

Potential-based achievement goals

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Potential-based Achievement Goals

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Abstract

Background: Self-based achievement goals use one's own intrapersonal trajectory as a standard of evaluation, and this intrapersonal trajectory may be grounded in one's past (past-based goals) or one's future potential (potential-based goals). Potential-based goals have been overlooked in the literature to date

Aims: The primary aim of the present research is to address this oversight within the context of the 3 x 2 achievement goal framework.

Samples: The Study 1 sample was 381 U.S. undergraduates; the Study 2 sample was 310 U.S. undergraduates.

Methods: In Study 1, we developed scales to assess potential-approach and potential-avoidance goals, and tested their factorial validity with exploratory and confirmatory factor analyses. In Study 2, we used confirmatory factor analysis to test both the separability of past-based and potential-based goals and their higher order integration within the self-based category.

Results: Study 1 supported the factorial validity of the potential-approach and potential-avoidance goal scales. Study 2 supported the separability of past-based and potential-based goals, as well as their higher order integration within the self-based category.

Conclusions: This research documents the utility of the proposed distinction, and paves the way for subsequent work on antecedent and consequences of potential-approach and potential-avoidance goals. It highlights the importance of focusing on distinct types of growth-based goals in the achievement goal literature.

Keywords: Achievement goal, standard, self-based, potential, past, growth

In research on achievement motivation, achievement goals have been a central focus of investigation for over three decades (Dweck, 1986; Maehr & Nicholls, 1980; Nicholls, 1984). “Achievement” represents competence and “goals” represent aims that guide and direct behavior, thus the study of achievement goals may be described as the study of competence-relevant aims that guide and direct behavior (Elliot, 1999; see also Kaplan & Maehr, 2007, for other perspectives with different emphases). In the present research, we focus on a subset of achievement goals, namely, self-based goals, seeking to demonstrate that such goals have multiple manifestations (past-based and potential-based) that can be assessed separately, but that nevertheless belong within the same conceptual category. In doing so we seek to heed Martin’s (2006; 2011) call for a more extensive focus on motivational constructs involving improvement, personal growth, and development.

From the beginning of the achievement goal approach to achievement motivation, a fundamental distinction between mastery goals and performance goals has been posited. Although several different definitions of these goals have been proffered over the years, they converge in portraying mastery goals as focused (at least in part) on task mastery and improvement, and performance goals as focused (at least in part) on normative competence. Elliot and colleagues (Elliot, 1999; Elliot, Murayama, & Pekrun, 2011) have explicitly grounded the achievement goal construct in the *definition* of competence, that is, in the standard or referent used to determine if one is doing well or poorly. There are three basic standards that may be used to define competence: the task itself, oneself, or others. From this perspective, mastery goals represent a combination of task- and self-based goals, while performance goals represent other-based goals.

The *definition* of competence is a basic, fundamental way in which achievement goals may be differentiated, but a second is the *valence* of competence. Competence is valenced in that it can be focused on the positive possibility of success (i.e., competence) or the negative possibility of failure (i.e., incompetence). These positive and negative possibilities are integrally linked to approach and avoidance tendencies and forms of regulation (Atkinson & Feather, 1966; Cacioppo & Berntson, 1994). The valence of competence is conceptually independent of the definition of competence, allowing the two components of competence to be crossed in a 3 x 2 achievement goal framework (Elliot, 1999; Elliot et al., 2011) comprised of the following: task-approach goals focused on task-based competence (e.g., “Do the task right”), task-avoidance goals focused on task-based incompetence (e.g., “Avoid doing the task wrong”), self-approach goals focused on self-based competence (e.g., “Do better than before”), self-avoidance goals focused on self-based incompetence (e.g., “Avoid doing worse than before”), other-approach goals focused on other-based competence (e.g., “Do better than others”), and other-avoidance goals focused on other-based incompetence (e.g., “Avoid doing worse than others). It is self-based goals -- self-approach and self-avoidance -- that are the central focus herein.

Within each definition/valence goal combination, including self-approach and self-avoidance goals, there can be many different manifestations and variants. The achievement situations that individuals encounter in daily life are distinct and unique, and people ideographically craft their goal pursuits to negotiate these different challenges and threats (Elliot, 2005). In addition, and most central to the present research, self-based goals use one’s own intrapersonal trajectory as the evaluative referent, and this intrapersonal trajectory may be grounded in one’s *past* (Albert, 1977; Levine & Greene, 1984; Sedikides & Hepper, 2009) or in one’s future *potential* (Markus & Nurius, 1993; Oettingen & Hagenah, 2005; Wilson & Ross, 2000). That is, self-approach goals may focus on doing better than one has done before or they

may focus on living up to one's own personal potential. In both instances, the self is used as a standard to define competence and the focus is on approaching success as opposed to avoiding failure. This past/potential distinction is equally applicable to self-avoidance goals, as such goals may focus on not doing worse than one has done before or on not failing to live up to one's own personal potential.

In the initial, nascent description of the 3 x 2 achievement goal framework (Elliot, 1999), self-based goals were defined entirely in terms of the past. That is, three standards were posited as basic, fundamental ways to define competence: the task, the past, and others. In subsequent, but still nascent characterizations of the 3 x 2 framework (Elliot & McGregor, 2001; Elliot & Murayama, 2008), self-based goals were described as intrapersonal goals, with no specification as to the precise type of aims that might fall within this rubric. In the full, formal articulation of the 3 x 2 framework (Elliot et al., 2011), self-based goals were explicitly conceptualized in terms of both past and potential, but were operationalized in questionnaire items solely in terms of the past (e.g., self-approach: "Do well on the exams in this class relative to how well I have done in the past on such exams"; self-avoidance: "Avoid doing worse on the exams in this class than I have done on prior exams of this type"). Thus, although it is acknowledged that self-based goals encompass one's potential, as well as one's past (see also, Hulleman, Schrager, Bodmann, & Harackiewicz, 2010), potential-based goal items have yet to be developed.

In the present research, we report two studies designed to address this empirical gap. Study 1 focused on both scale development and on testing whether the approach-avoidance distinction is applicable to potential-based goals. We anticipated that potential-approach and potential-avoidance goals would manifest as separable constructs, as the approach-avoidance distinction is basic (Elliot & Covington, 2001), and seems relevant to most if not all forms of motivation and regulation (Schneirla, 1959). Study 2 focused on the interrelation between past- and potential-based goals. We expected to find differentiation among the four focal self-based goals, as a focus on the self in the past and either improving or declining seems readily distinguishable from a focus on the self in the future and either living up to or not living up to one's potential. However, given that both past-based and potential-based goals, share the self as a standard, we also anticipated a hierarchical integration in which the past-based and potential-based goals focused on approach would converge, and the past-based and potential-based goals focused on avoidance would converge, at a higher-order level of analysis.

STUDY 1

In Study 1, we created items to assess potential-approach and potential-avoidance goals, and examined their factor structure. To provide a thorough test of the factorial validity of the measure, we randomly split the sample and applied exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to the respective sub-samples (see also Gerbing & Hamilton, 1996).

Method

Participants and Procedure

A total of 381 (118 male and 263 female) students at a U.S. university participated in return for extra course credit.¹ Participants were enrolled in an introductory-level psychology course where evaluation was based on a normative grading structure (e.g., 92nd percentile or above = A, etc.). The mean age of participants was 19.32; ethnicity was as follows: 60% Caucasian, 5% African American, 25% Asian, 6% Hispanic, 3% other, and 1% unspecified.

Participants reported their demographic information in a group session during the first day of the course. Twelve days later, they completed the potential-based goal items on a web

survey; the instructions informed participants that the items were about their goals “for the exams in this class”. Participants were assured that their responses would remain confidential and would not influence their course grade.

Measure

Pilot research was conducted with independent samples of university undergraduates with the aim of creating brief but reliable and face-valid indexes of potential-approach and potential-avoidance goals. At the completion of the pilot testing, three items were selected to represent each of the potential-based goals; these items are presented in the Appendix (e.g., potential-approach goal: “My goal is to do as well as I can possibly do on the exams in this class.”; e.g., potential-avoidance goal: “My goal is to avoid doing worse than my very best on the exams in this class.”). Participants indicated their responses on a 1 (*not at all true of me*) to 5 (*extremely true of me*) scale. The items for the two goal scales were averaged to form potential-approach and potential-avoidance goals indexes.

Results

Descriptive statistics and reliabilities are reported in Table 1. The means for both goals were well above the midpoint of the scale, and the full range of possible values was observed for each goal. Both goals exhibited good internal consistency, and the Pearson product-moment correlation between the goals was moderate ($r = .44, p < .01$). In this and the following study, all factor analyses were conducted using *Mplus* Version 6 (Muthen & Muthen, 2004).

Exploratory Factor Analysis

To explore the factor structure of the data, we randomly split the sample and applied an EFA with robust maximum likelihood solution to the first half of the data ($N = 178$). The Guttman-Kaiser criterion (eigenvalues greater than 1.0; Guttman, 1954; Kaiser, 1960), scree plot, and fit indices (see Murayama, Elliot, & Yamagata, 2011) all indicated that the two-factor solution was best. Accordingly, the final estimates were obtained with the two-factor model using Oblimin rotation. The model showed a good fit to the data, $\chi^2(4) = 4.20, p = .38$, CFI = 1.00, TLI = 1.00, RMSEA = 0.017. As reported in Table 2, all variables loaded above .50 on their primary factor and none of the secondary loadings exceeded .30, suggesting a simple two-factor structure.

Confirmatory Factor Analysis

To confirm the two-factor structure suggested by the EFA, we conducted a CFA with the second half of the data ($N = 203$) by designating that the items for each goal load on their respective latent factors. The model showed a good fit to the data, $\chi^2(8) = 12.00, p = .15$, CFI = 0.99, TLI = 0.98, RMSEA = 0.050. In addition, all standardized factor loadings were moderate to strong (ranging from .62 to .87; see Table 2).

STUDY 2

Study 1 produced items for assessing potential-based goals and established the applicability of the approach-avoidance distinction to these goals. In Study 2, we sought to examine the links between this new set of goal items and the recently established self-based goals items that focus exclusively on the past (Elliot et al., 2011). We hypothesized that the four goals would each load on separate factors in a CFA, but that a higher-order factor analysis would confirm that past-approach and potential-approach goals load together on an upper-level self-approach goal factor, and that past-avoidance and potential-avoidance goals load together on an upper-level self-avoidance factor. In this study, we also modified the assessment procedure with the ancillary aim of trying to reduce the correlation between approach and avoidance goals that is commonly seen in achievement goal measures (see Linnenbrink et al., 2012; Murayama et al.,

2011). Accordingly, we used a novel two-step response scale in which participants initially indicated goal adoption or not prior to reporting the strength of the goals that they indeed adopted (see Russell & Carroll, 1999, for parallels). In addition, in the instructions we defined goal as “what you focus on or aim for when doing a task or activity” and used these terms (focus and aim) synonymously with goal in the items (rather than repetitively using the term goal).

Method

Participants and Procedure

A total of 310 (114 male, 192 female, and 4 unspecified) students at a U.S. university participated in return for extra course credit. Participants were enrolled in an introductory-level psychology course where evaluation was based on an absolute grading structure (e.g., 92% or more of the possible points earned = A, etc.). The mean age of participants was 19.44; ethnicity was as follows: 56% Caucasian, 3% African American, 24% Asian, 6% Hispanic, 5% other, and 6% unspecified.

Participants reported their demographic information in a group session during the first day of the course. Two weeks later, they completed a potential-based goals measure and a past-based goals measure on a web survey; the instructions informed participants that the items were about their goals “for this class”. In addition, we removed the phrase “on the exams in this class” from all potential-based and past-based goal items to de-emphasize the focus on exam performance.² Participants were assured that their responses would remain confidential and would not influence their course grade.

Measures

Potential-based goals. The core of the potential-based goals items from Study 1 were used. Participants completed the items using a two-step response process. First they answered “Yes” or “No” as to whether the item represented a goal for them. If they answered “No”, they were given a 0 and proceeded to the next goal item; if they answered “Yes”, they were asked to additionally indicate the extent to which the item represented a goal for them on a 1 (slightly) to 6 (extremely) scale. As such, the possible range for each goal item was 0 to 6. The items for the two goal scales were averaged to form the potential-approach goal and potential-avoidance goal indexes.

Past-based goals. The core of the self-based goals items from Elliot et al.’s (2011) 3 x 2 Achievement Goal Questionnaire were used (e.g., past-approach goal: “Is your goal to do better than you typically do in this type of situation?”; e.g., past-avoidance goal: “Is your goal to avoid doing worse than you normally do on these types of exams?”) Participants responded to the three items of each measure using the same two-step response process described above for potential-based goals. The items for the two goal scales were averaged to form the past-approach goal and past-avoidance goal indexes.

Results

Descriptive statistics and reliabilities are reported in Table 1. The means for all goals were above the midpoint of the scale, and the full range of possible values was observed for each goal. All but past-approach goals exhibited good internal consistency; the reliability of past-approach goals was a bit below the conventional .70 target. Notably, with the modified assessment procedure, the Pearson product-moment correlation between potential-approach and potential-avoidance goals was descriptively lower than it was in Study 1 ($r = .28, p < .01$).

Confirmatory Factor Analysis

We conducted a CFA to confirm that potential-approach, potential-avoidance, past-approach, and past-avoidance goals form separate latent factors; specifically, we designated that

the items for each goal load on their respective latent factor. The model showed a good fit to the data, $\chi^2(48) = 116.85$, $p < .01$, CFI = 0.93, TLI = 0.91, RMSEA = 0.068. In addition, all standardized factor loadings were moderate to strong (ranging from .37 to .85). These results showed clear separability of potential-based and self-based goals, as well as their approach-avoidance components.

Higher-order Factor Analysis

The average correlation between potential-approach and past-approach goals, and potential-avoidance and past-avoidance goals (average $r = .48$) was descriptively higher than the average correlation between potential-approach and potential-avoidance goals, and past-approach and past-avoidance goals ($r = .37$). These patterns suggest that potential-based and self-based goals of the same valence might form a single higher-order latent factor.

To formally test this possibility, we compared three different types of higher-order factor analyses in which the four achievement goal factors themselves made up higher-order factors. We focused on three possible types of higher-order factor structures: (a) a general factor model, in which a single general factor explained the interrelationship among the four achievement goal factors, (b) a potential-past model, in which a potential factor (consisting of potential-approach goals and potential-avoidance goals) and a past factor (consisting of past-approach goals and past-avoidance goals) formed second-order factors, and (c) an approach-avoidance factor model, in which an approach factor (consisting of potential-approach goals and past-approach goals) and an avoidance factor (consisting of potential-avoidance goals and past-avoidance goals) formed second-order factors.

Table 4 reports the Akaike information criterion (AIC) and Bayesian information criterion (BIC) to compare these models. The approach-avoidance model had a negative variance in one of the error variance estimates; accordingly, we fixed the variance estimates to zero (Bollen, 1989). The results showed that the approach-avoidance model fit the data best, consistent with the observation seen in the correlation matrix (Table 3). Because the approach-avoidance model had a negative variance when tested with the maximum-likelihood approach, we also conducted a Bayesian factor analysis to supplement the initial analysis (Muthen & Asparouhov, 2012). One distinct advantage of Bayesian factor analysis over the conventional likelihood-based approach is that Bayesian factor analysis incorporates prior information to estimate parameters, thus enabling impossible parameter estimates (e.g., negative variance) to be avoided. In this analysis, we used non-informative priors (for variance parameters, we used positive non-informative priors), and posterior distribution for the parameters was evaluated using the Markov-Chain Monte-Carlo with Gibbs sampler. The deviance information criterion (DIC; the fit index for model comparison in Bayesian estimation) indicated that the approach-avoidance model was the best fit to the data (Table 4). In addition, parameter estimates (factor loadings, factor correlations) were comparable with those obtained with maximum likelihood estimation. In sum, these sets of analyses provide strong evidence that the relations among the four achievement goals are best described by the higher-order approach-avoidance model integrating potential-based and self-based factors.

General Discussion

The present research provides a measure of potential-based achievement goals and establishes potential-based goals as a subset of self-based goals within the 3 x 2 achievement goal model. Study 1 demonstrated that potential-based goals can be assessed in a brief, face-valid, and reliable manner. This study also showed that the approach-avoidance distinction is applicable to these goals, as both exploratory and confirmatory factor analyses validated the

separability of potential-approach and potential-avoidance goals. Study 2 further supported the psychometric properties of potential-approach and potential-avoidance goals, but also documented relations with past-based goals. Confirmatory factor analyses showed that potential-based goals and past-based goals are separable entities, but that these goals also form a shared, upper-level, self-based category.

In providing a new measure of potential-based achievement goals, the present research paves the way for systematic empirical work on potential-approach and potential-avoidance goals. In keeping with work on other achievement goal constructs, the logical place to begin such work is on antecedents of potential-based goal adoption and consequences of potential-based goal pursuit. Promising antecedent candidates are valenced dispositional variables such as approach and avoidance temperaments (Elliot & Thrash, 2002) and achievement motives (McClelland, Atkinson, Clark, & Lowell, 1953) that have been shown to be influential in prior work on valence-focused achievement goal frameworks (Bjornebekk & Diseth, 2010; Elliot & Thrash, 2002; Tanaka & Yamauchi, 2001; Zusho, Pintrich, & Cortina, 2005). Approach temperament and the need for achievement likely prompt potential-approach goals, whereas avoidance temperament and fear of failure likely give rise to potential-avoidance goals. The workmastery component of need for achievement may be particularly likely to facilitate potential-approach goal adoption, whereas competitiveness (importantly, other-based competitiveness; cf. Martin, 2011) may be unrelated (see Spencer and Helmreich, 1983, on the workmastery/competitiveness distinction). Perceived competence typically positive predicts approach-focused goals and negatively predicts avoidance-focused goals (Elliot & Church, 1997; Tanaka, Okuno, & Yamauchi, 2002), and this pattern is likely to hold for potential-based goals.

Predictions for the consequences of potential-based achievement goal pursuit are more difficult to generate, because the influence of goals is not acontextual, but instead can vary as a function of multiple features of the achievement situation (e.g., the nature of the achievement task, the type of feedback anticipated, age of participants, cultural norms and values; Elliot, 2005; Koslowski & Bell, 2006; Locke & Latham, 2007). A good starting place for generating potential-based goal predictions is research on past-based goals (D'Armenteau & Van der Linden, 2004; Peetz, Wilson, & Strahan, 2009), given the shared self-based categorization of these goals. In such research, past-approach goals have been shown to be positive predictors of a number of positive outcomes such as class participation, persistence, deep learning, and intrinsic motivation (Liem, Ginns, Martin, Stone, & Herrett, 2012; Martin, 2006; 2012) when the goals are about general schoolwork, but these goals have primarily produced null results when focused on exam performance (although they did facilitate feeling energized in class; Elliot et al., 2011). Past-avoidance goals have only been examined with regard to exam performance, and they have been shown to reduce feelings of energization in class, and have exhibited a trend toward undermining exam performance (Elliot et al., 2011).

Although potential-based and past-based goals are both grounded in a self-based standard, they differ in ways that may have implications for achievement outcomes, and this too should be considered in generating predictions. Relative to past-based goals, potential-based goals are more vague and abstract, and provide a less concrete referent for guidance and feedback in self-regulation. This would suggest that potential-based goals may not be very powerful predictors of performance, unless they are coupled with more concrete sub-goals or target goals (Harackiewicz & Sansone, 1991; Oettingen, Marquardt, & Gollwitzer, 2012). Indeed, in the goal-setting literature, "do your best" goals are commonly used as controls and are thought to have minimal impact on performance in most situations (Locke & Latham, 1990); however, such

goals have been found to facilitate performance in some instances (e.g., on complex tasks, on tasks in which skill development is needed before precise performance targets are prudent; Kanfer & Ackerman, 1989; Seijts & Latham, 2001; Winters & Latham, 1996). Potential-based goals, in contrast to past-based goals, focus on the future rather than the past. This focus on future potential may be inspiring and invigorating (Markus & Niurius, 1983; Tormala, Jia, & Norton, 2012), at least for potential-approach goals, and the ambiguity involved in using future possibilities as a standard may afford self-serving interpretations and appraisals (e.g., a wide range of outcomes may be interpreted as aligned with doing one's best; Locke & Latham, 2006; Robinson & Ryff, 1999). As such, potential-approach goals may be well-suited to facilitate phenomenological outcomes such as intrinsic motivation and subjective well-being. On the other hand, in focusing on future potential, potential-based goals may subtly imply a fixed, entity theory of ability, at least for some individuals (Kappes, Stephens, & Oettingen, 2011), and such goals may even suggest remediation in some instances (e.g., if "just" is implicitly or explicitly linked to "do your best"), with deleterious implications. In short, given the aforementioned considerations, any hypotheses generated regarding the consequences of potential-approach and potential-avoidance goal pursuit are best held tentatively at present.

Now that measures of potential-approach and potential-avoidance goals are available, a question that naturally arises is how best to utilize them. We do not recommend simply adding them to the measures of the other six goals of the 3 x 2 model in an extended achievement goal questionnaire. This would disproportionally weight one type of competence standard -- self-based -- over the others -- task-based and other-based. More importantly, lengthening the current questionnaire, particularly through the inclusion of similarly worded items, may heighten already existing tendencies toward multicollinearity due to response sets and biases (Linnebrink et al., 2012; Law, Elliot, & Murayama, 2011). Given that "satisficing" is common among research participants (Krosnick, 1991), shorter questionnaires with clear instructions encouraging attentiveness and discrimination are optimal. As such, achievement goal researchers would do well to move toward more targeted investigations of particular types of goals or sets of goals. For example, researchers could focus specifically on other-based goals -- other-approach and other-avoidance, or they could focus specifically on approach-based goals -- task-approach, self-approach, and other-approach. Most pertinent to the present work, they could focus on potential-approach and potential-avoidance goals alone or focus on examining similarities and differences between the two types of self-based goals -- past-based and potential-based.

Conceptually, past-based and potential-based goals fall within the same self-based category, and the hierarchical analyses from Study 2 provided empirical support for this conceptualization. We view the 3 x 2 achievement goal model and, more specifically, the three types of standards proposed within the model, as fully covering the conceptual space of competence definition (Elliot et al., 2011). In other words, we are decidedly *not* positing a 4 x 2 model herein (see Kaplan & Maehr, 2007, on the importance of parsimony), but instead are differentiating between manifestations of one of the three types of competence definition -- self-based competence. This retains the parsimony and clarity of the 3 x 2 goal structure, while still affording explication and exploration of specific subtypes within each of the six basic goal types. Subsequent work would do well to expand the focus on subtypes to task-based goals (e.g., those focused on a single accomplishment such as getting a question correct versus those focused on a cumulative accomplishment such as getting a certain percentage of questions correct; White, 1963) and other-based goals (e.g., those focused on specific others vs. those focused on abstract norms; Butler, 1998).

As self-based goals, past-based and potential-based goals both focus on one's personal competence trajectory, and there may be individual differences in the extent to which people's past and future foci are interrelated. For example, some may adopt and pursue potential-approach goals that focus on reaching one's full potential with little or no consideration of one's prior competence history, whereas for others, their focus on the future is closely tethered to and constrained by their prior experiences and outcomes. Future research would do well to investigate whether individual differences in variables such as self-improvement motivation (Taylor, Neter, & Wayment, 1995), future orientation (Gjesme, 1983), or time perspective (Zimbardo & Boyd, 1999) moderate this interrelation between past- and potential-based goals.

In the studies of the present research, we investigated U.S. undergraduates in introductory-level psychology courses. The restricted range in terms of age, culture, and academic subject may be considered a limitation of our work; future research is needed to extend our findings to different age groups (e.g., de Lange, Van Yperen, Van der Heijden, & Bal, 2010), different cultures (e.g., Wu, 2012), and different academic subjects (e.g., Liem, McInerney, & Yeung, *in press*).

In closing, the distinctions between task-based, self-based, and/or other-based standards of evaluation are integral to other literatures besides the achievement goal literature, including those on intrinsic motivation (White, 1959), person perception (Tormala et al., 2012), assessment and evaluation (Martin, 2011), affective forecasting (Van Boven & Ashworth, 2007) social comparison (Wheeler & Suls, 2005), competition and cooperation (Deutsch, 1959), and self motives (Sedikides & Stube, 1997). Within most of these literatures, self-based standards have received far less attention than other-based standards (e.g., Festinger, 1957; Wheeler & Suls, 2005), and perhaps even somewhat less attention than task-based standards (e.g., Csikszentmihalyi, 1990; Deci & Ryan, 1995). Within the self-based category, research and theory on past-based standards has far outstripped that on potential-based standards (e.g., Albert, 1977). In the present work, we have attempted to heed the call for a more concerted focus on self-based standards (Martin, 2006) by developing a measure of potential-approach and potential-avoidance achievement goals. We hope that the availability of this new measure and even the focus in this work on potential-based standards, will help move the field in the direction of this overlooked area.

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Footnotes

1. No manipulations were used and there were no data exclusions in either of the studies in this paper. All variables that were analyzed for each study are reported. Sample sizes for each study were based on the maximum number of participants that could be recruited during a predetermined period of data collection. The data for each study were collected in the context of a multi-study project (for Study 1, see Augustine et al., 2013, Study 3; for Study 2, see Augustine et al., 2013, Study 4). None of the results reported in the present research have been reported in prior work.
2. The changes that we made undoubtedly reduced the salience of exams in all items, but it should be noted that it did not remove all references to exams in all items (two past-approach and two past-avoidance goal items additionally make reference to exams at the end of the item, as in “done in the past on such exams”). This is irrelevant to the issue of the separability of potential-approach and potential-avoidance goals; if it affected responding on the past-based items it would have worked *against* our central hypothesis regarding the higher-order structure of the goals (i.e., it would favor the potential-past model over the hypothesized approach-avoidance model).

Table 1
Descriptive Statistics and Internal Consistencies across studies

	M	SD	Observed range	Cronbach's alpha
<u>Study 1</u>				
Potential-approach goals	4.47	0.68	1.00 – 5.00	0.77
Potential-avoidance goals	3.69	0.98	1.00 – 5.00	0.83
<u>Study 2</u>				
Potential-approach goals	4.97	1.36	0.00 – 6.00	0.80
Potential-avoidance goals	3.14	2.12	0.00 – 6.00	0.79
Past-approach goals	3.77	1.70	0.00 – 6.00	0.63
Past-avoidance goals	3.54	1.98	0.00 – 6.00	0.79

Table 2

Study 1: Factor loadings and factor correlations from EFA and CFA models

Sample	Factors	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Factor correlation
EFA sample	Factor 1	0.717	0.884	0.551	0.062	-0.053	0.026	.49
	Factor 2	0.021	-0.059	0.289	0.629	0.810	0.845	
CFA sample	Factor 1	0.824	0.806	0.615				.46
	Factor 2				0.815	0.709	0.866	

Note: EFA = exploratory factor analysis; CFA = confirmatory factor analysis. Loadings greater than .30 in absolute magnitude are in boldface. Items 1 – 3 are the items assessing potential-approach goals and Items 4 – 6 are the items assessing potential-avoidance goals (see Appendix).

Table 3
Study 2: Correlation matrix

Items	1	2	3
1. Potential-approach	-		
2. Potential-avoidance	.28**	-	
3. Past-approach	.40**	.36**	-
4. Past-avoidance	.12*	.56**	.45**

* $p < .05$. ** $p < .01$

Table 4

Study 2: Comparison of the hypothesized higher-order factor models

Model	χ^2	<i>df</i>	AIC	BIC	DIC
General factor model	154.21**	50	14921.0	15070.5	14922.1
Potential-past model	153.63**	49	14920.7	15073.9	14919.3
Approach-avoidance model	131.52**	50	14894.2	15043.6	14898.8

Note: *df* = degrees of freedom in maximum likelihood estimation; AIC = Akaike information criterion. BIC = Bayesian information criterion. DIC = Deviance information criterion (with Bayesian estimation).

Appendix

Potential-approach and potential-avoidance goal items**Potential-approach**

1. My goal is to do as well as I can possibly do on the exams in this class.
2. My goal is to do the best that **I** can do on the exams in this class.
3. My goal is to do my own personal best on the exams in this class.

Potential-avoidance

4. My goal is to avoid doing poorly in comparison to my absolute best on the exams in this class.
5. My goal is to avoid doing worse than I know I can do on the exams in this class.
6. My goal is to avoid doing worse than my very best on the exams in this class.