unique effect of possible self-revision experiences, the survey included control measures to assess other potentially stressful transitional life experiences. These included measures of both the frequency and the perceived stress associated with moving, job changes, relationship status change, and change of major. For example, participants reported the number of times they experienced a relationship break-up and, in addition, rated how much stress they experienced during the transition, using a five-point scale (1 = Not at All Stressful; 5 = Very Stressful). In addition, a measure of perceived stress associated with starting college was included, resulting in a total of nine control measures associated with major life changes.

Attribution ratings. Participants rated their agreement with two different attribution statements for why each possible self-failure experience occurred. Collectively, these statements represented one defensive and one non-defensive attribution. With respect to the defensive attribution, participants rated the extent to which they gave up their goal because of circumstances outside of his/her control (e.g., family stress, unfair instructors). With respect to the non-defensive attribution, participants rated the extent to which they gave up their goal because they did not have the skills or were not good enough. Participants rated their agreement with each attribution item using a five-point scale, from 1 (Definitely Not) to 5 (Definitely).

Chronic self-doubt. Finally, participants completed the chronic self-doubt scale (Oleson, Poehlmann, Yost, Lynch, & Arkin, 2000). At a conceptual level, this measure taps individual differences in the chronic experience of meta-cognitive uncertainty or doubt about one's competence coupled with an intense preoccupation over prospective failure and negative evaluation (Oleson et al., 2000). Thus, it explicitly measures the individual's chronic level of core self-certainty (low doubt) or uncertainty (high doubt) in his/her own competence. We selected this measure to test whether greater downward self-revision experiences predict higher levels of chronic self-doubt or, self-uncertainty, regarding one's own competence. This scale includes two reverse coded items ("I'm generally confident in my ability to succeed") and six positively scored items ("Sometimes I'm unsure of my ability to succeed at important tasks"). Participants rated their level of agreement with each item using a Likert scale, ranging from 1 (Strongly Disagree) to 6 (Strongly Agree). We merged these items into a single index of self-doubt, which showed excellent inter-item consistency ($\alpha > .87$).

Study 1 Results

To examine the relationship between attributions and self-doubt, we computed the relative use of defensive attributions for each experience of possible self-revision by subtracting

participants' average agreement with the non-defensive (internal) statement from their agreement with the defensive attribution statement. We then averaged these difference scores across all downward self-revision experiences the participant reported to create a single average index of relative defensive attribution use. In addition, all results reported herein are standardized.

To begin, the total effect of past downward self-revision experiences on greater chronic self-doubt was significant, with participants with more such experiences reporting greater self-doubt, $b = .456$, 95% CI [.340, .582], $p < .001$. However, consistent with our hypothesis, there was also an indirect relationship between possible self-revision experiences and self-doubt through attributions made, with the path from past revisions to attributions $a = .456$, $p < .01$, and the path from attributions to self-doubt, $b = .249$, $p < .01$. Together, these resulted in $ab = .113$, with a bootstrapped 95% percentile confidence interval based on 10,000 bootstraps yielding CI [.044, .214] (Hayes, 2013). The remaining direct effect was $c' = .369$, 95% CI [.155, .574]. Further, these effects held when controlling for other life transitions. The path from past revisions to attributions was $a = .473$, $p < .01$, and the path from attributions to self-doubt was $b = .264$, $p < .01$, and again a 10,000 bootstraps 95% percentile bootstrap interval of the indirect effect was still significant, $ab = .125$, CI = [.040, .232], further supporting the unique contribution of past downward self-revisions on chronic self-doubt. The direct effect also remained significant, $c' = .377$, $p < .001$. Figure 1 displays these results.

Study 1 discussion

As predicted, the results of Study 1 showed that greater reported experiences of downward possible self-revision ultimately predicted higher levels of chronic self-doubt, controlling for other life transition experiences. Moreover, consistent with the hypothesized mediation model, the results support the argument that relatively higher initial defensive attribution use mediated the effect of prior downward self-revision experiences on current levels of chronic self-doubt.

However, it must be acknowledged that these data are cross-sectional and correlational. Although consistent with our hypotheses, these initial findings are open to alternative explanations. Absent any manipulation of *X* or a longitudinal design, it is easy to switch *X* with *M*, *Y* with *X*, etc. and still obtain alternative and plausible indirect paths (MacKinnon, 2008). In particular, one could reverse the causal pathways to propose that, rather than higher prior possible self-revisions (X_{PSR}) diminishing core self-integrity (Y_{CSIR}), chronically lower core self-integrity (X_{CSI}) may create a negative retrieval bias that inflates
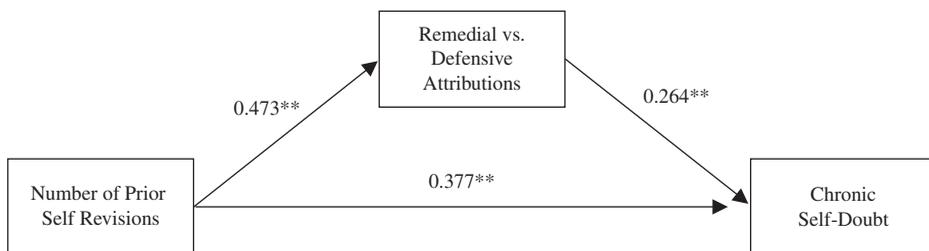

FIGURE 1 Study 1 mediation model results of path analyses relating prior self-revisions to chronic self-doubt through reported defensive (vs. non-defensive) attribution use delineating direct effects found to be significant, controlling for other life transitions. $*p < .05$, $**p < .01$.

the recollection of prior possible self-failures (Y_{PSR}) beyond what the individual actually experienced. Nonetheless, we can rule out some of these alternatives with the addition of a prospective longitudinal design in Study 2.

Study 2

Study 2 Design

This final study went beyond Study 1 in several ways in order to better support the proposed mediation hypothesis. Mediation requires changes in the variables involved in the mediation model, and in order for such changes to occur, it is necessary to have at least some time transpire between measuring X, M, and Y. This is perhaps particularly true in cases where it is clear that the variables require a longer time course in order for meaningful change to occur, as might be expected with core self-revisions. To that end, Study 2 employs a prospective longitudinal design in an attempt to rule out competing explanations regarding the directions of effects. In addition, this study also goes beyond Study 1 by adding a new remedial self-attribution statement. This allowed us to test the full mediation hypothesis that the greater use of defensive versus remedial attributions will mediate the effect of prior possible self-revisions on broader changes in core selves. The final study used the same general survey methodology. But, unlike Study 1, it used a prospective longitudinal design and additional attribution measures to better test the hypothesized pathways through which (a) earlier changes in career goals (e.g., becoming a teacher vs. doctor) cycle back to predict and (b) subsequent patterns of decline or growth in core self-esteem and well-being over time.

Study 2 Participants and Procedure

To track changes in critical measures over time, we recruited all incoming freshmen via an initial invitation email (and reminders) to participate in two web-based surveys at the beginning and end of their first college semester, with a 4-month interval separating each survey. One week before their first college term, an initial email was sent to each participant's new university email address that included the link to the first survey study. Upon completion of the first survey, participants were asked to electronically indicate consent to receive future invitations to participate in additional research surveys. In the final week of their first college semester (4 months later), those students who completed survey 1 and consented to future studies were emailed the link to complete the follow-up survey study. Sixty-three students responded to our invitation to participate at both time points. Participants ranged in age from 17 to 24 with a mean age of $M = 18$ years in this final sample.

   Possible self-revision experiences and attributions.   Study 2 used the same general survey instrument as Study 1 to assess the number of prior experiences of downward possible self-revision. Specifically, the Study 2 survey also asked participants to indicate the number of times they had to give up and change their career goals. To help isolate the unique effect of possible self-revision experiences, the survey included a subset of the control measures from Study 1. Specifically, it included measures of the frequency and the perceived stress associated with changing majors and change in relationship status. Moreover, Study 2 included the same two attribution items (1 defensive; 1 non-defensive) from Study 1. However, Study 2 added one new remedial attribution statement for each possible self-revision experience. Specifically, participants rated the extent to which they

gave up their goal because they did not have the right academic skills or qualifications to succeed at that time. As before, students used the same five-point Likert-type scale to rate their agreement with each attribution statement.

Chronic self-esteem and subjective well-being. To measure core self-integrity, students completed a reduced version of the Rosenberg self-esteem inventory (Rosenberg, 1965) using a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). Regarding the self-esteem scale, we used the first five items (three positively worded and two negatively worded items) of the full 10-item scale. These five items were merged to create a single Time 1 self-esteem index and a single Time 2 self-esteem index, both of which displayed excellent inter-item consistency (both α's > .87). Of note, prior research has also used and demonstrated the convergent validity of several reduced versions with the full Rosenberg self-esteem scale, including a one item version of the scale (Robins, Hendin, & Trzesniewski, 2001). To measure well-being, students completed the five-item Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985), using a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). As with self-esteem, we merged these five items at both time points to create a single Time 1 and Time 2 subjective well-being index, both of which showed excellent inter-item consistency (both α's > .91).

Study 2 Results

Initial Results & Analyses

As with our index of relative defensive versus non-defensive attribution use in Study 1, we computed the relative use of remedial versus defensive attributions by subtracting participants' T1 agreement with the defensive attribution statement from their T1 agreement with the remedial attribution statement for each downward self-revision experience. We then averaged these difference scores across all downward self-revision experiences reported at T1 to create a single average index of initial remedial versus defensive attribution use. To examine the influence of T1–T2 changes in remedial versus defensive attribution use, we subtracted the T1 difference between remedial versus defensive attribution use from their T2 remedial versus defensive attribution use. Thus, positive scores indicate increased remedial versus defensive attribution use from T1 to T2; negative scores indicate decreased remedial versus defensive attribution use. To examine the influence of T1–T2 new possible self-revisions, we subtracted participants' T1 number of reported possible self-revisions from their T2 number of reported possible self-revisions. Thus, higher scores indicate increased possible self-revision experience from T1 to T2. Finally, to examine changes in self-esteem and well-being from Times 1 to 2, we subtracted participants' average T1 self-esteem and subjective well-being scores from their average T2 self-esteem and subjective well-being scores. Thus, positive scores indicate increased self-esteem and subjective well-being from T1 to T2; negative scores indicate decreased self-esteem and subjective well-being.

As in Study 1, results here reflect standardized weights. Moreover, all analyses reported here control for other life changes as well as Time 1 self-esteem and subjective well-being. As predicted, the results of a regression analyses confirmed that greater prior experiences of possible self-revision at Time 1 predicted greater subsequent declines in self-esteem, $b = -.58$, 95% CI [−.689, −.123] and subjective well-being, $b = -.42$, 95% CI [−.66, −.17].

Test of Mediation Model

Although we used all 63 data points in the analyses of changes in self-esteem and subjective well-being, the analyses of attribution responses only used 35 cases given that 27 students reported no prior possible self-revisions (thus, they had no revisions to make attributions for).[4] To assess our mediation hypothesis, we conducted a path analysis to test whether variation in remedial versus defensive attribution use mediated the effect of prior possible self-revision experiences on broader revisions in self-esteem. Further, we included new possible self-revisions to add further support for the effects of attributions on both new self-revisions as well as chronic self-esteem and well-being changes. Control measures were included in the model as well, including frequency and stress of major and relationship changes (four items total), as well as T1 self-esteem and subjective well-being.

The model we estimated provided reasonable fit to the data, RMSEA = .067. Figure 2 presents the estimated model, with the exception of the control measures (e.g., T1 self-esteem, other life experiences). Note that whereas in Study 1, the outcome measure was self-doubt, whereas here the outcome measures are self-esteem and subjective well-being. As a result, the directions of effects differ, but agree in that they show more positive outcomes (lower self-doubt and higher self-esteem and subjective well-being) associated with remedial attributions.

As predicted, initial attribution use and changes in attribution use, in turn, affect both future possible self-revisions and future changes in self-esteem and subjective well-being. Specifically, at Time 1, greater use of remedial attributions predicted greater remedial attribution use in the future, $b = 647$, $p < .01$, 95% CI [.419, 1.205], and a decrease in possible self-revisions, $b = -.545$, $p < .01$, 95% CI [-.797, -.065]. In contrast, prior downward self-revisions did not predict later attribution use over the course of the semester, $b = .23$, $p = .30$, 95% CI [-.232, .6545].

Greater use of remedial attributions for new self-revisions also significantly predicted self-esteem changes, $b - .803$, $p < .01$, 95% CI [.313, 1.323], and marginally so for subjective well-being, $b = .634$, $p < .10$, 95% CI [-.018, 1.325]. In addition, the path from new self-revisions to self-esteem was also marginally significant, $b = -.283$, $p < .10$, 95% CI [-.578, .027], but did not predict subjective well-being, $b = -.190$, $p = .42$, 95% CI [-.660, .240].

We also calculated 95% confidence intervals for the indirect effects of interest based on 10,000 bootstraps (Hayes, 2013). We begin by again focusing on the attributions made. The paths from attributions at Time 1 through attributions made for new possible self-revisions to self-esteem and well-being outcomes were both significant, with the path to self-esteem $ab = .520$, CI [.200, 1.213], and the path to well-being marginally significant,
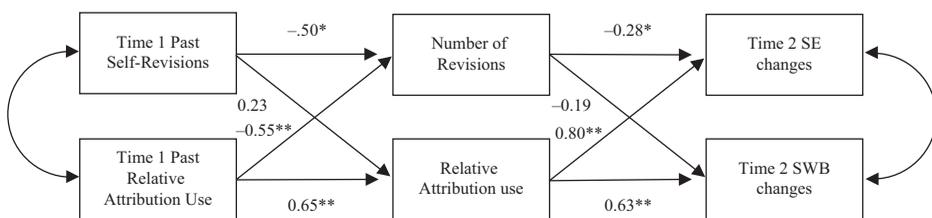

FIGURE 2 Longitudinal Study 2 mediation model results of path analyses delineating direct paths found to be significant, controlling for other life transitions, baseline self-esteem, and baseline subjective well-being. Numbers beside arrows are beta weights. *$p < .05$, **$p < .01$.

$ab = .410$, CI $[-.004, 1.144]$. The separate paths from Time 1 attributions through new self-revisions to self-esteem changes was not significant, $ab = .154$, CI $[-.029, .343]$, nor was the path to subjective well-being changes, $ab = .103$, CI $[-.110, .367]$.[5]

An alternative explanation for these findings may be that T1 self-revisions lead to changes in self-esteem and subjective well-being, which then drives later attributions and self-revisions. To test this possibility, we also considered an alternative model, with the T2 measures reversed. This model resulted in very poor RMSEA $= .244$, and as a result, does not appear to represent a viable alternative account of our findings.

General Discussion

Although preliminary, the results across two studies provided promising initial evidence for the proposed model of the consequences and pathways running from possible self-revisions to broader revisions in core self-integrity over time. Moreover, unlike Study 1, Study 2 is not as open to alternative interpretations that reverse the direction of causality. Indeed, unlike the retrospective design of Study 1, it is harder to argue that changes in the core self-esteem measure that emerged at Time 2 in the prospective design of Study 2 could have been the cause (vs. the result) of greater initial possible self-revisions or initial defensive vs. remedial attributions reported at Time 1. Thus, this final study provides better support for the hypothesized consequences and directional pathways running from early possible self-revisions to broader changes in core self-integrity measures.

The final longitudinal study also reinforced and extended Study 1 to better test the role of quality of initial attribution responses in mediating the process. Specifically, Study 2 showed that diminished (greater defensive vs. remedial) initial attribution efficacy, in particular, ultimately translates early possible self-failures into greater declines in core self-integrity measures over time. Consistent with the present model, this suggests that the key to long-term personal growth is not merely about whether you have experienced early failure or not—rather, it's about how well you *respond* to explain and resolve (vs. ignore) the cause of early failures.

To be clear, we are not proposing that defensive attributions never have benefits. Rather, consistent with Nussbaum and Dweck (2008), we propose that remedial and defensive responses correspond to primary and secondary control strategies that have adaptive priority under *different* conditions. Whereas remedial attributions assume initial priority as primary control strategies that exert direct behavioral control over the cause of controllable outcomes, defensive attributions are secondary control strategies that control one's emotional reaction to uncontrollable outcomes. Thus, when one cannot use primary control strategies, defensive attributions assume greater priority over continued remedial attributions in helping the person psychologically adjust to uncontrollable life outcomes (e.g., chronic handicap or illness). However, given that most outcomes offer some opportunity for improvement, remedial attributions appear to be more effective than defensive attributions as a primary first response to early possible self-failure. Consistent with this point, these findings showed that, relative to those who primarily used remedial attributions, those who primarily used defensive attributions were less likely to learn from old failures and, in turn, more likely to perpetuate the cause of old failures into new ones that slowly diminished core self-integrity over time.

Comparison of Present to Past Models

Of note, the present model differs from past models of core self-change in several important ways. With respect to broader core self-revisions, Epstein's model (Epstein,

1973, 1987) addressed punctuated (vs. gradual) changes in core selves in response to extreme trauma; by contrast, this model addresses the predictors and pathways (initial remedial or defensive attributions) of *gradual* revisions in core selves over time.

Of course, the present model even differs from other theories that *have* focused on gradual revisions in core selves over time. For example, Heatherton and Nichols (1994) also examined how repeated experiences of emotional distress and external threat ultimately culminate into broader "crystallization of discontent" within the personal narrative. However, the present model extends this work by replacing the abstract and diffuse labels of "repeated experiences of emotional distress and threat" that slowly converge into the "broader crystallization of discontent" with the specific variables of accumulating possible self-revisions and declines in core self-integrity measures. In addition, although Heatherton and Nichols note that failure narratives were more likely to include external attributions for threats, they never clarified the role of defensive attributions in the process. Thus, the present model extends prior work to clarify that the greater use of defensive (vs. remedial) attributions represents a critical mediator of the time-dependent process through which repeated possible self-revisions slowly translate into broader core self-revisions.

That is, whether or not an initial self-serving attribution is a long-term solution or just a quick explanatory fix depends upon whether it is a true remedial attribution that promotes learning and growth or, alternatively, a defensive attribution that serves immediate needs to protect, maintain, or enhance (or whatever else) core self-images in response to early failures. Although emotionally soothing in the short-term, these findings suggest that a greater initial tendency to generate defensive (vs. remedial) self-serving attributions ultimately translates old and new possible self-failures into greater declines in core self-integrity.

Conceptual implications

It is worth noting that the present findings have important implications for classic models that have focused on the maintenance (vs. revision) of chronic self-image disturbances. For example, Beck's (2002) model proposed that depression stemmed from the maintenance (vs. revision) of negative schemata of self (I am unworthy), environment (others do not love me), and the future (I will always be unworthy and unlovable). Relatedly, the Learned Helpless model focused primarily on the effects of established negative (self-denigrating) attribution patterns in depression maintenance (Seligman, 1975). The present model adds to these past models by articulating how those negative self-schemata and explanatory patterns might arise in the first place (i.e., primary defensive attribution tendencies).

Limitations and Future Directions

Despite having promising implications, this work also has important limitations. Of course, the most obvious limitation is that it includes only two studies and, in the case of Study 2, a relatively small sample size. The issue of sample size becomes particularly important in investigations such as this that estimate and test complex mediation models. Thus, the present study requires replication to establish the reliability of these effects. Second, this work may have neglected other potential aspects of past possible self-revisions beyond the sheer number. For example, critics could argue that the quality, not quantity, of prior possible self-revisions might be a better predictor of revisions in the quality of core selves. For example, perhaps an individual's temporal self-appraisal of

whether past possible self-revisions led to better or worse present possible selves matters just as much (or even more) than the sheer number of prior possible self-revisions he/she has experienced (Wilson & Ross, 2001). Though we agree that future work should include quality measures, we anticipate that the both quantity and quality interact or, work together, to determine the ultimate degree and direction of changes in core self-integrity.

In addition to examining aspects (quality) of prior possible self-revisions other than quantity, future work could also examine core self-integrity outcomes other than those measured in our studies. Importantly, prior work has indicated that revisions in interdependent selves created by break-ups can reduce overall self-concept clarity (Lewandowski, Nardone, & Raines, 2010; Slotter, Gardner, & Finkel, 2010). Of course, although we examined the effect of career-related changes in possible selves on self-doubt and self-esteem, we would imagine that revisions in career possible selves might also reduce self-concept clarity in the same way that relational self-revisions do. Thus, future work could examine the effect of revisions in career possible selves on core self-concept clarity as well as core self-doubt and self-esteem. Fourth, researchers should also explore the consequences and pathways from repeated upward possible self-revision to broader core self-revisions.

Finally, though it does examine how differences in attribution responses mediate the process, this work does not address the development of those differences in remedial and defensive attribution use. Thus, future work could identify the socialization practices that underlie the development of remedial versus defensive attribution responses. Of note, new work explores how different forms of parental praise following child performance can support or undermine self-esteem by promoting the development of *different attribution processes* (Brummelman et al., 2013). Whereas process praise focuses on the child's *behavioral contribution* to performances (you did a good job), person praise (e.g., you're so smart) focuses the attribution process on self such that failure (I'm not smart) and success (I'm smart) are attributed to the core self (Kamins & Dweck, 1999).

In so doing, person praise creates the very defensive vulnerability and self-doubt that it was originally intended to prevent. By contrast, the behavioral focus in process praise— unlike person praise—engenders feelings of efficacy and optimism following early failure (I can succeed if I try harder), thereby creating the very type of early remedial focus that may lead to the development of effective remedial attribution responses to later possible self-failure (Brummelman et al., 2013; Kamins & Dweck, 1999). Importantly, these scholars suggested that the messages repeatedly conveyed in these different forms of parental praise may become internalized over time such that the child automatically applies them to their own performance even in the absence of parental feedback (e.g., in college). Applied to the present discussion, future work could examine whether these forms of parental praise might represent one class of early socialization practices that can ultimately promote effective or ineffective attribution responses to possible self-failure experiences later in life. Although far from an exhaustive list, these represent just a few promising lines of future inquiry to extend these initial findings.

Summary

In closing, this is certainly not the first model to suggest that possible selves extend core self-schemas (Markus & Ruvolo, 1989). Nor, is it the first to suggest that self-serving attributions protect core self-images by attributing the failure to temporary personal (stress, fatigue) or situational (prejudice, unfair test) handicaps rather than the dispositional incompetence of self (Campbell & Sedikides, 1999). But, to our knowledge, this *is* the *first* theory to tie possible selves and self-serving attributions together as

complementary self-systems that can undermine as well as protect and enhance the core self-theories at the heart of a broader personal narrative written (and revised) over time.

Notes

1. Of course, Epstein distinguished his approach from Kelly's Personal Construct Theory that viewed people as naïve scientists who—like scientists—developed naïve theories, or constructs, to better understand, predict, and control their life experiences. In particular, Epstein's model did not view people as rationale scientists determined to systematically constructed and refined self-theories to better explain and control the data of life experiences. Rather, they were motivated scientists whose self-theory was driven by "hot" motivations to fulfill basic needs (e.g., hedonism, self-esteem, relatedness) other than accurate understanding over the course of life. Relatedly, Epstein argued that his model (vs. PCT) placed a greater significance on the role of emotion in driving the self-theory.

2. By "self-assessment error", we generally mean any error in the cognitive appraisal or behavioral expression of one's true core competencies. Thus, for example, a student who excels in computer science rather than art but believes they are better at art than computer science has made a self-assessment error. In the context of the present paper, self-assessment errors are problematic because new possible selves are translated from one's perceived (vs. actual) core self-competencies. Thus, the self-assessment error can lead to *translational errors* such that the student translates possible selves (e.g., become an artist) that he *believes* are *realistic* generalizations from his perceived core competencies but, *in fact,* are completely *unrealistic* generalizations because he does not actually have the true core competencies (e.g., artistic competencies) required to support that possible self-pursuit. The longer the self-assessment error remains in place, the more errors occur in the translation of his perceived core self-competencies into unrealistic new possible selves (artist) that are more likely to fail than realistic possible selves (computer scientist, programmer, etc.) translated from his true core self-competencies (computer science not art). Consistent with this point regarding the problems with self-assessment errors, Dunning and colleagues noted that "to the extent that people misjudge themselves, they may suffer costly consequences by pursuing wrong paths and missing opportunities to take advantage of special skills and resources they truly own (Dunning et al., 2004, p. 70)."

3. Of course, remedial attributions may identify other types of self-assessment errors such as errors in the initial strategy or effort one takes to successfully realize one's true potential. Thus, for example, he could realize that his performance and competency within the sciences depends upon the quality of the strategies and effort he invests with his better performances (vs. worse) restricted to prior conditions in which he used effective study habits and high effort (e.g., the 99% perspiration/1% inspiration formula for scientific success). Whatever the source of the error, early remedial attribution permit the young man to identify and resolve it to improve the translation of his core self-competencies into better new possible self-competencies.

4. Importantly, in contrast to the 26 excluded in Study 2 for never having experienced a revision, only four participants were excluded from Study 1. Although there may be other methodological differences that could explain this difference (retrospective vs. prospective survey design), it is very likely that the differences in actual college experience between the pre-college (Study 2) and college (Study 1) sample explain the differences in possible self-revision experiences. The greater number of Study 1 participants who reported prior revisions experiences may merely be because their greater college experience also provided greater opportunities to experience possible self-revision relative to their Study 2 counterparts. That is, unlike the Study 1 sample in which students had an average of $1-2$ years of college experience when we assessed them, we assessed the Study 2 sample before they ever arrived on campus. Thus, there may have been fewer Study 2 participants than Study 1 participants with prior possible self-revision experiences because we assessed them

before (vs. 1–2 years after) they had actually experienced the transition into the intensely evaluative university environment, where direct challenges to unrealistic possible selves frequently arise from educator attempts to steer "wayward" students toward more realistic career possibilities.

5. To lend further credence to our hypothesis that attributions for failure mediate the relationship between self-revisions and self-integrity outcomes, we estimated an additional model with direct paths from the T1 measures to the T2 outcome measures of self-esteem and well-being. The model fit was excellent, RMSEA = .000, but the utility of RMSEA is limited in this model because nearly all possible paths are estimated, and so the model-implied correlation matrix is to be expected to be nearly identical to the sample correlation matrix. As (or more) importantly, the additional paths from T1 control measures to T2 outcome measures were not significant, and so in keeping with our hypotheses the model discussed here does not include any direct paths from T1 to T2 outcomes.

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