Exploring Facets of Student Motivation Using a Bass Ackward Strategy and the Conceptual Lens of Self-Determination Theory

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Abstract

Motivational constructs have proliferated in educational psychology, reflecting the complexity of what moves people to engage and learn. In this exploratory research, we focused on students' motivation for higher education. Our goal was to understand how a wide range of motives are empirically and conceptually related. We also examined how this diversity of motivational content relates to the motivational typology postulated by Self-Determination Theory (SDT). In Study 1, we extracted items from a broad collection of measures, formatted them with a common set of instructions, and administered them to multiple samples of current and former U.S. college students. Using Goldberg's (2006) Bass Ackward factor-analytic method, we distilled twenty-six distinct facets that capture a wide variety of motivational contents. Multidimensional Scaling (MDS) suggested a dimension that resembled SDT's continuum of relative autonomy, with some facets similar to amotivation and others falling along a range from less to more autonomous or volitional forms of motivation. In Study 2, we administered these provisionally labelled motivational facets alongside SDT's regulatory styles and a set of external criteria covering multiple outcomes of interest in higher education. MDS analyses replicated the general pattern found in Study 1, recovering a dimension resembling SDT's continuum of autonomy. Motivational facets were also associated with external criteria in a theoretically coherent manner. We discuss the implications of these exploratory findings for understanding the structure of self-reported motivation and for theory and measurement of student motivation.

Keywords: motivation; Self-Determination Theory; Bass Ackward; multidimensional scaling; autonomy

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Educational psychology is replete with motivational constructs, reflecting the complexity of the influences, incentives, and inspirations that encourage or discourage students from participating in school learning. Instruments have been designed to measure student motivation from a variety of theoretical perspectives. This variety in scientific approach has shed light on questions like, "How can we define and measure student motivation?", "What encourages students to engage fully in learning?", "What are the causes, correlates, and outcomes of student motivation?" and even "How might we improve educational methods?" However, this proliferation of constructs can also be confusing (King & Fryer, 2023). Some constructs appear similar. Others assess motivation at different levels of resolution. Some constructs are broad. Some are very specific.

Our purpose was to better understand this landscape of motivational constructs in a relatively open and novel way. To that end, we applied Golberg's (2006) Bass Ackward factor-analytic method and multidimensional scaling (MDS) to investigate how the item contents from a wide sampling of instruments assessing motivation might be interrelated. Our goals were to empirically survey the landscape of student motivation by distilling a wide variety of specific facets of motivation and motivation-related experiences, and then explore and describe that landscape using MDS. We were also interested to see if the typology of motivation described within Self-Determination Theory (SDT; Ryan & Deci, 2017) and its hypothesized continuum of relative autonomy (Howard et al., 2021; Ryan & Connell, 1989) may be recovered within the psychometric space captured by our MDS analysis.

We believe this study holds promise with respect to several important themes within educational psychology. First, by examining how different motivational constructs interrelate, the present study may offer educators and researchers a more nuanced understanding of the factors that drive student engagement and learning. Understanding the associations between constructs may help bring clarity to various models of student learning and educational interventions. Second, the application of Goldberg's Bass Ackward factor-analytic method and MDS introduces a novel analytical lens through which the interrelations among motivational constructs can be viewed, potentially uncovering patterns previously overlooked or obscured by conventional analyses. Although the Bass Ackward method is commonly used within the domain of personality psychology (e.g., Jackson et al, 2010; Kaufmann, 2013), to our knowledge this study represents its first application within the domain of educational psychology. Third, by examining the extent to which autonomy comprises a line along which different motivations may be described, the present study offers a novel examination of SDT. Specifically, given the breadth of motivational content included in our study, its results may potentially suggest elaborations to SDT's motivational typology. Finally, and perhaps most importantly, this exploratory research can help lay a broad foundation for future investigations, offering an admittedly preliminary empirical map of motivational constructs that can inspire more focused, hypothesis-driven studies. While developing a new scale to assess student motivation was not our primary goal, we hoped this investigation would inform future scale-development projects by using our results to refine construct definition and measurement.

Motivational Constructs in Educational Psychology

The term *motivation* originates from the Latin word *movere*, which simply means "to be moved." Within educational psychology, the topic of motivation is often concerned with the

forces that move students to participate, study, learn, and develop. Hattie et al. (2020) recently commented that the maturation of several theoretical models of motivation has brought new terms and concepts into use, seemingly at the expense of parsimony. Hattie and colleagues (2020) accordingly encouraged researchers to test competing hypotheses from different models. Another approach toward parsimony and knowledge integration would be to locate different motivational constructs at different points within a shared psychometric space—the parsimony and knowledge integration would lie in characterizing the psychometric space within which the constructs reside. Importantly, this may be achieved without sacrificing theoretical nuance since diverse constructs may find their respective locations in that shared space.

Educational psychologists indeed use a wide range of terms to describe the diverse aspects of student motivations. These include goals, schemas, expectancies, values, strivings, orientations, strategies, interests, efficacies, intentions, emotions, and others. Notably, some of these terms start with "self-", highlighting the significance of personal agency, beliefs, feelings, evaluations, and social comparisons. Motivational constructs developed outside of educational psychology are also relevant and routinely used for researching student motivations and academic outcomes. Constructs like action control (Kuhl, 2000), perfectionism (e.g., Etherson et al. 2022), fear of negative evaluation (Leary, 1983), flow (Csikszentmihalyi, 1990), need for cognition (Cacioppo & Petty, 1982), procrastination (Lay, 1986), burnout (e.g., Salmela-Aro et al., 2009), and passion (e.g., Vallerand et al., 2003), to just name a few, have proven useful for understanding the student experience. We incorporated such constructs in our study.

Motivational Constructs in Self-Determination Theory

SDT furnishes a typology of motivational constructs that has been extensively applied in educational psychology (Ryan & Deci, 2020). According to SDT, human motivations span a

continuum of relative autonomy or volition, extending from motives that are enacted with an internal perceived locus of causality, at one end, to motives that are enacted with external and impersonal perceived loci of causality, at the other. Figure 1 shows the distinct qualities of motivations called *regulatory styles* that are commonly measured in SDT-based studies.

Intrinsic regulation represents a highly autonomous type of motivation. It refers to behaviors that are enacted out of interest or for the enjoyment that ensues with the enactment of activities (e.g., a student is curious to read about a specific topic or has fun participating in class discussion). Studies have demonstrated numerous benefits of intrinsic motivation for educational outcomes (see Howard et al., 2021). A larger section of SDT's typology pertains to different extrinsic motivations. As a group, these differ from intrinsic motivation in that such motives aim for the attainment of operationally separable outcomes. *Identified regulation* is an autonomous type of extrinsic motivation. It refers to behaviors that people perform because they ascribe importance and consciously value the goals of an activity (e.g., a student studies because they believe that what they are learning is useful). *Introjected regulation* is a more controlled (less autonomous) quality of motivation. It refers to behaviors that one "should" or "must" perform or risk loss of self- or other-approval (e.g., a student studies because they would otherwise feel ashamed). When behavior is enacted for introjected reasons, students' engagement is often conflicted, ambivalent, and unstable. *External regulation* is the most controlled quality of extrinsic motivation. It refers to behaviors that are performed in order attain externally controlled rewards or avoid punishments (e.g., a student strives for a certain GPA to get the car their parents promised or studies to avoid getting scolded). Externally regulated behaviors depend on the expectancy that reward and punishment contingencies are in effect (e.g., the student is less likely to study when their parents are not monitoring their achievements). Finally, *amotivation*

describes states of passivity in which people lack intentions to behave. Amotivation may be characterized by feelings of indifference, perceptions that an activity lacks relevant value, or feelings of helplessness and ineffectance (e.g., a student does not study because they do not care about their performance).

Ryan and Connell (1989) developed an initial questionnaire to assess elementary school children's intrinsic, identified, introjected, and external motivations for doing schoolwork. This questionnaire asked students *why* questions—e.g., Why do I work on my classwork?—and listed items reflecting specific regulatory styles—e.g., "Because I enjoy doing my classwork" (intrinsic regulation), "Because it's important to me to work on my classwork" (identified regulation), "Because I'll be ashamed of myself if it didn't get done" (introjected regulation), and "So that the teacher won't yell at me" (external regulation). Consistent with an ordered continuum of relative autonomy, Ryan and Connell (1989) found a simplex-like pattern of correlations such that regulatory styles closer together in Figure 1 were more strongly associated than those farther apart (Guttman, 1954). Subsequent studies (e.g,, Vallerand & Bissonnette, 1992; Yamauchi & Tanaka, 1998), using self-regulation questionnaires modeled on Ryan and Connell's (1989) format similarly recovered simplex patterns of correlations. More recently several meta-analytic reviews have broadly supported the continuum model (see Ryan et al. 2023). For example, Howard et al. (2017) summarized data from 486 samples ($N > 200{,}000$) to examine the interrelations between SDT's motivation subtypes, finding that motivations conformed to the expected pattern across domains of activity, including in the domain of education. They applied a unidimensional MDS to illustrate the continuum across student, employee, and general samples.

Previous studies within SDT have indeed suggested that its taxonomy of motivation may be further differentiated. For example, some SDT researchers have tried to differentiate intrinsic

motivation, drawing distinctions between intrinsic motivations associated with the joys of learning, task mastery, and affectively pleasant stimulation (e.g., Carbonneau et al., 2012). Roth et al. (2006) using samples composed of Israeli elementary and high school students, demonstrated the continuum of relative autonomy using MDS, suggesting that additional motives might also be located along this dimension. Their MDS analysis suggested that approach and avoidance subtypes of both external and introjected regulation may also be located along the relative autonomy simplex. Sheldon, Osin, et al. (2017) used MDS in data collected from samples of American and Russian students. In response to the questions, "Why did you choose this major?" and "Why do you go to class?" they not only found evidence of an autonomy continuum, but also support for differentiating positive and negative forms of introjected regulation. Positive introjection was composed strivings to sustain self-worth (e.g., "Because I want to feel good about myself") and was located between identified regulation and negative introjection in the MDS space. Negative introjection was composed of strivings not to lose self-worth (e.g., "Because I would feel like a failure if I didn't") and fell between positive introjection and external regulation.

Given the breadth of motivational constructs within SDT and the fact that its motivational framework lends itself well to MDS analyses, we were curious to see if SDT's continuum of relative autonomy could be identified within a broader array of motivational constructs. Consistent with SDT, we expected that facets of motivation resembling at least some of SDT's regulatory styles would be recognized and that they would be arrayed along a continuum of autonomy. We also wondered if other facets of motivation, not currently specified by SDT, could be identified along the expected autonomy line. If found, such facets could suggest possible additions or refinements to SDT's motivational typology.

Overview of the Present Research

We sought to empirically survey the landscape of self-reported motivation within educational psychology by extracting the items from different questionnaires, formatting them with a common set of instructions, and administering them to samples of college and university students. To identify patterns of overlapping variance among the items, we used Goldberg's (2006) Bass Ackward method. This technique involves calculating principal component scores of multiple rotated solutions, starting with a one-component solution, proceeding to two- and then three-component solutions, continuously increasing the component solution by one component, and ending with a solution where all components remain interpretable. Correlations among component scores from adjoining levels, which are akin to part-whole correlations, are then graphically represented as path coefficients in a sequential structure, tracing the separation of larger components into increasingly smaller ones. We reasoned that this approach would allow us to identify broad motivational constructs and, most important to our purposes, the more "granular" or "specific" constructs that follow. Interestingly, this procedure allowed for the possibility that items originating from different scales may cohere within a common component. Upon identifying the most granular components, we submitted the provisionally labelled constructs to an MDS procedure. The MDS procedure allowed us to visually represent the psychometric space of student motivation. We were particularly interested to see if within this space we could detect a continuum of relative autonomy similar to that described in SDT.

Preliminary Study: Questionnaire and Item Selection

The goal of this preliminary study was to establish a suitable list of questionnaire items with which to assess a broad array of student motivations. To keep our efforts squarely within the domain of motivation, which was here construed narrowly as the reasons or drives behind

behavior, we focused on constructs that capture what initiates, directs, and sustains student behavior. Constructs that capture how students interpret their experiences and capabilities (e.g., academic self-concept; Marsh, 1987), or how they respond to challenges (e.g., mindsets; Dweck, 2006), were excluded from our purview, as were constructs describing dispositional traits (e.g., trait conscientiousness; Jackson et al., 2010). Our focus was on deriving a wide array of motivational constructs representing drivers of behavior that are used to explain why specific actions are taken, rather than constructs pointing to enduring individual differences that influence student motivation.

Method

Although our study was not designed as a scoping review, our approach to systematic searches and screening partially mirrored that of a scoping review. Therefore, we describe our screening process below using the PRISMA Extension for Scoping Reviews format (Munn et al., 2022; Tricco et al., 2018) to facilitate clarity of our search and screening methods.

Eligibility Criteria

To be included in this study, scales had to provide a quantitative measure of individual motivation. Many motivational constructs relevant to education are also relevant in other applied domains (e.g., parenting, healthcare, organizations); therefore, we chose not to restrict our search to the domain of educational psychology. Scales from peer-reviewed journal articles published in English were included. We did not apply any restrictions on the year of scale creation; however, as the search concluded in 2018, the search included articles published up to that year.

Information Sources

To identify as many potential scales as possible, we searched across three databases that cover the motivation literature: ERIC, APA PsycInfo, and APA PsycTests. The most recent

search was executed in December 2018. Our goal was to find validated research instruments and we therefore concentrated our search on these academic databases and did not use Google Scholar, which we expected would be more likely to return irrelevant results. In addition to database searches, we also included individual questionnaires and items covering topics appropriate for motivation. These topics were not identified through the initial database search and screening. Instead, these items were derived from expert opinions among the authors and included constructs such as perceived choice and awareness of self, physical activity motives, self-regulation, autonomous functioning, novelty need satisfaction, contingencies of self-worth, and sense of purpose.

Search

We compiled a list of common motivation search terms. Our search words were:

Engag*, Curious* Explor*, Reward, Punishment, Intrinsic Motivation, Motivational Regulation, External Contingencies, External Regulation, Shame, Guilt, Self-Conscious Emotions, Pride, Authentic Pride, Hubristic Pride, Ego-Inflation, Introjected Regulation, Fulfillment, Self-Worth, Self-Worth, Personal Goal Striving, Identified Regulation, Goal Coherence, Goal Clarity, Goal Conflict, Commitment, Expectancy-Value Theory of Achievement, Regulatory Styles, Attainment Value, Utility Value, Flow, Negative Introjection, Positive Introjection, Play, Interest, Openness, Intellect, Achievement Goal Orientation, Learning Goals, Avoidance, Fear of Failure, Motiv*

AND

Measure OR Scale OR Questionnaire

As the inclusion of all search terms returned many articles that did not include measures of motivation, and without filters to provide more specificity, we did not engage in a systematic scoping review of the literature. Instead, we conducted a broad search by entering each search term independently along with "Measure," "Scale," or "Questionnaire." We then organized the database results by relevance and screened the pages with the most pertinent results to identify any relevant measures.

To maximize the identification of appropriate studies while ensuring specificity from the search, we conducted snowballing searches and manually screened the reference sections of relevant articles for additional motivational constructs and scales. Finally, each author of the study contributed their expertise by suggesting constructs and questionnaires that might not have been identified by the other search strategies. The aim throughout was to capture diverse items from across the universe of items comprising this area of research.

Selection of Sources of Interest

Titles of measures initially identified through the database searches were independently screened by two authors. To distill these search results, two authors with expertise in motivational psychology independently inspected and categorized the content of each questionnaire item. *Directly relevant* items featured motivational content tailored to the academic domain. *Indirectly relevant* items also featured motivational content, but were not tailored to the academic domain; these items could be suitably rephrased for academic use. *Irrelevant items*, which did not feature motivational content, were discarded. At each stage, conflicts were discussed between the two screeners. If an agreement could not be reached, the other authors were consulted to achieve a consensus.

Data Items

In the initial round of screening, the titles of the measures were used. For the full-measure round of screening, the scale title and scale items were extracted from each scale.

Results

Selection of Sources of Evidence

Initial searches identified a total of 257 measures. After screening, we retained 155 measures and were able to access 154 of these, which contained 261 subscales. These were then fully screened. Following the complete screening of the measures and subscales, we retained 175 subscales from 100 measures, encompassing a total of 1,326 items. Subsequently, the research team examined the comprehensiveness of the item contents and devised an additional 17 items to encapsulate specific motivations which, in their judgment, were not represented in the initial set. Examples of these motivations include: “I am going to college simply because that is what my friends are doing,” “I would rather work part-time than put in the extra effort to study,” and “Going to college takes away too much time from my hobbies.” This resulted in a final set of 1,343 items, which was presented to the broader research team and finalized for inclusion in the study. The complete set of items is listed in Supplemental Table 1, and the scales from which the items originated are listed in Supplemental Table 2. Supplemental Figure 1 presents a PRISMA-style flow diagram that summarizes the scale and item selection procedure.

To minimize participant fatigue and obtain reliable results from our Bass Ackward procedure, we sought to identify and remove semantically redundant items and items exhibiting poor psychometric qualities. Redundant items posed the risk of creating what Cattell (1978, p. 289) called a “bloated specific factor.” Items with poor psychometric quality (e.g., low variance, skew) risked obscuring the factor-analytic results with weakly loading items. Therefore, we conducted a preliminary round of data collection, which received institutional review board

approval [ethics board information withheld to preserve author anonymity]. In this initial study, the full 1,343-item set was divided into five subsets of randomly selected items. From each subset, we randomly selected and administered 50 items to participants (N = 1,323). Consequently, each participant responded to a random selection of 250 items in total. The items were presented with the following instructions: "The following questions measure your motivation for studying. Please read each item carefully and indicate the degree to which the statement is true for you at this point in your life on a scale from 1 (Strongly Disagree) to 10 (Strongly Agree)."

Participants in this phase were college undergraduates in the United States, comprising 33.35% males, 65.53% females, and 1.12% unknown, with a mean age of 22.63 years (SD = 3.60). These participants were recruited by a professional panel company. Item correlations and descriptive statistics were computed for each item. We used common psychometric rules of thumb for distilling items (Nunnally & Bernstein, 1994; Tukey, 1977). We reasoned that item correlations greater than r = .80 indicated content redundancy. Based on this criterion, we removed 458 items by randomly selecting one item from each redundant pair. Additionally, we removed 18 items with a skewness greater than |1.50|, 483 items with a kurtosis greater than |1.50|, and 23 items with an inter-quartile range below the first or above the third quartile. These item-removal procedures resulted in a final list of 361 items from 104 subscales of 83 different questionnaires. These items are presented with asterisks in Supplementary Table 1.

Study 1: Examining the Landscape of Student Motivation

Having established a suitable list of items in our pilot study, we turned to our main focus: examining the landscape of student's self-reported motivation. We anticipated that the lowest

level of the Bass Ackward sequence would contain a diversity of constructs that, when submitted to a MDS procedure would capture the psychometric space of student motivation.

Method

The study received institutional review board approval from [ethics board information withheld to preserve author anonymity]. This study was not pre-registered as it was inherently exploratory in nature. We anticipated identifying a number of academic motivations and sought to examine their interrelations in a "bottom-up" manner.

Participants

Participants completed an online consent form before entering the study. Participants were again U.S. college or university undergraduates (N = 2,050; 48.29% male, 50.00% female, 1.71% not specified) with a mean age of 22.55 years (SD = 3.68) recruited via a professional panel company. All types of degree programs were acceptable, including enrollees in both associate's and bachelor's degree programs. We recruited approximately equal proportions of students from the humanities (33.17%), social sciences (33.42%), and natural sciences (33.41%). Additionally, we achieved nearly equal proportions across the first, second, third, and fourth years of study (22.22%, 29.37%, 21.95%, and 22.78%, respectively); 3.61% of students reported being in their fifth or higher year of study. The majority of participants identified as Caucasian (61.66%), while a significant minority were Black (13.07%). The remaining participants (25.27%) reported belonging to various other ethnicities.

Measures

In addition to demographic questions, participants completed the asterisked items listed in Supplementary Table 1 following the same instruction set used in the pilot study. To alleviate the potential for fatigue, we implemented a protocol wherein each participant was administered a

random subset of 250 items selected from the pool of 361 items. The exclusion of 111 items for each participant was performed in a manner consistent with a *Missing Completely at Random* (MCAR) mechanism (Enders, 2022). To account for the resultant missing data, we utilized the Predictive Mean Matching (PMM) algorithm for imputation as facilitated by the *mice* package (van Buuren & Groothuis-Oudshoorn, 2011). We selected PMM as our imputation method for several reasons. First, PMM is highly flexible and does not necessitate strict parametric assumptions about the underlying data distribution. Second, it retains the distributional attributes of the observed data. Third, it is robust to model misspecification. Last, PMM avoids issues related to data extrapolation that are inherent to some model-based imputation techniques.

Data Analytic Approach

We conducted two types of statistical analyses. We first subjected the items to principal component analysis with promax rotation. As a data reduction technique, we reasoned that principal components analysis was more suitable than exploratory factor analysis for our study because our goal was to describe, not explain, the covariation among motivational items. Using the Bass Ackward approach (Goldberg, 2006), we first extracted a single unrotated principal component. We then extracted and rotated two components; then three, then four, and so on, until we could no longer interpret the components. Component scores were saved for each iteration and the loadings between each extraction were calculated by correlating the component scores with one another. Following the Bass-Ackward procedure, we conducted an MDS analysis to visually examine the resultant psychometric space. We reasoned that the visual simplicity of MDS would help us understand the relationships between the diverse motivational contents.

Results

Bass Ackward Results

Supplementary Figure 2 visually depicts the results of the Bass Ackward procedure and Supplementary Table 3 displays the component correlations among each of the extracted components. The procedure yielded components that were interpretable up to seven extractions. To facilitate communication, we gave these seven components informal working labels: "Negative Orientation," "Positive Orientation," "Anxious Orientation," "Competitive Orientation," "Lackadaisical Orientation," "Pressured Orientation," and "Procrastinating Orientation." The loadings of this seven-component extraction are listed in Supplementary Table 4.

The item content of these seven components, though coherent, appeared heterogeneous. For example, the Negative Orientation included items connoting aimlessness (e.g., "I feel aimless at college"), laziness (e.g., "I am lazy with my studies"), lack of choice (e.g., "I feel like it is not my own choice to study"), and a variety of other sentiments. Positive Orientation included items that captured enjoyment and interest (e.g., "I study because it is fun") as well as absorption (e.g., "I can spend hours on a single problem raised at college because I just cannot rest without knowing the answer") and other seemingly positive forms of activity (e.g., "I do my schoolwork to forget my other worries in life"). Similar observations were made about the other five large components.

Given the apparent heterogeneity of the seven components, we wondered if they may be further explored. To obtain a more granular picture of student motivation, we therefore conducted additional Bass Ackward procedures on each of the seven components, reasoning that this additional set of analyses may enable us to identify *motivational facets* within these broad item clusters. In these exploratory analyses, we restricted our attention to those items with

loadings equal to or greater than |.30| on each component and ignored the fact that some items had cross-loadings on more than one of the seven broad components.

In total, the above procedure resulted in the identification of 32 provisional facets with distinct item groupings. However, we noted that 127 items had loadings equal to or greater than |.30| on more than one facet. To draw sharper distinctions among the facets, we inspected the item set and adjudicated the most appropriate facet for each item through group discussion. Items that had predominant loadings on one facet were retained for that facet and removed from the composition of other facets. This item-adjudication procedure whittled away a number of items from most facets, with other facets de-itemized completely (i.e., they were fully composed of cross-loaders), leaving a total of 26 unique facets. To interpret and label these facets, we then focused on those items with factor loadings equal to or greater than |.40|. For each facet, we aimed to select the most representative 4, 5, or 6 items. This refined the item pool further to a total of 125 items.

Supplementary Table 5 lists these motivation facets and their corresponding items. The broad component "Negative Orientation" broke into four coherent facets that we termed *Aimlessness*, *Boredom*, *Impression Management*, and *External Pressure to be Perfect*. "Positive Orientation" broke into five facets that we termed *Enjoyment and Interest, Absorption, Creative Engagement, Class Participation, Mood Regulation,* and the negatively loading *Work Avoidance. "*Anxious Orientation" broke into four facets that we termed *Anxiety About Tests*, *Shame Driven*, *Fear of Public Shame*, and *Difficulty Meeting Others' Expectations*. "Competitive Orientation" broke into *Preference for Competition*, *Seeking Fame and Admiration*, *Internal Pressure to be Perfect*, and *Looking Smart*. "Pressured Orientation" broke into *Avoiding Trouble* and *Not Having Choice*. "Procrastinated Orientation" broke into *Laziness*, *Proactivity*, and

Procrastination. Finally, "Lackadaisical Orientation" broke into *Indifferent to Others' Evaluations*, *Self-Forgiveness*, and *Anti-Intellectualism.*

Motivation facet scores were computed by calculating the mean of each facet's respective items. The facet scales showed acceptable levels of internal reliability, with Cronbach's alphas ranging from .70 to .87. Inspection of participants' scores across the motivation facets indicated that there was considerable variation in the extent to which participants generally expressed agreement across the full item set. These individual differences may reflect acquiescence bias ("yea-saying"), substantive differences in motivation, or other systemic sources of variance. Additionally, because our sample was comprised students from various types of degree programs, academic disciplines, years of study, institutions, and regions across the United States, it was important to address these between-person differences, which could potentially obscure the general interrelationships among the motivation facets. We therefore centered participants' facet scores by subtracting the within-person mean across the complete set of items from all facet scores. The correlations derived from this centering method predominantly reflect within-person variance rather than between-person variance.

Table 1 presents the correlations among the 26 derived motivation facets. As expected, the magnitudes of the correlations between some facets originating from the same broad component were fairly large. Enjoyment and Interest, for example, had large positive correlations with both Creative Engagement (r = .69) and correlated negatively with Work Avoidance (r = -.48). Facets originating from different broad components also had interesting patterns of correlations. Internal Pressure to be Perfect, for example, was positively associated with Preference for Competition (r = .19) but negatively correlated with Work Avoidance (r = -.27). The table also suggests specific patterns of relationships between each construct and others

of potential interest to researchers. For example, Procrastination showed positive associations with Anti-Intellectualism and Boredom, and negative associations with Class Participation, Absorption, and Creative Engagement. Other facets show similarly interesting patterns of relationships, from the costs and benefits of Looking Smart to the affective outcomes of Self-Forgiveness. We note that we avoided naming any of these facets with names of well-known constructs, so as not to claim any identity with any existing scales.

MDS Results

To visually represent the psychometric space of student motivation, we next conducted an MDS analysis. We used the *cmdscale* function included in *R*'s base package to conduct classic MDS analyses that tested one- to six-dimensional configurations. We computed normalized stress scores, which indicated how well the distances between motivation facets in the multidimensional space were preserved when the data were reduced into a smaller number of dimensions. Lower stress values indicate better fit of the data to the dimensions used. The resulting normalized stress scores were .1480, .0376, .0191, .0122, .0068, and .0043. These results suggested a two-dimensional configuration because pronounced reductions of stress were observed up to the two-dimensional configuration; the two-dimensional configuration stress value of .0376 is less than the value of .313 that marks the first percentile of stress values for 26 random variables (Sturrock & Rocha, 2000).

The resulting two-dimensional space is presented in Figure 2. The horizontal dimension was anchored by Enjoyment and Interest, on one end, and Boredom on the other. Around Enjoyment and Interest there was a loose cluster consisting of Proactivity, Creative Engagement, Class Participation, Absorption, and Mood Regulation. Around Boredom there was a loose cluster consisting of Work Avoidance, Procrastination, Aimlessness, Laziness, Not Having

Choice, and a little further away, Anti-Intellectualism and Impression Management. The other motivational facets were more diffusely spread between these poles. Self-Forgiveness and Indifferent to Others' Evaluations appeared relatively close together, as did Preference for Competition, Internal Pressure to be Perfect, Seeking Fame and Admiration, Looking Smart, and Shame Driven. These clusters, primarily representing intrapersonal pressures, standards, and ideals, were roughly the same distance from Enjoyment and Interest but were spread along the vertical dimension. Difficulty Meeting Others' Expectations, External Pressure to be Perfect, Avoiding Trouble, Fear of Public Shame, and Anxiety About Tests formed a grouping closer to the cluster that included Aimlessness.

The constructs along the horizontal dimension seem to conceptually align with the continuum conception of relative autonomy in SDT, which underlies different types of motivation. The item content of Enjoyment and Interest was in part derived from SDT scales assessing intrinsic motivation. Close to Enjoyment and Interest was Absorption, which reflects Csikszentmihalyi's (1990) Flow, a construct related to intrinsic motivation (Di Domenico & Ryan, 2017; Nakamura & Shankland, 2019). Class Participation and Creative Engagement similarly featured item content connoting intrinsic enjoyment. Situated within the Enjoyment and Interest cluster was Proactivity (e.g., "I usually start assignments shortly after they are assigned"), the only facet that resembled SDT's identified regulation.

At the opposite end of the graph, Aimlessness seemed to capture the impersonal locus of causality that is characteristic of Amotivation. Whereas Boredom, Laziness, and Anti-Intellectualism are similar in that high scores on these facets reflect a lack of perceived value, Procrastination and Work Avoidance connote a lack of motivation. Within SDT, a lack of

motivation is called Amotivation, often associated with lack of value or of perceived competence, which here was suggested by facet labeled Difficulty Meeting Others' Expectations.

In close proximity to this apparent Amotivation cluster there appeared motivational facets consistent with SDT's External Regulation such as Not Having Choice, Avoiding Trouble, External Pressure to be Perfect, Impression Management, Anxiety about Tests, and Fear of Public Shame, capturing different ways of having one's behavior externally controlled and regulated by possible punishments. The locations of Shame Driven, Looking Smart, Internal Pressure to be Perfect, Seeking Fame and Admiration, and Preference for Competition appeared in conceptual alignment with SDT's Introjected Regulation.

Interpreting the vertical dimension proved more challenging. We observed an empty space in the lower-left quadrant of Figure 2 and noted that Self-Forgiveness and Indifference to Others' Evaluations were diagonally opposite to Shame Driven, Fear of Public Shame, Looking Smart, and External Pressure to be Perfect. This observation led us to speculate that the vertical dimension might represent students' "concern for others versus concern for self." This potential interpretation brought to mind Rogers' concept of *locus of evaluation* (Rogers, 1951).

According to Rogers (1951), individuals with an internal locus of evaluation depend on their own instincts, perceptions, and judgments to examine their own experiences. They trust their sentiments and are more self-directed. Self-Forgiveness and Indifference to Others' Evaluations may partially reflect these tendencies in students. On the other hand, individuals with an external locus of evaluation rely on external sources to evaluate their self-worth, values, and behavior. This may involve seeking others' opinions and validation or conforming to societal norms and expectations. Rogers (1951) suggested that an external locus of evaluation could lead individuals to become dependent on others' approval to maintain their self-esteem. The factors of

Shame Driven, Fear of Public Shame, Looking Smart, and External Pressure to be Perfect may be indicative of these tendencies in students. We found this interpretation intriguing, and perhaps suggestive of other-focused and self-focused forms of introjection, but we defer making any conclusions about the vertical dimension.

Mood Regulation stood out as a facet that required some additional consideration. The item content of this facet suggests that studying may be a coping strategy for some students (e.g., "I do my coursework to forget about my problems"). The fact that Mood Regulation was relatively close to the Enjoyment and Interest cluster may suggest that such coping behaviors are volitionally enacted by students who find satisfaction in their schoolwork.

Brief Discussion

Our exploration of student motivation suggests that it is a landscape rife with distinct qualities of motivation. Sequential principal components analysis of 361 items distilled from the original pool resulted in the identification of 26 coherent motives that captured a wide diversity of student motivation. We termed these *motivational facets*. The psychometric space occupied by these 26 motivational facets was described by two dimensions when they were submitted to MDS procedure. As expected, the horizontal dimension of this space resembled the SDT continuum of autonomy. The vertical dimension of this space was more ambiguous and difficult to interpret.

Study 2: Examining the Motivational Facets Alongside SDT's Regulatory Styles

The goal of this study was to investigate how the 26 motivational facets we identified in Study 1 are associated with SDT's taxonomy of motivation. To this end, we administered a set of items that captured the perceived locus of causality (PLOC) of SDT's regulatory styles alongside the items that formed our motivational facets. We expected that each of our 26 motivational

facets would be differentially associated with the regulatory styles measured by the SDT assessment. Specifically, we expected that those motivational facets suggesting greater autonomous motivation would be positively correlated with intrinsic and identified motivation and negatively associated with external regulation and amotivation. We also expected to recover the horizontal dimension obtained in Study 1 and that SDT's regulatory styles would be distributed along the horizontal dimension in an ordered fashion; in effect, we expected that SDT's relative autonomy continuum would graphically align with our horizontal dimension.

To examine the broader nomological net of our 26 facets, we also assessed a set of student outcomes that we expected to have differential associations with our 26 motivational facets. This study was conducted in the fall of 2020, in the midst of worldwide COVID-19 lockdowns when most university students had transitioned to online learning. To avoid peculiarities of this cohort of students, we recruited a sample of participants aged between 25 and 35 years who had previously attended college. We adapted the instruction set and item content of our questionnaires to the past tense. To facilitate participants' memory, the questionnaire included a number of questions that served to reinstate the context of participants' college experience. Context reinstatement is a memory-retrieval technique that improves recall (e.g., Fisher and Geiselman, 1992) and has been used for retrospective questionnaires (e.g., Kahneman et al., 2004).

Method

The study received institutional review board approval from [ethics board information withheld to preserve author anonymity]. Given that Study 2 was a straightforward conceptual replication and extension of Study 1, we did not pre-register this investigation.

Participants

Participants were 861 U.S. adults who had previously attended college or university, recruited by a professional panel company. Participants completed an online consent before entering the study. The sample (47.62% male, 51.22% female, 1.16% other or unknown) had a mean age of $M = 30.91$ ($SD = 3.53$). Once again, the majority identified as Caucasian (72.93%), while a significant minority were Black (10.22%), with the remaining participants belonging to various other ethnicities (16.85%). The sample displayed diverse levels of educational attainment: 15.10% reported having some college education, 10.69% held an Associate's degree, 46.81% had a Bachelor's degree, 24.16% possessed a graduate or professional degree, and 3.25% had received some graduate or professional school training. The sample exhibited socioeconomic diversity, as reflected in the participants' reported annual personal incomes. Specifically, 11.73% earned less than $15,000 per year, 7.55% earned between $15,001 and $25,000, 10.57% earned between $25,001 and $35,000, 14.98% earned between $35,001 and $50,000, 16.03% earned between $50,001 and $75,000, 17.31% earned between $75,001 and $100,000, and 21.84% earned more than $100,000 per year.

After answering demographic questions, participants were asked a number of questions to reinstate the context of their days as a college student. They were asked to indicate the age at which they started and finished college, the name of their institution at both the start and end of college, the type of undergraduate program in which they were enrolled (e.g., Natural Sciences, Social Sciences, or Humanities), their specific subject majors and minors at both the start and end of their college studies, the courses they enjoyed the most and the courses they disliked the most, and whether or not they lived on campus, commuted, or some combination of both. These questions served to cognitively reinstate the context of their college studies (Fisher & Geiselman, 1992; Kahneman et al., 2004).

Measures

Academic Motivations

Motivational Facets. Participants completed the items in Supplementary Table 5 that were rephrased into the past tense. They did so using an instruction set that was adapted for recall. “The following questions will ask you about your motivation for studying while you were an undergraduate student at [*institution*]. As you consider your responses, try to remember what your experience and motivations were like when you were an undergraduate student at [*institution*] and indicate the degree to which each statement is true for you on a scale from 1 (Strongly Disagree) to 10 (Strongly Agree).”

SDT Regulatory Styles. The instruction set that was used for the motivational facets was also used when administering the SDT Regulatory Style items. Four items each corresponded to Intrinsic Motivation, Identified Regulation, Positive Introjection, Negative Introjection, External Regulation, and Amotivation. Sample items include, “I studied because I found it fun” (Intrinsic Motivation), “I wanted to study because I found it useful and valuable” (Identified Regulation), “I studied because I would have felt better about myself when I did well” (Positive Introjection), “I studied because I would have felt bad about myself if I didn’t” (Negative Introjection), “I studied because others pressured me to” (External Regulation), and “Studying often didn’t matter to me” (Amotivation).

External Criteria

Given the highly varied motivational facets uncovered in Study 1 we selected a broad array of outcomes relevant to higher education. We reasoned that this diversity of external criteria would afford an appropriate range of predictive targets for these diverse constructs.

Academic Performance. Participants were asked to report their academic performance in two ways. First, they were presented with the question, "To the best of your memory, what percentage grades did you typically get in college/university?" to which they could respond using the following 12-point scale: Below 60%, 60% to 62%, 63% to 66%, 67% to 69%, 70% to 72%, 73% to 76%, 77% to 79%, 80% to 82%, 83% to 86%, 87% to 89%, 90% to 92%, and 93% to 100%. Then, they were asked, "To the best of your memory, what was your overall Grade Point Average in college/university?" Participants responded to this question on a standard 0.0 to 4.0 GPA scale. Percentage grades and GPA were highly correlated, $r = .60$, $p < .0001$. These variables were therefore standardized and aggregated into an overall measure of academic performance.

Honors and Awards. Participants provided a Yes/No response to the question, "Did you receive any special honors or awards for your undergraduate performance (e.g., cum laude, phi beta kappa)?"

Skipping Class. Participants were asked, "How often did you skip class or lecture when you were an undergraduate at [institution]?" They answered using a 4-point scale that ranged from 1, "I almost never skipped class or lecture," to 4, "I almost always skipped class or lecture."

Benefits and Costs. Participants were asked, "Did the benefits you received from attending [institution] outweigh the costs to you and your family?" Responses were provided on a 5-point scale that ranged from 1, "Definitely not," to 5, "Definitely."

Perceived Usefulness of Education. Participants were asked, "How useful has your college/university education been for your career path? Responses were provided on a 5-point scale that ranged from 1, "Not at all useful," to 5, "Very useful."

Choose College Again. Participants were posed with the following hypothetical question, "If you could go back, would you still choose to go to college/university?" to which could response on a scale ranging from 1, "Definitely not," to 5, "Definitely yes."

Choose Different Subject. Participants were posed a second hypothetical question, "If you could go back, would you choose to study a different subject?" Answers were collected on a scale ranging from 1 "Definitely not" to 5 "Definitely yes."

Advise High School Senior. Participants were asked, "Would you encourage a high school senior who resembles you when you were a high school senior (similar background, ability, interests, and temperament) to attend [*institution*]? Participants provided their response on a scale ranging from 1, "Definitely not," to 5, "Definitely."

Education Satisfaction. Participants rated their overall satisfaction with their undergraduate education on a scale ranging from 1 "Very Dissatisfied" to 5 "Very Satisfied."

Social Satisfaction. Participants also rated their satisfaction with their social experiences while they were undergraduate students. Responses were collected on a scale ranging from 1, "Very Dissatisfied" to 5 "Very Satisfied."

Career Relevance. Participants provided a Yes/No response to the question, "Is your current occupation related your educational field(s) of study or training while you were a student at [*insert institution*]?"

Continued Learning. Participants were asked, "How much do you continue to read or learn in your major area of study? (e.g., through books, magazines, online education, journal articles)." Their responses were recorded on a scale that ranged from 1, "Not at all," to 10, "Very much."

Continued Contact. Participants were asked, "Are you regularly in touch with people you met at [*institution*]? Participants provided their responses by selecting from a checklist that listed advisors, professors or staff, members of teams and clubs, classmates and friends." Each selection was counted for one point and participants' selections were summed to compute a total score.

Continued Affiliation. Participants were also asked if they have participated in events or activities at their undergraduate institutions in the last 5 years. Responses were obtained using an 11-item checklist (e.g., visited campus, attended reunion or homecoming, worked as an admissions volunteer). Selections were summed into a total score.

Financial Contributions. Finally, participants were asked to select a statement that best describes their financial contributions to their former college. Response options were 1, "I have not contributed financially and do not plan to in the future," 2, "I have not contributed financially but plan to in the future," 3, "I have contributed financially but plan to give less or not at all in the future," 4, "I have contributed financially and plan to continue giving at the same level in the future," and 5, "I have contributed financially and plan to increase my giving in the future."

Data Analytic Approach

Given the preliminary status of our motivational facet items and the fact that we adapted the items into the past tense, we first assessed the internal reliability of these measures. We then conducted correlational analyses to examine the differential associations between the motivational facets and the PLOC Regulatory Styles. To conceptually replicate the findings from Study 1 and to visually represent the relationship between the motivational facets and regulatory styles, we ran an MDS procedure that included participant responses on both questionnaires.

Finally, correlational analyses examined the differential associations between the motivational facets and external criteria.

Results

Assessing Internal Reliability

As expected, the internal reliability of the SDT Regulatory Styles subscales was within acceptable bounds, with Cronbach's alphas ranging from .71 to .91 (see Supplementary Table 6). The Regulatory Styles also evidenced the expected simplex-like pattern, with the largest correlations appearing along the main diagonal of the correlation matrix (Ryan & Deci, 2020).

The internal reliability for many of the 26 motivational facets was initially low. Internal reliabilities for eleven of these were readily fixed upon removing one or two problematic items. The correlations among the items for Boredom, Internal Pressure to be Perfect, Self-Forgiveness, and Anti-Intellectualism were examined more closely when simple item removal failed to improve the reliability of these scales. Inspecting the Boredom items suggested distinguishing *Boredom* (e.g., "Coursework was boring for me") from *Strain* (e.g., "Going to lectures was a real strain for me"). We separately scored the items for these scales and found that the internal reliabilities were much improved. We similarly inspected Internal Pressure to be Perfect, from which we distinguished *Rigid Introjected Perfectionism* (e.g., "I felt like my value as a person depended on my school work being perfect") and *Work-Related Perfectionism* (e.g., "When it came to schoolwork, I did things perfectly or I didn't do them at all"); Self-Forgiveness, from which we distinguished *Kind to Self* (e.g., "As a college student, I was nice to myself") from *Self-Forgiveness* proper (e.g., "When things went wrong for me in my classes, I found it easy to forgive myself"); and Anti-Intellectualism, from which we distinguished *Anti-Intellectualism* (e.g., "Learning new ways to think didn't excite me very much") from *Intellectual Laziness* (e.g.,

"I tried to anticipate and avoid courses in which I would be required to learn and think deeply"). The internal reliabilities of these differentiated facets were strong. The internal reliabilities for three motivational facets—Impression Management, External Pressure to be Perfect, and Anxiety about Tests—could not be readily improved; these scales were accordingly dropped from our analyses. These reconfigurations to the item set resulted in a total of 27 facet scales. The items belonging to these revised facet scales are listed in Supplementary Table 5 and the resultant internal reliabilities are summarized in Table 2.

Assessing Differential Associations Between Regulatory Styles and Facets

We next conducted correlational analyses to examine the differential associations between the motivational facets and SDT's Regulatory Styles. Scores for both the motivational facets and Regulatory Styles were again centered by subtracting the within-person mean across the full set of items. The results of these correlational analyses are presented in Table 3.

Given that Aimlessness, Not Having Choice, Boredom, Procrastination, Work Avoidance, and Laziness were found to cluster together at one extreme of the horizontal dimension identified in Study 1, we expected each of these scales to have strong positive associations with Amotivation. Consistent with these expectations, the correlations of these motivational facets with Amotivation ranged from r = .28 to .62. On the other side of the pole, we expected Enjoyment and Interest, Creative Engagement, Class Participation, Proactive Engagement, Absorption, Creative Engagement, and Mood Regulation to hold positive correlations with Intrinsic Motivation. Indeed, each of these Facets held strong positive associations with Intrinsic Motivation, r = .33 to .72, except Class Participation, which was negatively correlated with Intrinsic Motivation, r = -.19. Self-Forgiveness and Work-Focused

Perfectionism (but not Rigid Introjected Perfectionism) also evidenced positive associations with Intrinsic Motivation, r = .32 and r = .28, respectively.

Avoiding Trouble and Not Having Choices had the large positive correlations with External Regulation, as would be expected. The largest negative association with External Regulation was held with Enjoyment and Interest, r = -.49. Anti-Intellectualism and Strain—two facets that we expected to have positive associations with External Regulation—both held negative associations with External Regulation, r = -.23 and -.19, respectively.

We expected that Negative Introjection would have strong positive associations with Rigid Introjected Perfectionism and Shame Driven. However, Rigid Introjected Perfectionism was not systematically related with Negative introjection and Shame Driven held a negative correlation with Negative Introjection. On the other hand, Positive Introjection correlated positively with Work-Focused Perfectionism and Looking Smart, findings that were consistent with our expectations. Positive Introjection also had positive relationships with Mood Regulation and Seeking Fame and Admiration. Finally, Identified Regulation had a similar set of associations with the motivational facets as Intrinsic Motivation, suggesting engagement with learning and positive outcomes from university.

Multidimensional Scaling

As in Study 1 we again used an MDS procedure to better understand the relationship between facets within a dimensional space. We used the *cmdscale* function included in R's base package to conduct classic MDS analyses, testing one- to six-dimensional configurations. The resulting normalized stress scores were .2052, .0472, .0252, .0154, .0095, and .0063. These results suggested a two-dimensional configuration because pronounced reductions of stress were observed up to the two-dimensional configuration; the two-dimensional configuration stress

value of .0472 is less than the value of .3370 that marks the first percentile of stress values for 33 random variables (Sturrock & Rocha, 2000).

The resulting two-dimensional space is presented in Figure 3. SDT's Regulatory Styles arrayed themselves across the horizontal dimension, with Intrinsic Motivation on one end, Amotivation on the other, and the other Regulatory Styles positioned in their expected order in between. Positive Introjection and Identified Regulation were both relatively close to Intrinsic Motivation and there was a gap of space separating Positive and Negative Introjection, an observation to which we return in the Discussion.

With respect to the motivational facets, the horizontal dimension was once again anchored by Enjoyment and Interest, on one end, and a cluster consisting of Aimlessness, Boredom, Laziness, Work Avoidance, Procrastination, on the other. Intrinsic Motivation was close to Interest and Enjoyment and Proactive Engagement, with Identified Regulation and Positive Introjection nearby on the horizontal axis. The facets Absorption and Creative Engagement were clustered nearby, consistent with the idea that these facets reflect a high degree of autonomous motivation. Directly above Positive Introjection were the facets Work-Focused Perfectionism and Mood Regulation. Self-Forgiveness was close to Positive Introjection on the horizontal dimension. The alignment and proximity of these motivational facets with Positive Introjection appear consistent with affectively positive internal processes that drive individuals to seek self-approval, regulate their emotions, and uphold high personal standards.

On the opposite side of Figure 3, Amotivation was to the left of the cluster that included Aimlessness. External Regulation was to the right of this cluster. The positioning of Aimlessness, Boredom, Laziness, Work Avoidance, and Procrastination is in keeping with the suggestion that these facets capture low levels of student motivation. Close to and to the right of

External Regulation lay Fear of Public Shame, Intellectually Lazy, and Not Having Choice. The motivational contents of these facets connote high levels of controlled and low levels of autonomous regulation by way of fearing social punishments, lacking interest, or experiencing little choice. A number of facets were positioned between Positive and Negative Introjection. These include, Difficulty Meeting Others' Expectations, Looking Smart, Seeking Fame and Admiration, Shame Driven, Rigid Introjected Perfectionism, and Preference for Competition. These facets appear to share characteristics with both types of introjections, reflecting a mix of internal pressures and the pursuit of specific goals. However, four facets that appear less directly related to the concept of introjection were also placed between Positive and Negative Introjection. These were Kind to Self (e.g., "I was kind to myself when experiencing difficulty in school," Class Participation (e.g., "I tried to answer questions in class because it was important to me to try to answer hard questions."), Indifferent to Others' Evaluations (e.g., "I wasn't concerned with what other people thought about my grades"), Strain (e.g., "Going to lectures was a real strain for me"), and Anti-Intellectualism (e.g., "Learning new ways to think didn't excite me very much").To better understand the placement of these facets, we considered their location along the vertical dimension.

The vertical dimension was again challenging to interpret. We noted that, in Study 1, Indifference to Others' Evaluations was close to Self-Forgiveness, but in the present image, this variable is close to Kind to Self and spaced relatively far from (revised) Self-Forgiveness. In Study 1, Self-Forgiveness and Indifference to Others' Evaluations were almost opposite to Shame Driven. However, in the present arrangement, both Kind to Self and Indifference to Others' Evaluations are relatively close to Shame Driven. Interestingly, these facets are also in

horizontal proximity to Negative Introjection, which may suggest that they both describe coping mechanisms in response to hostile introjections.

These inconsistencies between Studies 1 and 2 again make rendering an interpretation of the vertical dimension difficult. However, noting that the cluster of motives at the bottom of the vertical dimension—Preference for Competition, Rigid Introjected Perfectionism, Shame Driven, Class Participation, Kind to Self, Indifference to Others' Evaluations, Strain, and Anti-Intellectualism—all seem to entail self-focused attention, whereas the diffuse cluster on the top—Avoid Trouble, Seeking Fame and Admiration, Looking Smart—seem to entail other-focused attention, we again wondered if self versus other focus or locus of evaluation may, at least in part, characterize this dimension.

Motivational Facets and External Criteria

Correlations between SDT Regulatory Styles, motivational facets, and criterion variables are listed in Table 4. The correlations offer preliminary support for the construct validity of the facets. To organize our discussion of these relationships, we focus on correlations with an absolute value of $r > |.20|$ since this value marks the empirical lower bound for the top two thirds of all effect sizes in psychology (Hemphill, 2003).

As expected, motivational facets residing close to Amotivation on the horizontal dimension were negatively associated with academic performance. Specifically, Laziness, Procrastination, Aimlessness, and Boredom were negatively associated with academic performance as measured by student grades and GPAs. Conversely, Proactive Engagement was positively associated with academic performance, as was SDT-Identified Regulation. Skipping Class was positively associated with Boredom, Procrastination, and Laziness but negatively correlated with SDT-Identified Motivation.

Participants who reported greater Absorption, Creative Engagement, and Enjoyment and Interest also endorsed the view that the benefits of going to college outweighed the costs. The SDT-Identified Regulation and Intrinsic Motivation held similarly positive associations with this outcome. On the negative pole, Boredom, Aimlessness, and SDT-Amotivation were negatively associated with the belief that the personal benefits of attending college outweighed the costs. Several motivational facets were positively associated with the perceived usefulness of college education. Those respondents scoring higher on Creative Engagement, Enjoyment and Interest, Mood Regulation, and Absorption were especially disposed to toward this perception. In contrast, higher scores on Aimlessness, Boredom, Work Avoidance, Laziness, and Procrastination were negatively correlated with the perceived usefulness of college education. Enjoyment and Interest was the only Regulatory Facet with a pronounced positive association with affirmative responses to the question, "If you could go back, would you still choose to go to college/university?" Interestingly, SDT-Positive Introjection, Identified Regulation, and Intrinsic Motivation evinced positive correlations with this measure. Aimlessness, Not Having Choice, and Boredom were the motivational facets that held strong negative correlations with this item, as did SDT-Amotivation. Aimlessness held a strong positive association with affirmative responses to choosing a different subject.

Enjoyment and Interest, Creative Engagement, Care for Self, and Proactive Engagement was positively associated with affirmative responses to the question asking respondents whether they would encourage a high school senior similar to themselves to attend college. Aimlessness, Boredom, Laziness, Work Avoidance, and Procrastination had the opposite association with this question. These facets held similar associations with education satisfaction and social satisfaction.

Respondents were asked how relevant their current occupation is to their chosen college field of study and the extent to which they continue learning in that subject area. Facets with the most positive associations with these variables were Creative Engagement, Enjoyment and Interest, Mood Regulation, and Seeking Fame and Admiration. Those with the strongest negative associations were Work Avoidance, Aimlessness, and Boredom. Interesting, Class Participation held a negative association with continued learning. These motivational facets evinced a similar pattern of associations with continued contact and continued affiliation, though Work-Focused Perfectionism, Absorption, and Looking Smart were notably strongly associated with continued affiliation. Finally, Creative Engagement, Seeking Fame and Admiration, Mood Regulation, and Enjoyment and Interest were positively associated with respondents making financial contributions to their former college. Work Avoidance and, surprisingly, both Class Participation and Kind to Self held negative associations with making financial contributions.

Overall, these correlational analyses, with a few exceptions, showed that those facets located at the furthest poles along the horizontal dimension evidenced the strongest associations with external criteria. This general pattern of findings is broadly consistent with meta-analytic studies that indicate that the relative degree of autonomy is a central predictor of important student outcomes (Howard et al., 2021).

General Discussion

The purpose of the present research was to empirically survey the landscape of student motivation as represented in the items of self-report instruments. To do so we extracted 1,343 motivation items from 175 subscales of 100 different motivation questionnaires, administered these items to current university students, and submitted the items to an iterative Bass Ackward procedure (Goldberg, 2006). This analysis converged upon 26 item groupings that we called,

motivational facets. We then submitted these facets to an MDS procedure and found that they arrayed along two dimensions, with a prominent horizontal dimension that resembled SDT's motivational continuum of autonomy. In a second study, we explored the nomological net of these facets by administering them to a second sample of respondents along with a set of SDT-based PLOC scales and a list of criterion variables. The internal reliability of some facet scales was low, but this was readily addressed by omitting problematic items and differentiating some of the items into more specific facets. This re-assortment resulted in a total of 27 motivational facets. A second MDS procedure was conducted on these facets along with an SDT based measure of motivations. Results again supported an interpretation of the horizontal dimension as representing a continuum of relative autonomy, though the vertical dimension remained difficult to interpret. Examining the correlations of the motivational facets with external criteria was broadly consistent with previous studies in SDT showing that the relative degree of autonomy is a central predictor of important student outcomes (e.g., Howard et al., 2021; Ryan et al., 2023).

The present findings inspire a host of observations and questions for basic research. It appears that respondents are able to discern a variety of motivational experiences. Moreover, this diversity of motivational phenomena may be partly explained by the dimension of relative autonomy. Indeed, the MDS plot presented in Figure 3 illustrates the anticipated configuration of SDT constructs, with the PLOC scales displayed from left to right in the theoretically predicted sequence: Amotivation, External Regulation, Negative Introjection, Positive Introjection, Identified Regulation, and Intrinsic Motivation. These results are also consistent with the meta-analytic MDS findings reported by Howard et al. (2017). This underscores the widespread motivational significance of autonomy and suggests that each aspect of student motivation, with its distinctive characteristics, is more or less related to willingness and volition.

However, in line with Roth et al.'s (2006) argument that additional constructs might be identified along SDT's autonomy continuum, Figure 3 presents a notable gap along the horizontal dimension between Positive and Negative Introjection, as measured by the PLOC scales. We believe that the motivation facets identified by the Bass Ackward procedure may be useful in informing theory and research in this respect. Positioned between and around both forms of introjection, from right to left, we see Work-Focused Perfectionism, Mood Regulation, Self-Forgiveness, Looking Smart, Seeking Fame and Admiration, Shame Driven, Rigid Introjection Perfectionism, Preference for Competition, Class Participation, Kindness to Self, Avoiding Trouble, and Fear of Public Shame. These facets appear to share the intrapersonal, partially internalized quality of behavioral regulation that is typical of introjection (Ryan & Deci 2017).

For example, consider Looking Smart ("One of my goals was to look smart in comparison to the other students in my classes") and Work-Focused Perfectionism ("One of my goals was to be perfect in everything that I did in college"). Both of these facets have an intrapersonal focus and neither concern engaging in schoolwork because it is valued or enjoyable. Both are seemingly concerned with strivings for feelings of self-worth, all of which are hallmarks of positive introjection (Ryan & Deci, 2017). Similarly, consider Rigid Introjected Perfectionism ("I felt like my value as a person depended on my schoolwork being perfect") and Fear of Public Shame ("I was frequently afraid of other people noticing my wrong answers on tests"). Once again, both facets have an intrapersonal focus. Neither suggests a personal valuing or interest in doing schoolwork, and both convey a belief that one "should" or "must" perform well or face self- and other-disparagement—hallmarks of negative introjection. We accordingly

believe present results offer a broad foundation for future measurement projects in SDT that aim to capture more granular motives along the autonomy continuum.

The diverse array of motivational facets also raises questions about their relations with psychological need satisfactions and frustrations. Within SDT, different qualities of student motivation have been examined, in part, as outcomes of the ambient supports for autonomy, competence, and relatedness that students experience, as well as their fulfillment of these needs (Ryan & Deci, 2017). Amotivation, for example, can stem from students' feelings of incompetence or their lack of interest or non-valuing of school subjects (low autonomy). Similarly, Introjected regulations may originate from the perception that significant others, such as parents or instructors, convey acceptance and approval (relatedness) when students perform to certain standards or expectations and less when they do not. This phenomenon in which relatedness and autonomy are pitted against each other is called *conditional regard* (Ryan & Deci, 2017). Illustratively, a study by Assor et al. (2004) examined the effects of parents' use of conditional regard on their college-aged children's motivation and well-being. The study found that parents' conditional regard predicted Introjected regulation and that Introjection mediated the link between conditional regard and fluctuations in self-esteem, parental disapproval, and short-lived satisfaction following successes.

In this light, an important question concerning the 27 facets identified in this study concerns the dynamics of need satisfaction and frustration that may underlie their development. The general expectation is that those facets closer to the right-hand side in Figure 3 will be associated with greater satisfactions of autonomy, competence, and relatedness, whereas those closer to left-hand side will likely be associated with frustrations of these needs. More interestingly, the facets situated closer to the middle of the MDS plot may reflect varied degrees

of need satisfaction and frustration, akin to what has been described for Introjection. Given the apparent differences between the motivational facets, this would seem to be an interesting area for future work.

In contrast to SDT's PLOC scales, which arrayed themselves closely around the horizontal axis in Figure 3, the motivational facets identified by the Bass Ackward procedure were more diffusely arrayed. Further research is needed to better understand the vertical dimension, which eluded clear interpretation in the current studies. In both Studies 1 and 2, we observed that this dimension appears to capture a continuum ranging from "concern for others" to "concern for self." This idea resonates with Rogers' theory of locus of evaluation (Rogers, 1951). Students who exhibit an internal locus of evaluation, possibly characterized by traits such as "Indifference to Others' Evaluations," tend to rely on their own judgment and exhibit self-directed behavior. Conversely, those with an external locus of evaluation look to external benchmarks, such as societal or academic expectations, to validate their performance. This may be expressed in motivational facets like "Fear of Public Shame" and "Anxiety About Tests." Future studies may benefit from employing rational scale construction methods to further develop the vertical dimension and scrutinize the construct validity of the motivations that lie along its axis. For example, when previously discussing Figure 2, we noted the empty space in the lower-left quadrant. Using rationale scale construction, the goal would be to identify constructs that feature an internal locus of evaluation and an external locus of perceived causality. As a hypothetical example, consider a student who personally values their academic success (internal locus of evaluation) yet still experiences reactive ambivalence, perhaps because their parents are pressuring them to perform well (external locus of causality). Future studies are needed to assess these ideas.

The results of this study also reaffirm construct validity for other motivational perspectives. For example, items assessing *flow* (Nakamura & Shankland, 2019) showed predicable relations with conceptually related facets such as interest and absorption. Additionally, facets emerged that reflected external and internal forms of perfectionism, as predicted by prior theory and research (e.g., Etherson et al., 2022). One unorthodox aspect of our approach in this study was that items originating from different scales were allowed to coalesce into a newly identified motivation facets. This makes direct comparison of the motivation facets obtained here with established constructs and scales difficult.

The present findings also inspire questions for applied research. Granular motivational facets may hold greater utility for predicting focused outcomes in applied settings. A similar point about prediction accuracy has been raised with respect to the broad superordinate dimensions of personality traits (i.e., the Big Five) and the narrower trait facets that broad personality dimensions encompass (e.g., Ozer & Benet-Martinez, 2006); trait facets are typically more useful for predicting specific outcomes. For example, studies indicate that the Industriousness facet of Conscientiousness is more strongly associated with academic performance than the broad Conscientiousness construct (Di Domenico & Fournier, 2015). Unlike Big Five research, which is relatively well developed, our identification of the so-called motivational facets is only preliminary and more psychometric work will be needed to ascertain the number and contents of motivational facets, as well as their relation to SDT's commonly used Regulatory Styles. The present study does however suggest that such work is likely a fruitful endeavor.

Related to the considerations above, it is important to remember that the Bass Ackward method is an exploratory tool and does not represent construct hierarchies in the conventional

sense of the term, where correlations between facets are explained by a higher-order, latent variable (Goldberg, 2006). As noted by Goldberg (2006, p. 357), one might think of Bass Ackward structures as sequential rather than hierarchical, akin to a flow chart. Our implementation of the Bass Ackward procedure proved useful for identifying motivation facets, but future work using confirmatory methods, such as exploratory structural equation modeling (Marsh, Morin, Parker, & Kaur, 2014), will be necessary to characterize the hierarchical organization of the motivational constructs described here. In this respect, we believe the present results provide a useful foundation not only for understanding the hierarchical nature of motivational constructs but also for the development of omnibus questionnaires that broadly and deeply measure student motivation.

The specificity of motivational facets is important because educational interventions can be extensive and varied in their scope, incorporating distinctive pedagogical approaches and targeting different outcomes. And given the inherent diversity of instructional settings, student demographics, and academic subject matter, broad motivational concepts might not precisely capture the specific elements within an intervention that contribute most significantly to observed benefits. Broad motivational constructs may, therefore, hamper the replicability and generalizability of the same intervention in different contexts. Previous work with the Big Five domains showing that trait facets are typically more useful than higher-order traits for predicting specific educational outcomes (e.g., Di Domenico & Fournier, 2015) is again illustrative. The motivational facets captured in the present research may therefore offer a more detailed assessment of the student experience and enhance our comprehension of how interventions work. Relatedly, motivational facets may also help inform theory-guided methods in the design of personalized learning experiences, allowing educators to more accurately align instructional

strategies with individual student motivations, thereby enhancing engagement, improving learning outcomes, and ensuring that educational interventions are more meaningful for each student (Bernacki et al., 2021).

Of potential interest to colleges is the data herein concerning participants' continued affiliation with and contributions to their institution. These positive outcomes were most associated with facets of creative engagement, intrinsic motivation, and interest/enjoyment, as well as motives for seeking fame and admiration. Such findings may be informative about the motivational underpinnings and profiles of sustained alumni support. These findings are also not without precedent. Researchers in the domain of philanthropic psychology have long pointed out that the extent to which donors can personally identify with a cause influences their likelihood of supporting that cause (Sargeant, 1999). Given that creative engagement, intrinsic motivation, and interest/enjoyment—all autonomous forms of motivation—were predictive of support, these findings may suggest that those who have more autonomous motives for their college studies are more likely to offer support. This may be a topic of interest for future research.

The present study is not without its limitations. A first limitation concerns the exploratory nature of the analyses with which the motivational facets were identified. Indeed, the current research adopted a “bottom-up” strategy to surface the motivational facets; we did not have “top-down” preconceptions about the quantity or content of the possible motivational facets. We were ourselves surprised at some of the facets that emerged, as well as some that did not. Those facets we did identify, and the items with which we measured these facets, require additional psychometric work using confirmatory factor-analytic methods before they can be recommended as instruments with which to reliably and validly assess student motivation. In this sense, this is

not a measurement development article but rather a psychometric exploration of items reflecting motivational constructs. Future validation work on the motivational facets is necessary.

A second limitation concerns the cross-sectional method used to evaluate the associations between motivational facets and external criteria. This issue is especially important for Study 2, which employed a retrospective method to assess student motivation. Future research should employ both concurrent and longitudinal designs to more rigorously evaluate the construct validity of these provisional motivation facets. In Study 2, three facets identified in Study 1 exhibited poor internal reliability and were removed. Additionally, the facet Internal Pressure to be Perfect, identified in Study 1, was split into Rigid Introjected Perfectionism and Work-Focused Perfectionism in Study 2 to preserve internal reliability. Likewise, Self-Forgiveness was split into Kind to Self and Self-Forgiveness. And although a general pattern of associations supported the significance of the identified facets, some correlations between the motivation facets and the PLOC measures in Study 2 did not meet our expectations. It is important to emphasize that our primary goal in employing the Bass Ackward procedure was not to create and validate new measures but rather to identify coherent item groupings of distinct motivational contents. In this basic sense, we think our study provides “proof of concept” for a diversely populated landscape of study motivation. Future scale-development efforts may utilize the findings from this study for more precise construct definition and measurement.

A third issue concerns the limitation of only using scales in English, and our reliance on U.S. student and former student samples. Exploring how varied motivational constructs both “map” and have predictive utility within different cultures is an important future agenda. The present studies focused on university and college and the present findings also cannot be generalized across other levels of education, where different motives may well emerge. Indeed,

to evaluate cultural and educational level differences in motivational phenomenology it might be beneficial to compare MDS mappings like the ones developed here.

The final, and perhaps most important, limitation to note is that although we derived our motivational facets from an initial list of 1,343 items, our motivational facets likely do not comprise an exhaustive set. Some items were eliminated from further consideration in our preliminary investigation because they either evidenced redundancy with other items in the pool or showed poor psychometric properties. Our scale and item search also concluded in 2018, so newer motivational constructs may have been missed in our study. Moreover, our scale and item search, though structured and mirroring a PRISMA Extension for Scoping Reviews format (Munn et al., 2022; Tricco et al., 2018), was only partially aligned with a full scoping review. An initial search of motivational constructs returned 465,498 articles—far too many to thoroughly examine. For feasibility purposes, we needed to be pragmatic and targeted in our search. We thus do not claim to fully represent the universe of items in this field but do capture a diverse set of them. However, given that our aims were exploratory and that we have obtained a preliminary picture of the landscape of student motivation, we look forward to future studies that might further populate the horizontal and vertical dimensions with additional motivational facets and help produce a yet more detailed and fine grained portrait.

Finally, though not a limitation *per se*, this research focused on motivational constructs in a relatively narrow manner—needs, goals, self-efficacy, values, expectancies, intrinsic and extrinsic motivations, and experiences inherent in motivational processes (e.g., flow, burnout, optimism). Consequently, it necessarily omitted conceptually adjacent constructs such as academic self-concept (Marsh, 1987), attributions for successes and failures (Weiner, 1972), and mindsets (Dweck, 2006). These cognitive constructs are useful for understanding how

motivation functions and are often incorporated into empirical models to explain how students initiate, sustain, or cease their academic behaviors. It remains a task for future studies to examine how constructs at the admittedly "fuzzy boundaries" of motivation fit into the two-dimensional landscape pictured in the present study. We believe such an endeavor can help to further elucidate the landscape of student motivation.

Notwithstanding the above limitations, we believe the present work advances the field's understanding of the diversity of student motivations, and their inter-relations. The current findings suggest that the landscape of student motivation is phenomenologically rich. Still, amidst this diversity, students' sense of autonomy appears to provide a conceptual dimension along which many distinct motivations systematically vary.

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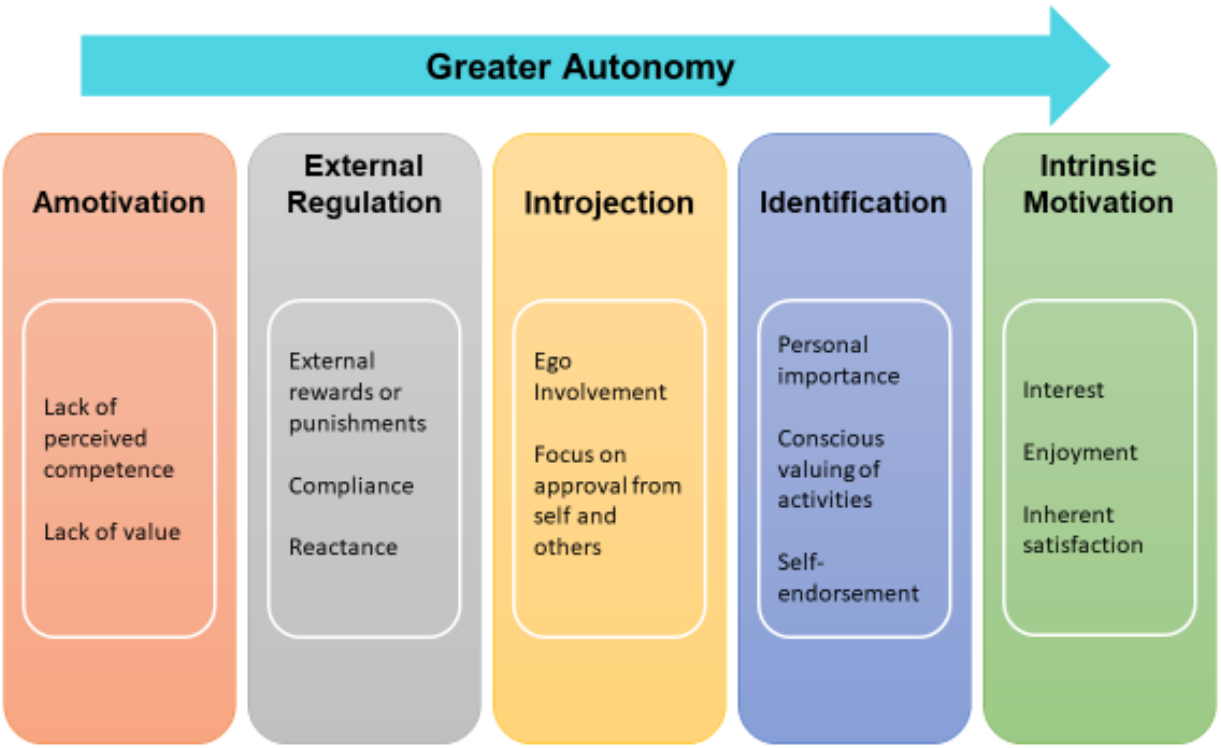
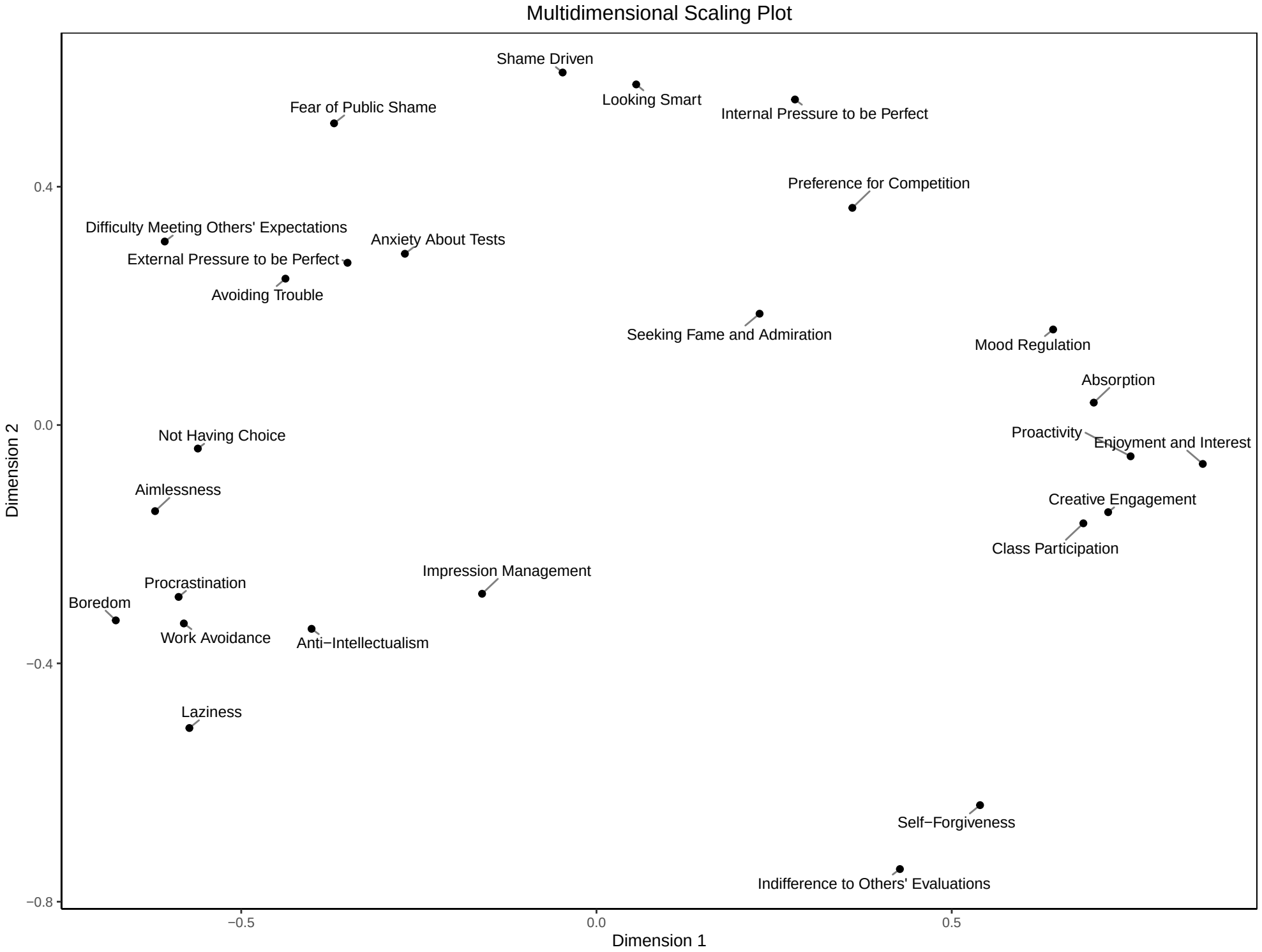


Figure 1. Self-Determination Theory's Regulatory Styles


Multidimensional Scaling Plot
Shame Driven
Looking Smart
Fear of Public Shame
Internal Pressure to be Perfect
Preference for Competition
Difficulty Meeting Others' Expectations
Anxiety About Tests
External Pressure to be Perfect
Avoiding Trouble
Seeking Fame and Admiration
Mood Regulation
Absorption
Proactivity
Enjoyment and Interest
Not Having Choice
Aimlessness
Creative Engagement
Class Participation
Impression Management
Procrastination
Boredom
Work Avoidance
Anti−Intellectualism
Laziness
Self−Forgiveness
Indifference to Others' Evaluations
0.4
0.0
−0.4
−0.8
−0.5
0.0
0.5
Dimension 2
Dimension 1

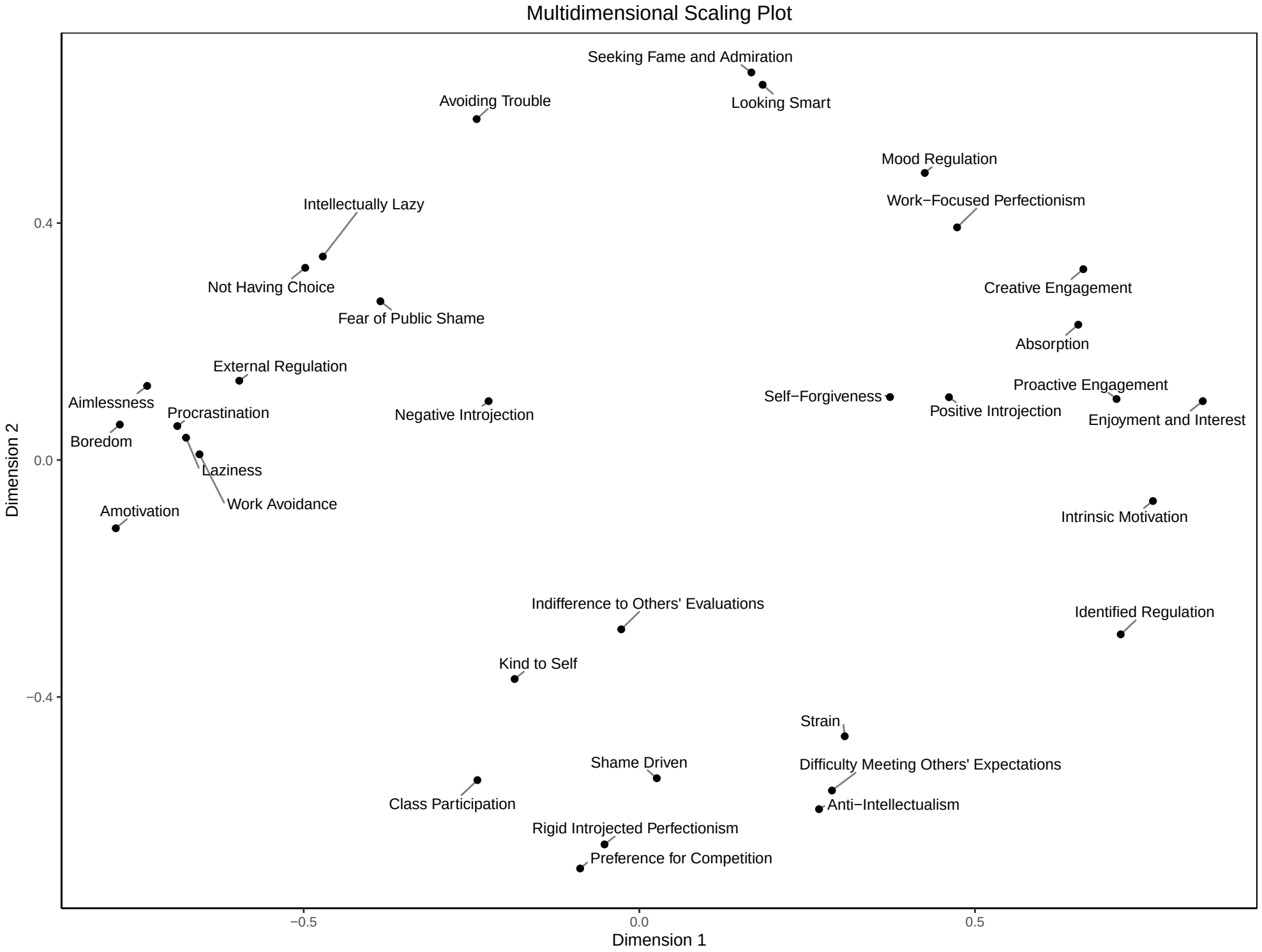

Multidimensional Scaling Plot
Seeking Fame and Admiration
Looking Smart
Avoiding Trouble
Mood Regulation
Work−Focused Perfectionism
Intellectually Lazy
Not Having Choice
Creative Engagement
Fear of Public Shame
Absorption
External Regulation
Aimlessness
Proactive Engagement
Self−Forgiveness
Positive Introjection
Enjoyment and Interest
Procrastination
Negative Introjection
Boredom
Laziness
Work Avoidance
Amotivation
Intrinsic Motivation
Indifference to Others' Evaluations
Identified Regulation
Kind to Self
Strain
Shame Driven
Difficulty Meeting Others' Expectations
Class Participation
Anti−Intellectualism
Rigid Introjected Perfectionism
Preference for Competition
0.4
0.0
−0.4
Dimension 2
−0.5
0.0
0.5
Dimension 1

Table 1. Internal reliabilities and correlations of motivation facets.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Internal Pressure to be Perfect	**.78**												
2. Seeking Fame and Admiration	.10	**.87**											
3. Preference for Competition	.36	.20	**.87**										
4. Looking Smart	.25	.32	.45	**.87**									
5. Shame Driven	.18	.00	.05	.23	**.78**								
6. Anxiety About Tests	.00	-.20	-.19	-.07	.25	**.74**							
7. Fear of Public Shame	.08	-.10	.01	.22	.29	.38	**.86**						
8. Difficulty Meeting Others' Expectations	-.02	-.16	-.21	.02	.22	.31	.45	**.84**					
9. Anti-Intellectualism	-.21	-.08	-.21	-.12	-.16	.03	.03	.06	**.87**				
10. Self-Forgiveness	-.26	-.01	-.09	-.28	-.35	-.31	-.42	-.55	-.04	**.81**			
11. Indifference to Others' Evaluation	-.30	-.13	-.23	-.46	-.38	-.24	-.50	-.47	.03	.62	**.73**		
12. External Pressure to be Perfect	.09	-.11	-.01	.02	.05	.09	.15	.26	-.01	-.41	-.32	**.83**	
13. Boredom	-.29	-.23	-.29	-.21	-.15	.10	.04	.28	.33	-.21	-.01	.16	**.85**
14. Impression Management	-.15	.07	-.05	.05	-.21	-.21	-.13	.10	.18	-.10	-.06	.01	.19
15. Aimlessness	-.26	-.25	-.32	-.16	-.08	.09	.13	.40	.18	-.31	-.12	.18	.48
16. Creative Engagement	.07	.03	.11	-.12	-.14	-.15	-.31	-.43	-.21	.41	.27	-.27	-.44
17. Absorption	.15	-.02	.09	-.12	.00	-.11	-.19	-.32	-.31	.26	.18	-.24	-.49
18. Class Participation	.07	.11	.17	-.03	-.16	-.31	-.49	-.42	-.35	.34	.25	-.24	-.40
19. Mood Regulation	.27	.11	.20	.05	.11	-.09	-.14	-.28	-.26	.03	.00	-.16	-.45
20. Work Avoidance	-.32	-.18	-.27	-.15	-.09	.09	.10	.16	.41	-.06	.01	.09	.50
21. Enjoyment and Interest	.12	.08	.13	-.05	-.08	-.22	-.29	-.43	-.42	.44	.29	-.34	-.64
22. Laziness	-.36	-.14	-.33	-.22	-.29	-.09	-.02	.26	.27	-.06	.09	.00	.50

23. Proactivity	.14	-.02	.11	-.11	-.05	-.14	-.23	-.43	-.17	.40	.32	-.26	-.43
24. Procrastination	-.30	-.15	-.27	-.15	-.12	.12	.13	.31	.17	-.14	-.03	.06	.46
25. Avoiding Trouble	-.10	-.05	-.18	.05	.16	.08	.17	.25	.06	-.35	-.30	.34	.18
26. Not Having Choice	-.20	-.18	-.23	-.09	-.01	.01	.04	.23	.13	-.30	-.15	.30	.39

Note. Cronbach's alphas are presented in **bold** along the main the diagonal.

Table 1 (continued). Internal reliabilities and correlations of motivation facets.

	14	15	16	17	18	19	20	21	22	23	24	25	26
1. Internal Pressure to be Perfect													
2. Seeking Fame and Admiration													
3. Preference for Competition													
4. Looking Smart													
5. Shame Driven													
6. Anxiety About Tests													
7. Fear of Public Shame													
8. Difficulty Meeting Others' Expectations													
9. Anti-Intellectualism													
10. Self-Forgiveness													
11. Indifference to Others' Evaluation													
12. External Pressure to be Perfect													
13. Boredom													
14. Impression Management	**.75**												
15. Aimlessness	.21	**.89**											
16. Creative Engagement	-.20	-.43	**.70**										

17. Absorption	-.29	-.38	.41	**.77**									
18. Class Participation	-.09	-.39	.45	.33	**.83**								
19. Mood Regulation	-.11	-.32	.30	.50	.26	**.83**							
20. Work Avoidance	.00	.26	-.39	-.41	-.40	-.51	**.78**						
21. Enjoyment and Interest	-.24	-.50	.53	.57	.56	.45	-.51	**.85**					
22. Laziness	.36	.37	-.38	-.43	-.28	-.45	.42	-.39	**0.84**				
23. Proactivity	-.32	-.41	.45	.48	.35	.41	-.38	.53	-0.50	**.84**			
24. Procrastination	.17	.34	-.38	-.42	-.29	-.46	.44	-.40	0.57	-.71	**.87**		
25. Avoiding Trouble	.09	.21	-.34	-.32	-.31	-.25	.13	-.40	0.08	-.32	.09	**.86**	
26. Not Having Choice	.18	.49	-.42	-.39	-.33	-.33	.23	-.50	0.23	-.35	.19	.47	**.86**

Note. Cronbach's alphas are presented in **bold** along the main the diagonal.

Table 2. Internal reliabilities of regulatory facets.

Regulatory Facet	Cronbach's Alpha	Cronbach's Alpha
Aimlessness	0.66	0.81
Boredom	0.45	
Boredom		0.79
Strain		0.68
Impression Management	0.24	facet removed
External Pressure to be Perfect	0.27	facet removed
Enjoyment and Interest	0.89	0.89
Absorption	0.64	0.79
Creative Engagement	0.84	0.84
Class Participation	0.61	0.89
Mood Regulation	0.63	0.85
Work Avoidance	0.75	0.75
Anxiety About Tests	0.21	facet removed
Shame Driven	0.58	0.83
Fear of Public Shame	0.72	0.82
Difficulty Meeting Others' Expectations	0.46	0.79
Preference for Competition	0.46	0.76
Seeking Fame and Admiration	0.54	0.86
Internal Pressure to be Perfect	0.38	
Rigid Introjected Perfectionism		0.78
Work-Focused Perfectionism		0.61
Looking Smart	0.69	0.86
Avoiding Trouble	0.86	0.86
Not Having Choice	0.34	0.73
Laziness	0.63	0.83
Proactivity	0.87	0.87
Procrastination	0.65	0.84
Indifferent to Others' Evaluations	0.39	0.67
Self-Forgiveness	0.45	
Kind to Self		0.77
Self-Forgiveness		0.70
Anti-Intellectualism	0.50	0.68
Intellectual Laziness		0.73

Table 3. Correlations between motivational facets and Regulatory Styles. Correlations | r | > .07, p < .05.

Regulatory Facet	Amotivation	External Reg.	Neg Introj.	Pos. Introj.	Identified Reg.	Intrinsic Mot.
Enjoyment and Interest	-.62	-.49	-.22	.29	.55	.72
Proactivity	-.51	-.31	-.12	.28	.45	.45
Absorption	-.46	-.35	-.13	.23	.40	.50
Creative Engagement	-.48	-.27	-.15	.27	.36	.48
Work-Focused Perfectionism	-.35	-.19	-.01	.27	.18	.28
Strain	-.19	-.19	-.04	.09	.27	.15
Self-Forgiveness	-.21	-.11	-.20	.05	.21	.32
Mood Regulation	-.32	-.17	-.05	.20	.16	.33
Difficulty Meeting Others' Expectations	-.19	-.16	-.08	.09	.27	.15
Anti-Intellectualism	-.13	-.23	-.09	.06	.27	.16
Looking Smart	-.22	-.01	.08	.32	-.05	.06
Shame Driven	.13	-.04	-.28	-.14	.14	.10
Indifferent to Others' Evaluations	-.01	-.05	.08	.06	.00	-.06
Seeking Fame and Admiration	-.17	.03	.04	.18	-.10	.12
Preference for Competition	.05	-.04	.03	-.10	.07	-.05
Rigid Introjected Perfectionism	.08	-.02	-.05	-.15	.08	-.01
Kind to Self	.10	-.06	.09	-.04	.00	-.12
Class Participation	.11	.03	.08	-.05	-.02	-.19
Fear of Public Shame	.18	.13	.24	.00	-.27	-.32
Avoiding Trouble	.06	.30	.24	-.04	-.33	-.23
Not Having Choice	.28	.40	.14	-.20	-.39	-.36
Work Avoidance	.42	.32	.14	-.20	-.35	-.50
Intellectual Laziness	.28	.36	.12	-.14	-.40	-.33
Procrastination	.50	.28	.09	-.27	-.42	-.41
Laziness	.62	.33	-.01	-.44	-.46	-.37
Aimlessness	.59	.39	.09	-.33	-.51	-.49
Boredom	.61	.40	.07	-.31	-.49	-.55

Table 4. Motivational Facets and External Criteria

	Grades	Honors and Awards	Skipping Class	Benefits and Costs	Perceived Usefulness of Education	Choose College Again	Choose Difference Subject	Advise High School Senior
Absorption	.09	.05	-.06	.23	.30	.12	-.11	.19
Aimlessness	-.18	-.15	.17	-.27	-.47	-.25	.24	-.35
Anti-Intellectualism	.15	.00	-.16	-.02	-.05	.02	-.03	-.04
Avoiding Trouble	-.14	.04	.09	-.04	.03	-.06	.04	-.03
Boredom	-.21	-.15	.22	-.28	-.38	-.22	.17	-.28
Care for Self	-.04	-.01	.03	.15	.23	.08	-.06	.22
Class Participation	.00	-.06	-.04	-.10	-.19	-.07	-.02	-.08
Creative Engagement	.02	.12	-.02	.26	.43	.13	-.12	.30
Enjoyment and Interest	.14	.14	-.10	.30	.40	.23	-.17	.32
Fear of Public Shame	-.08	.00	.10	-.11	-.09	-.02	.08	-.12
Indifferent to Others' Evaluations	.04	-.01	-.05	-.10	-.09	-.04	-.06	-.07
Difficulty Meeting Others' Expectations	.12	-.01	-.15	.02	.00	.03	-.04	.01
Intellectual Laziness	-.13	-.05	.14	-.08	-.13	-.13	.05	-.11
Kind to Self	.07	-.05	-.06	-.12	-.14	-.09	-.04	-.12
Laziness	-.24	-.17	.24	-.19	-.30	-.18	.08	-.23
Looking Smart	-.01	.15	.08	.11	.21	.14	.00	.09
Mood Regulation	-.01	.13	.04	.20	.31	.09	-.05	.18
Not Having Choice	-.17	-.06	.18	-.16	-.16	-.22	.15	-.15
PLOC-Amotivation	-.22	-.15	.19	-.24	-.35	-.21	.13	-.29
PLOC-External Regulation	-.17	-.02	.07	-.07	-.07	-.04	.13	-.05
PLOC-Identified Regulation	.20	.12	-.25	.26	.30	.23	-.18	.31
PLOC-Intrinsic Motivation	.15	.14	-.15	.28	.37	.24	-.17	.31
PLOC-Negative Introjection	.02	.06	-.09	.00	-.01	.06	-.01	.01
PLOC-Positive Introjection	.19	.12	-.12	.15	.22	.20	-.07	.25
Preference for Competition	.04	-.08	-.06	-.05	-.13	-.06	-.01	-.07
Proactive Engagement	.23	.14	-.19	.19	.24	.14	-.13	.21

Procrastination	-.21	-.11	.23	-.20	-.27	-.13	.11	-.20
Rigid Introjected Perfectionism	.00	-.10	-.10	-.06	-.06	-.05	.02	-.05
Seeking Fame and Admiration	-.11	.14	.20	.13	.25	.12	.04	.09
Shame Driven	-.03	-.04	-.05	-.01	-.05	-.05	.04	-.08
Strain	.09	-.02	-.17	.01	.01	.10	-.06	.03
Work Avoidance	-.14	-.12	.08	-.18	-.37	-.18	.10	-.22
Work-Focused Perfectionism	.04	.16	-.05	.13	.20	.13	-.02	.16

Note: Correlations $| r | > .07$, $p < .05$.

Table 8. Motivational Facets and External Criteria (continued)

	Education Satisfaction	**Social Satisfaction**	**Career Relevance**	**Continued Learning**	**Continued Contact**	**Continued Affiliation**	**Financial Contributions**
Absorption	.26	.23	.16	.24	.25	.28	.20
Aimlessness	-.40	-.30	-.29	-.26	-.27	-.32	-.14
Anti-Intellectualism	-.04	-.11	-.09	-.07	-.05	-.11	-.15
Avoiding Trouble	-.05	.00	.14	.11	.09	.07	.12
Boredom	-.36	-.27	-.20	-.24	-.22	-.33	-.17
Care for Self	.24	.34	.12	.17	.15	.22	.22
Class Participation	-.12	-.23	-.14	-.28	-.18	-.20	-.22
Creative Engagement	.32	.45	.32	.39	.41	.42	.38
Enjoyment and Interest	.40	.38	.18	.33	.31	.37	.28
Fear of Public Shame	-.16	-.24	-.01	-.08	-.05	-.08	-.04
Indifferent to Others' Evaluations	-.08	-.12	-.10	-.13	-.11	-.13	-.14
Difficulty Meeting Others' Expectations	.03	-.02	-.06	-.10	-.05	-.09	-.14
Intellectual Laziness	-.17	-.11	.00	-.06	-.06	-.10	.01
Kind to Self	-.13	-.20	-.09	-.17	-.15	-.15	-.21

Laziness	-.25	-.19	-.18	-.20	-.20	-.20	-.08
Looking Smart	.14	.12	.17	.25	.18	.24	.21
Mood Regulation	.23	.22	.23	.31	.31	.33	.30
Not Having Choice	-.17	-.08	-.06	-.04	-.07	-.10	.02
PLOC-Amotivation	-.35	-.21	-.18	-.25	-.23	-.30	-.17
PLOC-External Regulation	-.08	.00	-.01	-.02	-.05	-.04	.01
PLOC-Identified Regulation	.34	.25	.06	.22	.15	.22	.06
PLOC-Intrinsic Motivation	.41	.35	.18	.35	.29	.36	.26
PLOC-Negative Introjection	.00	-.02	.01	.03	-.03	-.04	-.07
PLOC-Positive Introjection	.26	.20	.08	.17	.13	.17	.11
Preference for Competition	-.05	-.18	-.11	-.21	-.17	-.16	-.19
Proactive Engagement	.26	.27	.17	.20	.14	.22	.14
Procrastination	-.24	-.22	-.19	-.20	-.18	-.24	-.12
Rigid Introjected Perfectionism	-.06	-.13	-.03	-.15	-.10	-.11	-.16
Seeking Fame and Admiration	.16	.22	.27	.27	.27	.34	.34
Shame Driven	-.04	-.05	-.06	-.09	-.07	-.07	-.12
Strain	.02	-.02	-.05	-.06	-.08	-.07	-.11
Work Avoidance	-.30	-.28	-.21	-.31	-.32	-.35	-.28
Work-Focused Perfectionism	.15	.22	.16	.25	.23	.28	.22

Note: Correlations $|r| > .07$, $p < .05$.