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Running head: SELF-DETERMINATION AND ACHIEVEMENT GOALS

The Relation of Self- Determination and Achievement Goals to Taiwanese Eighth Graders' Behavioral and Emotional Engagement in Schoolwork

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Abstract

The present study attempted to examine how Taiwanese junior high school students' perceptions of autonomy support were related to their motivational characteristics, and to determine the ability of these constructs to explain students' academic engagement. Three hundred and forty-three eighth-grade students complete a self-report survey assessing their perceptions of autonomy support from teachers, achievement goal orientations, self-regulatory styles, and behavioral as well as emotional engagement in schoolwork. Results lent support to the contention of SDT that when students learn out of personal interest and personal relevance, they are more fully engaged in schoolwork, both behaviorally and emotionally. Moreover, Taiwanese students perceiving higher levels of autonomy support provided by teachers also reported more adaptive patterns of learning. In terms of effects of achievement goals, results suggested that when constructs from SDT were accounted for, mastery-approach and performance-avoidance goals remained important for explaining Taiwanese students' academic functioning. This study also documented profiles of behaviorally engaged students with different levels of emotional engagement. Findings showed that behaviorally engaged students with higher levels of emotional engagement reported higher perceptions of autonomy support from teachers, identified regulation, intrinsic motivation, and mastery-approach goal orientation than did behaviorally engaged students with lower levels of emotional engagement. Implications for education and future research are discussed.

Keywords: self-determination theory, achievement goal theory, self-regulatory styles, autonomy support, academic engagement

The Relation of Self- Determination and Achievement Goals to Taiwanese Eighth Graders' Behavioral and Emotional Engagement in Schoolwork

Over the past decade, research on motivational processes and dynamics has received increased attention in the field of education (Murphy & Alexander, 2000; Pintrich, 2000). Given that students vary considerably in their engagement and enthusiasm for schoolwork, the motivation behind the engagement is crucial in understanding and predicting subsequent engagement and learning (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004; Miserandino, 1996). Two prominent approaches that have sparked great interest among motivational researchers are self-determination and achievement goal theory (Ames, 1992; Deci & Ryan, 2000; Dweck & Legget, 1988; Ryan & Deci, 2000a; Wolters, 2004). In spite of an abundant literature in Western contexts, the empirical evidence documenting the utility of these two theories for understanding non-Western students' motivational processes as well as academic engagement is far from complete (Wolters, 2004). The goal of the present research was to shed further light on how these two approaches to motivation are related to each other and to a variety of behavioral and emotional outcomes within the Taiwanese classroom context.

Self-Determination Theory: A Multidimensional Conceptualization of Motivation

Self-determination theory (SDT; Deci & Ryan, 2000; Ryan & Deci, 2000a) has focused on the quality of learners' motivation rather than the quantity, level, or amount of motivation that learners display for a particular learning activity (Ryan & Deci, 2000b). Quality of motivation refers to the type or kind of motivation that underlies the learner's engagement. By examining the quality of motivation, SDT has proven useful in explaining the variation in students' learning strategies, performance, and persistence (Vansteenkiste, Lens, & Deci, 2006).

SDT posits that motivated behaviors vary in the extent to which they are autonomous versus controlled. Behaviors regulated by autonomous motivation involve the experience of volition and choice, whereas controlled behaviors are experienced as being pressured or coerced (Black & Deci, 2000; Williams & Deci, 1996). Within SDT, intrinsic motivation is seen as the prototype of autonomy. Intrinsically motivated behaviors are undertaken out of interest and enjoyment inherent in the activity. In contrast, extrinsically motivated behaviors are carried out for the outcome that is separable from the activity itself. According to SDT, however,

extrinsic motivation is no invariantly controlled. Through the process of internalization, initially controlled behaviors can become autonomous (Ryan & Deci, 2000a; Vansteenkiste, Zhou, Lens, & Soenens, 2005).

Internalization refers to individuals' natural tendency to "take in" regulations or social values (e.g., school-related behaviors). SDT proposes that internalization is an innate tendency serving to promote the development of self-determined motivation. Depending on the degree to which initially external regulations have been transformed into internal regulations, three different types of extrinsic motivation are differentiated (Otis, Grouzet, & Pelletier, 2005; Ryan & Deci, 2000a; Vansteenkiste et al., 2005, 2006). *External regulation* is the least autonomous form of extrinsic motivation. When externally regulated, individuals' behaviors are controlled by such external contingencies as rewards, punishments, and deadlines. The pressuring contingencies have not been internalized at all. With *introjected regulation*, a second type of extrinsic motivation, individuals have partially internalized the behavioral regulation but have not yet accepted it as their own. In this case, people engage in an activity because of internal pressure, such as contingent self-worth and feelings of guilt and shame. Finally, *identified regulation* refers to a fuller internalization in which the individual identifies with the value of an activity and thus accepts regulation of the activity as his or her own. When people recognize the personal relevance of an activity, they are more likely to engage in the activity volitionally and willingly. Although still extrinsic in nature, identification is considered self-determined because the process is characterized by an internal perceived locus of causality (Vansteenkiste et al., 2006).

SDT assumes that these different types of motivation lie along a continuum of autonomy from external to internal (Deci & Ryan, 1985, 2002). Ryan and Connell (1989) tested this postulate and found that external, introjected, identified, and intrinsic regulations were intercorrelated according to a quasi-simplex pattern, suggesting an underlying continuum. Along the continuum of relative autonomy, behaviors regulated either by external contingencies or introjected demands are defined as controlled. These two forms of regulation are sometimes combined into a controlled motivation composite (e.g., Vallerand, Fortier, & Guay, 1997; Vansteenkiste et al., 2005). By contrast, intrinsic motivation and the well-internalized form of extrinsic motivation such as identified regulation are considered autonomous. These two types of motivation are often combined into a composite of autonomous

motivation (e.g., Black & Deci, 2000; Vansteenkiste, Lens, De Witte, De Witte, & Deci, 2004; Vansteenkiste et al., 2005). A variety of previous studies have shown the advantages of autonomous compared with controlled motivation for learning. Autonomous motivation has been associated with higher perceived academic competence (Fortier, Vallerand, & Guay, 1995), enjoyment of school (Miserandino, 1996), higher quality learning (Grolnick & Ryan, 1987), less superficial information processing (Vansteenkiste et al., 2004), less defensive coping styles (Ryan & Connell, 1989), lower dropout rates (Vallerand et al., 1997), greater creativity (Koestner, Ryan, Bernieri, & Holt, 1984), higher well-being (Black & Deci, 2000; Levesque, Zuehlke, Stanek, & Ryan, 2004), and higher academic achievement (Black & Deci, 2000; Soenens & Vansteenkiste, 2005).

Autonomy-Supportive Social Contexts

Given the optimal effects of autonomous motivation on a wide range of achievement-relevant outcomes, SDT researchers have explored the social contexts that may induce autonomous regulation. In autonomy supportive contexts, an individual in a position of authority takes the other's perspective; allows opportunities for self-initiation and choice; provides a meaningful rationale for the requirement; and acknowledges the other's feelings; while minimizes the use of pressures and demands (Deci, Eghrari, Patrick, & Leone, 1994). SDT contends that autonomy-supportive environments tend to maintain or enhance intrinsic motivation and facilitate the internalization of extrinsic motivation. In turn, intrinsic and well-internalized extrinsic motivations are likely to foster adaptive learning outcomes. Indeed, previous evidence has indicated that autonomy-supportive contexts are associated with more intrinsic motivation (Deci, Schwartz, Sheinman, & Ryan, 1981) and internalization (Grolnick & Ryan, 1989), better conceptual learning (Grolnick & Ryan, 1987), more positive affect (Ryan & Grolnick, 1986), higher well-being (Levesque et al., 2004), academic competence and achievement (Soenens & Vansteenkiste, 2005).

Achievement Goal Theory

In addition to SDT, as an alternative and complementary view of individuals' motivation and behavior in educational settings (Miserandino, 1996), achievement goal theory has also provided a lens through which to understand students' motivation and achievement-related outcomes (Ames, 1992; Dweck & Legget, 1988; Wolters, 2004). Achievement goals refer to the purposes or reasons for a person's pursuit in an achievement situation. Different purposes result in different patterns of cognition,

affect, and behavior (Dweck & Leggett, 1988; Maehr, 1989; Urdan & Midgley, 2003). To date, a full 2 × 2 crossing of the performance-mastery and approach-avoidance distinctions has been proposed by the achievement goal theorists to account for the broad spectrum of competence-based strivings (Elliot & McGregor, 2001; Elliot & Thrash, 2001; Pintrich, 2000). Mastery-approach goals motivate individuals to increase their competence or achieve task mastery. Mastery-avoidance goals represent striving to avoid losing one's skills and abilities or a lack of task mastery. Performance-approach goals focus students on demonstrating their ability relative to others or proving their self-worth. Finally, performance-avoidance goals lead students to avoid appearing incompetent or less able than others.

In empirical work, three of the four goals in the 2 × 2 conceptualization (i.e., mastery-approach, performance-approach, and performance-avoidance goals) have been frequently explored because of the prevalence of these goals in most achievement settings (for a review, see Wolters, 2004). Mastery-approach goals are associated with a range of adaptive outcomes including preference for challenging work, high intrinsic motivation, absorption during task engagement, effort while studying, persistence in the face of setbacks, willingness to seek help with schoolwork, the use of cognitive, metacognitive or self-regulatory strategies, and long-term retention of information (Elliot & Church, 1997; Elliot & McGregor, 2001; Elliot, McGregor, & Gable, 1999; Middleton & Midgley, 1997; Wolters, 2004).

Performance-approach goals have been found to have both positive and negative features. This type of goal is linked to a variety of positive outcomes such as higher levels of aspiration, absorption during task engagement, effort exertion, persistence at academic tasks, intrinsic motivation and performance attainment (Elliot & Church, 1997; Elliot & McGregor, 2001; Elliot et al., 1999; McGregor & Elliot, 2002; Skaalvik, 1997; Wolters, 2004). Also, performance-approach goals have been shown to be related to such negative outcomes as test anxiety and help avoidance (Elliot et al., 1999; Middleton & Midgley, 1997). With regard to performance-avoidance goals, prior evidence has indicated that such goals are correlated with a host of negative outcomes including threat-related affect while studying, reduced intrinsic motivation, low absorption during task engagement, reluctance to seek help with schoolwork, test anxiety, superficial processing of information, and poor performance (Church, Elliot, & Gable, 2001; Elliot & McGregor, 2001; Elliot et al., 1999; McGregor & Elliot,

2002; Skaalvik, 1997; Wolters, 2004).

There has been a lack of empirical attention to mastery-avoidance goals in the achievement goal literature. To address the need to account for the varieties of competence-based strivings as thoroughly as possible, more attention to this construct ought to be an important issue on the research agenda (Elliot, 1999; Elliot & Thrash, 2001). Accordingly, a 2 × 2 achievement goal conceptualization was examined within the Taiwanese classroom context.

Effects of Cultural Contexts

Whereas considerable empirical findings reviewed above corroborated the beneficial effects of autonomy-supportive experiences, a recent influential cultural analysis, presented by Markus and Kitayama (1991, 2003), seems to challenge the applicability of the SDT perspective on autonomy versus control to non-Western cultures. Their self-systems theory suggests that the exact content and structure of the self may differ considerably by culture. Individuals in Western cultures possess a model of the self as fundamentally independent. A conception of the self as an autonomous, independent person enables members of Western cultures to desire a sense of autonomy and strive to express their unique attributes. For these individuals, the provision of autonomy support may be essential to the formation of their self-identity (Iyengar & Lepper, 1999).

In contrast, individuals in many non-Western, and particularly East Asian, cultures possess a more interdependent model of the self (Iyengar & Lepper, 1999; Markus & Kitayama, 1991). This view of the self portrays the individual not as separate from the social context but as more connected with others. Members of more interdependent cultures strive to fit in with relevant others, to fulfill obligation, and to maintain harmony among people (Hsu, 1985; Miller, 1988; Triandis, 1995). For individuals holding the independent view of the self, autonomy and its expression is often afforded primary significance, whereas for those who possess a more interdependent model of the self, one's autonomy may be secondary to, and constrained by, the primary task of interdependence (Markus & Kitayama, 1991). Accordingly, individuals possessing interdependent selves might sometimes prefer to submit to choices expressed by significant others for the sake of the superordinate cultural goal of belongingness (Iyengar & Lepper, 1999). For example, studies of the Chinese society showed that instead of exercising personal choice, Chinese people

tend to act primarily in accordance with the anticipated expectations of others and social norms (Bond, 1986; Yang, 1981). In terms of achievement motivation, the motive to achieve may not necessarily reflect the person's internal wishes. It can have social or collective origins. Children are striving to live up to the expectations of reciprocally interdependent others, such as family and teachers (Markus & Kitayama, 1991).

Some recent findings in culture and motivation research appear to lend support to the notion of the self-systems theory. Iyengar and Lepper's study (1999) indicated that contexts providing autonomy support may not always bring forth the highest levels of intrinsic motivation. Whereas Anglo American children display more intrinsic motivation when they make their own task choices than when choices are made for them by others, Asian American children are most intrinsically motivated when choices are made for them by significant and trusted others. Clearly, the exercise of choice per se may be relatively less crucial for Asian American children. Instead, having choices made by relevant in-group members seems more intrinsically motivating, for it may help to promote harmony and to fulfill the goal of belonging to the group. These striking findings question the universality of the contention of SDT. Iyengar and Lepper (1999) argued that the effects of the cultural context on individuals' motivational processes may be even stronger among local residents of Asian collectivist cultures (p. 364). Hence, it would be informative to examine whether their findings regarding Asian American children's motivational styles also apply to Taiwanese students.

In addition to the role in SDT constructs, culture may also play an integral role in the development of the individual's goal orientations (Elliot, Chirkov, Kim, & Sheldon, 2001). Education in the Chinese family is associated with collectivistic values. Academic excellence of the child is an important source of pride for the entire family, whereas academic failure may be regarded as a stigma to the family (Salili, 1995). The collectivistic emphasis on connections with others may foster the individual's fear of rejection as a result of academic failure. Cross-cultural comparisons have revealed that relative to individualism, collectivism is associated with higher fear of failure and more avoidance-based coping strategies (Abe & Zane, 1990; Eaton & Dembo, 1997). Elliot et al. (2001) also found that people from collectivistic countries (South Korea and Russia) adopted more avoidance goals than those from an individualistic country (the United States). It is interesting to investigate

how achievement goals operate in another collectivistic society, namely, the Taiwanese context.

To sum up, the present study was designed to examine how Taiwanese junior high school students' achievement goal orientations, perceptions of autonomy support from teachers, and self-regulatory styles were related to one another, and to determine the ability of these constructs to explain students' behavioral as well as emotional engagement in schoolwork. Specifically, the present research attempted to answer the following research questions: (a) Are there any within-subject differences among Taiwanese students' achievement goal orientations and self-regulatory styles? (b) Do students' perceptions of autonomy support from teachers and achievement goal orientations predict their self-regulatory styles? (c) Do students' perceptions of autonomy support from teachers, achievement goal orientations, and self-regulatory styles predict their behavioral and emotional engagement in schoolwork? (d) Do behaviorally engaged students' perceptions of autonomy support from teachers, achievement goal orientations, and self-regulatory styles differ according to their levels of emotional engagement?

Method

Participants

The participants included 343 eighth-grade Taiwanese students from twelve classes in three junior high schools. Participating schools were located in the northern part of Taiwan. All of the school principals granted initial consent for data to be collected in their schools. The 174 girls (51%) and 169 boys ranged in age from 13 years, 0 month to 15 years, 1 month (M = 14 years, 3 months). The school districts were primarily middle class in terms of socioeconomic status. All of the participants were Taiwanese. Guidelines for the proper treatment of human subjects were followed.

Procedure

The data were collected at the beginning of the year in eighth grade (September). Students were invited to fill out a few questionnaires (described in detail below) voluntarily during regular class time. It took participants approximately 30 minutes to complete the whole survey. There were two research assistants in each class for the data collection. They assured students of the confidentiality of their self-reports and encouraged them to respond to the items as accurately as possible. When the students filled out the questionnaires, the two assistants walked around to check skipped items

and ensure quality responses.

Measures

Participants were instructed to respond to all items on five-point Likert scales ranging from 1 (not at all true of me) to 5 (very true of me). A Chinese version of this self-report survey was employed. To ensure adequate translation, the guidelines of the International Test Commission (Hambleton, 1994) were followed. All questionnaires were translated into Chinese and then back-translated into English.

Achievement goals. The questionnaire assessing children's achievement goal orientations was developed based on the work of Elliot and McGregor (2001) and Pintrich (2000). This questionnaire is composed of four scales for each of the achievement goals. Four scores representing mastery-approach (e.g., "I want to learn as much as possible from this class"; 6 items; α = .84), mastery-avoidance (e.g., "It is important for me to avoid losing what I have learned from this class"; 6 items; α = .90), performance-approach (e.g., "It is important for me to do well compared to others in this class"; 6 items; α = .88), and performance-avoidance goals (e.g., "I just want to avoid doing poorly in this class compared with others"; 5 items; α = .75) for each student were created accordingly. To evaluate the assumption that these four types of personal goal orientations represented different underlying constructs, a confirmatory factor analysis was completed using LISREL 8.52 (Jöreskog & Sörbom, 2002). Maximum Likelihood was used as the estimation method (Hoyle & Panter, 1995). In the model tested, items from each scale were hypothesized to load only onto their respective latent variables. Results suggested that this model represented an adequate fit to the data, χ^2 (224, N = 343) = 711.24, $p < .01$, χ^2/N = 2.07, RMSEA (Root Mean Square Error of Approximation) = .07, GFI (Goodness of Fit Index) = .90, NFI (Normed Fit Index) = .95, NNFI (Non-Normed Fit Index) = .96, CFI (Comparative Fit Index) = .96, IFI (Incremental Fit Index) = .96, RFI (Relative Fit Index) = .94. Although the value of RMSEA was greater than .05, a number of researchers suggested that values in the range of .05 to .08 indicate reasonable fit (Browne & Cudeck, 1993; McDonald & Ho, 2002). Further, the χ^2 /N ratio was less than 5.0, showing a good fit. In addition, any model with a fit index above .90 was considered acceptable (Hu & Bentler, 1999).

Perceived autonomy support. Students' perceptions of autonomy support provided by their teachers were assessed by the Learning Climate Questionnaire

(LCQ; Williams & Deci, 1996). The scale has 14 items that measure the degree to which the students perceive the instructors as supporting their autonomy (e.g., "I am able to open with my instructor during class"; "I feel that my instructor accepts me"; α = .92). Higher scores represent a higher level of perceived autonomy support. In the model tested in the confirmatory factor analysis, the 14 items were hypothesized to load onto one latent factor. Results suggested that this model represented a reasonable fit for the proposed structure of the scale, χ^2 (77, N = 343) = 232.05, p < .01, χ^2/N = .68, RMSEA = .07, GFI = .91, NFI = .97, NNFI = .98, CFI = .98, IFI = .98, RFI = .96.

Self-Regulatory Styles. The Self-Regulatory Style Questionnaire-Academics (SRQ-A; Connell & Ryan, 1987; Ryan & Connell, 1989) was employed to assess the extent to which students perceived themselves to be autonomously versus externally motivated for school-related activities. Participants were required to indicate their reasons for doing academic tasks such as homework and studying. These reasons were represented by the four subscales differentiated along a continuum of autonomy according to self-determination theory: External Regulation (i.e., motivated by pressuring external contingencies such as rewards, expectations, and punishments; e.g., "because I'll get in trouble if I don't"; 9 items; α = .77); Introjected Regulation (i.e., motivated by internal compulsions and obligations; e.g., "because I will feel bad about myself if I don't do it"; 9 items; α = .86); Identified Regulation (i.e., motivated by personal commitments; e.g., "because I want to understand the subject"; 7 items; α = .86); and Intrinsic Motivation (i.e., motivated by inherent task pleasure and satisfaction; e.g., "because I enjoy doing my homework"; 7 items; α = .86). The validity and reliability of this measure in the Taiwanese sample has been sustained (d'Ailly, 2003). Also, correlations for study variables shown in Table 1 suggested that the four different self-regulatory types did conform to a simplex-like (ordered correlation) structure in the present sample, with each subscale correlating more positively (or less negatively) with subscales closer to it and less positively (or more negatively) with subscales farther from it (Guttman, 1954). In addition to the four different types of self-regulation, according to SDT and previous studies (e.g., Sheldon, Ryan, Deci, Kasser, 2004), an autonomous motivation composite was created by averaging the scores for identified and intrinsic regulation, r = .53, p < .001, α = .87, and a controlled motivation composite was formed by averaging the scores

for external and introjected regulation, $r = .55$, $p < .001$, $\alpha = .91$.

Academic engagement. In the current study, engagement was hypothesized to be manifestations of active behaviors and positive emotions. Students' academic engagement was assessed by scales adapted from Rochester Assessment of Intellectual and Social Engagement (RAISE) measuring the extent to which students acted in certain ways or felt certain emotions in classroom settings (Miserandino, 1996). The scale assessing behavioral engagement is composed of five subscales including Involved (e.g., "I listen carefully in class"; 5 items; $\alpha = .68$), Persisting (e.g., "If a problem is really hard, I keep working at it"; 4 items; $\alpha = .89$), Avoiding (e.g., "When I have a hard problem on a test, I skip it"; 4 items; $\alpha = .76$), Ignoring (e.g., "When I'm in class, I usually think about other things"; 3 items; $\alpha = .78$), and Participating (e.g., "I participate in class discussions"; 2 items; $\alpha = .78$). Another five different indicators were also included in the scale assessing emotional engagement: Curiosity (e.g., "When I'm doing my work in class, I feel interested"; 4 items; $\alpha = .83$), Anxiety (e.g., "When my teacher first explains new material, I feel scared"; 3 items; $\alpha = .64$), Anger (e.g., "When I can't solve a problem in class, I feel angry"; 2 items; $\alpha = .80$), Enjoyment (e.g., "When I'm in school, I feel happy"; 4 items; $\alpha = .71$), and Boredom (e.g., "When I'm doing my work in class, I feel sleepy"; 5 items; $\alpha = .82$). Separate scores for each of the behavior and emotion factors were created by averaging students' responses for each of the subscales.

To test the validity of these subscales, Miserandino (1996) performed separate factor analyses with promax rotation on the items. The factors of the scale assessing behavioral engagement accounted for 49% of the variance, whereas the factors of the scale assessing emotional engagement accounted for 47% of the variance. I conducted another principal-component factor analysis to examine the validity of the scales. Results showed that 65.26% of the total variance was accounted for by the five indicators of the behavioral engagement scale. The five factors of the emotional engagement scale accounted for 64.59% of the total variance.

Results

Mean Differences Among Achievement Goals and Self-Regulatory Styles

Table 1 also provides descriptive information. To explore Taiwanese students' self-reported tendencies toward personal goal orientations as well as self-regulatory

styles, repeated measures ANOVAs, with Greenhouse-Geisser correction were performed separately. Using the Bonferroni method to correct for inflated probability levels associated with significance when conducting multiple tests, significant within-subjects effects were found on students' achievement goal orientations, $F(2.88, 984.11) = 41.21$, $p < .001$, $\eta^2 = .11$, and their self-regulatory styles, $F(2.29, 784.09) = 120.89$, $p < .001$, $\eta^2 = .26$. Post hoc analysis suggested that in terms of achievement goal orientations, mastery-approach goals ($M = 3.56$) were rated higher by Taiwanese students than the other three types of goals. Further, students had significantly higher scores on mastery-avoidance goals ($M = 3.33$) than they did on both performance-approach ($M = 3.15$) and performance-avoidance goals ($M = 3.12$).

As for the mean differences among students' self-regulatory styles, post hoc analysis showed that students scored higher on identified regulatory style ($M = 3.31$) than they did on other types of regulations. Nonetheless, another form of autonomous motivation, namely, intrinsic motivation was rated the lowest ($M = 2.47$).

Regression Analyses

Results from the regression analyses are presented first for outcomes regarding students' self-regulatory styles, then for their behavioral engagement in academic work, and finally for emotional engagement. The alpha level used to determine the significance of all of these analyses was set at .01. This more conservative alpha level was selected to reduce the possibility of making a Type I error arising from completing a series of analyses with related outcomes (Wolters, 2004).

While performing the regression analyses, VIFs were run in each set of the analyses. This procedure was conducted to diagnose multicollinearity that might have resulted from some high correlations among study variables. Results showed that no values were above 5.0 (VIFs from 1.34 to 2.59), indicating that there was no problem with multicollinearity.

Hierarchical Regressions Predicting Self-Regulatory Styles

This set of regression analyses focused on the predictors of students' perceived autonomy represented by their self-regulatory styles. External regulation, introjected regulation, identified regulation, and intrinsic motivation were regressed separately on the hierarchical regression models. Table 2 shows results from the regressions predicting students' self-regulatory styles. In these analyses, the order of entry in the regression model was assigned according to theoretical considerations. Predictors that

were presumed to be causally prior were given higher priority of entry (Tabachnick & Fidell, 1996). Because the perceived learning climate may shape academic motivation within the individual (Ryan & Deci, 2000a), students' perceptions of autonomy support from their instructors were given the highest priority of entry across the groups of predictor variables.

External regulation. In the first step of the analysis, students' perceptions of autonomy support provided by their teachers were entered. Perceived autonomy support did not significantly predict students' motivation arising from pressuring external contingencies, however. Results from Step 2 indicated that adding the four types of achievement goal orientations increased the amount of variance explained by 16% for external regulation, $F(5, 337) = 12.85$, $p < .001$. Both performance-approach ($\beta = .28$, $p < .001$) and performance-avoidance goals ($\beta = .23$, $p < .01$) emerged as significant positive predictors of external regulation.

Introjected regulation. The amount of variance explained by the predictor variable in the first step of the analysis was significant for introjected regulation, $F(1, 341) = 53.52$, $p < .001$. Perceived autonomy support in the learning environment emerged as a significant predictor of introjected regulation, $\beta = .37$, $p < .001$. Adding the four types of goal orientations in Step 2 increased the amount of variance explained for this self-regulatory style by 38%, $F(5, 337) = 71.44$, $p < .001$. When other variables were controlled for, performance-approach ($\beta = .42$, $p < .001$) and performance-avoidance goals ($\beta = .24$, $p < .001$) were significant predictors of introjected regulation. The association between perceived autonomy support and introjected regulation also remained significant, $\beta = .17$, $p < .001$.

Identified regulation. The variable entered in Step 1 (i.e., perceived autonomy support) predicted a significant amount of the variance in identified regulation, $F(1, 341) = 154.84$, $p < .001$. Students with higher perceptions of autonomy support in the classroom context tended to report higher levels of identified regulation, $\beta = .56$, $p < .001$. Results from the second step of the analysis indicated that adding four types of achievement goals increased the amount of variance explained in identified regulation by 27%, $F(5, 337) = 94.05$, $p < .001$. Perceived autonomy support remained a significant predictor of this self-regulatory style, $\beta = .28$, $p < .001$. Additionally, mastery-approach ($\beta = .34$, $p < .001$), mastery-avoidance ($\beta = .15$, $p < .01$), and

performance-approach goals (β = .16, p < .01) significantly predicted identified regulation.

Intrinsic motivation. The first predictor variable, that is, perceived autonomy support explained a significant amount of the variance in intrinsic motivation, F(1, 341) = 65.56, p < .001. Students who perceived higher levels of autonomy support from their instructors were more likely to be motivated intrinsically, β = .40, p < .001. In Step 2, personal goal orientations were entered in the equation. Adding these variables increased the amount of variance explained in intrinsic motivation by 20%, F(5, 337) = 39.01, p < .001. When other predictors were controlled for, mastery-approach (β = .36, p < .001) and performance-approach (β = .16, p < .01) goals significantly predicted intrinsic motivation.

Hierarchical Regressions Predicting Behavioral Engagement

Table 3 provides the results of the hierarchical regressions predicting students' behavioral engagement in academic work. Students' perceived autonomy support within the classroom was entered in Step 1 and predicted a significant amount of the variance in involvement, F(1, 341) = 144.05, p < 001; persistence, F(1, 341) = 61.67, p < .001; avoiding, F(1, 341) = 11.90, p < .01; ignoring, F(1, 341) = 43.18, p < .001; and participation, F(1, 341) = 90.65, p < .001. The perceived autonomy support was a significant predictor for each component of students' behavioral engagement (for involvement, β = .55, p < .001; for persistence, β = .39, p < .001; for avoiding, β = -.18, p < .01; for ignoring, β = -.34, p < .001; for participation, β = .46, p < .001).

Results from Step 2 indicated that adding the four types of achievement goals increased the amount of variance explained by 18% for involvement, F(5, 337) = 61.13 p < .001; 23% for persistence, F(5, 337) = 42.20, p < .001; 14% for avoiding, F(5, 337) = 14.61, p < .001; 8% for ignoring, F(5, 337) = 16.14, p < .001; and 18% for participation, F(5, 337) = 43.38, p < .001. When other predictors were accounted for, students who expressed a stronger focus on mastery-approach goals tended to report higher levels of involvement (β = .44, p < .001), persistence (β = .52, p < .001), and participation (β = .33, p < .001), and lower levels of avoiding (β = -.44, p < .001) and ignoring (β = -.35, p < .001). Performance-avoidance goals positively predicted students' reported avoiding (β = .28, p < .001), suggesting that

students who were focused on not appearing incompetent tended to avoid engaging in schoolwork.

In Step 3, the controlled motivation composite and the autonomous motivation composite were entered. Adding these variables increased the amount of variance explained for involvement by 6%, $F(7, 335) = 54.50$, $p < .001$; for persistence by 4%, $F(7, 335) = 35.58$, $p < .001$; for avoiding by 3%, $F(7, 335) = 12.79$, $p < .01$; for ignoring by 3%, $F(7, 335) = 12.78$, $p < .01$; and for participation by 4%, $F(7, 335) = 35.02$, $p < .001$.

When other predictors were accounted for, students experiencing pressure and control to study tended to report higher levels of avoiding (β = .19, $p < .01$) and ignoring (β = .17, $p < .01$), and lower levels of involvement (β = -.20, $p < .001$). By contrast, when other predictors were controlled for, students who were autonomously motivated tended to report higher levels of involvement (β = .35, $p < .001$), persistence (β = .31, $p < .001$), and participation (β = .26, $p < .001$), and lower levels of avoiding (β = -.23, $p < .01$).

Hierarchical Regressions Predicting Emotional Engagement

Results from the regressions predicting students' emotional engagement in schoolwork are presented in Table 4. The amount of variance explained by the variable in the first step of these analyses (i.e., perceived autonomy support) was significant for curiosity, $F(1, 341) = 153.92$, $p < .001$; anxiety $F(1, 341) = 32.30$, $p < .001$; enjoyment, $F(1, 341) = 139.65$, $p < .001$; and boredom, $F(1, 341) = 71.61$, $p < .001$. The perceived autonomy support positively predicted such academic emotions as curiosity (β = .56, $p < .001$) and enjoyment (β = .54, $p < .001$), whereas the very variable negatively predicted anxiety (β = -.29, $p < .001$) and boredom (β = -.42, $p < .001$).

Results from the second step of these regressions indicated that adding the four types of achievement goals increased the amount of variance explained by 19% for curiosity, $F(5, 337) = 68.06$, $p < .001$; 10% for anxiety, $F(5, 337) = 15.59$, $p < .001$; 27% for anger, $F(5, 337) = 26.90$, $p < .001$; 7% for enjoyment, $F(5, 337) = 38.30$, $p < .001$; and 14% for boredom, $F(5, 337) = 30.77$, $p < .001$. When other predictors were accounted for, students who scored higher on mastery-approach orientation tended to report higher levels of curiosity (β = .46, $p < .001$) and enjoyment (β

= .36, $p < .001$), and lower levels of anxiety (β = -.27, $p < .001$) and boredom (β = -.42, $p < .001$). Performance-avoidance goals positively predicted anxiety (β = .29, $p < .001$) and boredom (β = .21, $p < .001$), indicating that students who wished to avoid looking incompetent appeared to experience higher levels of maladaptive emotions. In terms of the emotion of anger, when other predictors were controlled for, both mastery-avoidance and performance-approach goals positively predicted this type of emotion, β = .31, $p < .001$ and β = .24, $p < .001$, respectively.

Adding students' reported controlled and autonomous motivation in Step 3 increased the amount of variance explained for curiosity by 11%, $F(7, 335) = 75.59$, $p < .001$; for anxiety by 2%, $F(7, 337) = 12.88$, $p < .01$; for enjoyment by 2%, $F(7, 337) = 29.18$, $p < .01$; and for boredom by 5%, $F(7, 337) = 26.83$, $p < .001$. When other predictors were controlled for, controlled motivation positively predicted anxiety (β = .21, $p < .01$) and boredom (β = .18, $p < .01$). In contrast, students with higher levels of autonomous motivation tended to report higher levels of curiosity (β = .51, $p < .001$) and enjoyment (β = .19, $p < .01$), and lower levels of boredom (β = -.31, $p < .001$).

Mean Differences Between Behaviorally Engaged Students with Different Levels of Emotional Engagement

To determine whether behaviorally engaged students' motivational profiles varied with their emotional engagement in schoolwork, multivariate analysis of variance was performed. First, a behavioral engagement composite and an emotional engagement composite were separately created by averaging the scores for the five subscales of each engagement mode. Students who scored above the mean on both the behavioral and emotional engagement composite were identified as high-behavior/high-emotion students, whereas students scoring above the mean on the behavioral engagement composite and below the mean on the emotional engagement composite were identified as high-behavior/low-emotion students. In total, 171 out of 343 students met this definition, including 129 high-behavior/high-emotion and 42 high-behavior/low-emotion students. Table 5 presents the means and standard deviations of the dependent variables according to these students' group membership.

The assumption for the MANOVA had been examined before the analysis was performed. Because cell sizes for the independent variables were unequal, Box's *M* test was conducted first to check for the homogeneity of covariance matrices. The

result of this test was not significant ($F = 1.35$, $p > .05$), indicating the confirmation of this assumption (Tabachnick & Fidell, 1996). MANOVA revealed significant effects for emotional engagement, Hotelling's $t = .24$, $F(9, 161) = 4.37$, $p < .001$, $\eta^2 = .20$. Results of the univariate analyses indicated significant effects of emotional engagement on the perceived autonomy support from the teachers, $F(1, 169) = 16.09$, $p < .001$, $\eta^2 = .09$; identified regulation, $F(1, 169) = 10.66$, $p < .01$, $\eta^2 = .06$; intrinsic motivation, $F(1, 169) = 14.42$, $p < .001$, $\eta^2 = .08$; and mastery-approach goals, $F(1, 169) = 11.12$, $p < .01$, $\eta^2 = .06$. High-behavior/high-emotion students scored significantly higher on perceived autonomy support ($M = 3.79$ vs. $M = 3.31$), identified regulation ($M = 3.85$ vs. $M = 3.47$), intrinsic motivation ($M = 2.95$ vs. $M = 2.42$), and mastery-approach orientation ($M = 4.06$ vs. $M = 3.65$) than did high-behavior/low-emotion students. Evidently, even within the selective group of behaviorally engaged students, these youngsters' emotional experiences involved in school activities were likely to vary as a function of the quality of their motivational processes (i.e., the extent to which students were autonomously motivated).

Discussion

The present research advances our understanding of how constructs of SDT and achievement goal theory are related to each other and to students' engagement in schoolwork in the Taiwanese classroom context. Markus and Kitayama (2003) have maintained that experiences of autonomy may not be vitalizing to individuals in collectivistic cultures because such experiences are incongruent with the emphases on conformity, social cohesion, and harmonious group functioning in collectivistic cultural contexts. Further, these cross-cultural researchers argued that non-Western students might even flourish when they are required to live up to pressuring internal or external expectations (Iyengar & Lepper, 1999; Markus & Kitayama, 2003). Results of the current study, however, conflict with their argument. Taiwanese students experiencing pressure and control to study tend to report maladaptive patterns of learning. By contrast, autonomous motivation positively predicts students' optimal engagement in academic work. Below, several important findings are discussed.

Motivational Characteristics of Taiwanese Students

Results of repeated measures ANOVAs indicate significant within-subjects effects on Taiwanese students' achievement goal orientations and self-regulatory

styles. Although findings from previous studies (Elliot et al., 2001; Markus & Kitayama, 1991; Markus, Kitayama, & Heiman, 1996) have indicated that collectivists, relative to individualists, engage in more avoidance regulation, the present evidence suggests that students within the Taiwanese classroom score higher on mastery-approach goals than they do on other types of goal orientations. It appears that compared to their counterparts from other collectivistic countries of East Asia, Taiwanese students are more approach-oriented at the goal level of analysis. In Chinese culture, exertion of effort is highly valued. Pupils in Taiwan are influenced by Confucian doctrines such as "Being diligent in study means devoting one's effort to it for a long time" (Confucius, Zi Zhang chapter). The culturally prescribed belief in hard work is likely to inspire Taiwanese students to adopt mastery-approach goals to enhance ability.

In terms of self-regulatory styles, Taiwanese students have higher scores on identified regulation than they do on other types of regulations. With the cultural background described previously, Taiwanese students are socialized to identify with the value of school activities. Prior evidence showed that identified regulation ensures the execution of important behaviors that are not interesting (Koestner & Losier, 2002). In comparison with other leisure-based activities, school activities are often perceived as uninteresting (Otis et al., 2005). Results of the present study clearly indicate that Taiwanese students recognize the personal relevance of school activities and accept regulation of these activities as their own. It is also noteworthy that intrinsic motivation was rated the lowest by these students. Due to the very selective and competitive educational systems, Taiwanese junior high school students have to compete with their peers for getting into good schools at the next level. It may be that such practices lead students to focus on competitions, rather than enjoyment inherent in learning activities. These findings reveal that instead of intrinsic interest, Taiwanese students appear to be motivated to engage in schoolwork by a fuller internalization of values of school-related behaviors, namely, identified regulation.

Predictors and Effects of Self-Regulatory Styles

Results of regression analyses show that students' perceived autonomy support from teachers positively predicts introjected, identified, and intrinsic regulation. Although it is unexpected that students' perceptions of autonomy support in the learning environment predict introjected regulation, a form of controlled motivation, such findings are in line with results of Pelletier, Fortier, Vallerand, and Briere's study

(2001). These researchers examined persistence in competitive swimming in a sample of adolescent Canadian swimmers and found that swimmers' perceptions of coaches' autonomy support positively predicted self-determined motivation (intrinsic motivation and identified regulation), as well as introjected regulation.

As for predicting effects of achievement goals on self-regulatory styles, both performance-approach and performance-avoidance goals positively predict controlled motivation (external and introjected regulation). In spite of the common focus on the individual's competence relative to others, performance-approach and performance-avoidance goals are two functionally separate goals (Elliot, 1999; Elliot & Church, 1997). The simultaneous adoption of approach and avoidance goals focuses individuals' attention on incompatible possibilities (i.e., trying to do better than others vs. trying not to appear worse than others). As a consequence, it is likely to give rise to a great deal of conflict in the process of self-regulation, the two forms of non-self-determined motivation in this case.

Identified regulation and intrinsic motivation are positively predicted by the approach-focused goals (mastery and performance-approach goals). In other words, these two forms of self-determined motivation appear to be instigated by a positive or desirable event or possibility, whether the focus is on learning as much as possible or demonstrating ability relative to others (Elliot, 1999). In addition to approach-focused goals, mastery-avoidance goals also predict identified regulation. The contribution of this type of goal in explaining identified regulation sustains the validity of a 2×2 achievement goal conceptualization. Identified regulation takes place when the person recognizes an activity as personally valuable (Deci et al., 1994). It seems reasonable that students who manage to avoid a lack of task mastery are very likely to be those who endorse the value and importance of schoolwork.

With respect to the effects of self-regulatory styles on students' academic engagement, in accordance with previous evidence (Deci & Ryan, 1985; Miseradino, 1996; Vansteenkiste et al., 2005), results of hierarchical regression analyses show the beneficial impacts of self-determined motivation. When controlling for other predictors, students who engage in schoolwork out of inherent interest or internalized values report more involvement, participation, curiosity, and enjoyment. Further, autonomous motivation is associated with less avoiding and boredom. The adaptiveness of experiences of autonomy among Taiwanese students clearly sustains

the claim of SDT that the concept of autonomy would be applicable in non-Western cultures that embrace collectivistic values (Ryan & Deci, 2000a; Vansteenkiste et al., 2005).

Autonomy-Supportive Environments and Academic Engagement

A number of cross-cultural researchers (Iyengar & Lepper, 1999; Markus & Kitayama, 1991, 2003) have argued that the promotion of autonomy is a less culturally congruent experience in non-Western cultures. Findings from the current study, however, show the advantages of promoting autonomy even for non-Western individuals. When achievement goal orientations and self-regulatory styles are controlled for, Taiwanese students who perceive higher levels of autonomy support provided by teachers report more involvement and participation and experience higher levels of curiosity and enjoyment while studying. Moreover, students' perceptions of autonomy support are linked to less maladaptive patterns of engagement including ignoring, anxiety, and boredom. It should be noted that these beneficial effects of autonomy support are independent of personal autonomy, suggesting the unique role that autonomy-supportive environments play in fostering optimal academic functioning. Results of the present study validate the contention of SDT that autonomy-supportive contexts should facilitate adaptive learning because such contexts tend to satisfy rather than thwart the learner's basic need for autonomy (Vansteenkiste et al. 2006).

Achievement Goals and Academic Engagement

Even when constructs from SDT (i.e., students' self-regulatory styles and perceived autonomy support from teachers) are accounted for, effects of students' achievement goal orientations on their behavioral and emotional engagement in schoolwork remain significant. As expected, results of the present study confirm the adaptive effects of mastery-approach goals consistently found in Western samples (e.g., Elliot & McGregor, 2001; Elliot et al., 1999; Wolters, 2004). In comparison with the powerful effects of mastery-approach goals on academic functioning, both mastery-avoidance and performance-approach goals show relatively limited predictability after controlling for constructs from SDT. Such findings are rather intriguing, given that performance-approach goals were found to be related to a wide range of achievement-relevant outcomes in previous studies (e.g., Elliot & McGregor, 2001; McGregor & Elliot, 2002; Skaalvik, 1997; Wolters, 2004). Nevertheless, as reported earlier, performance-approach goals are linked to all forms of self-regulation

in the present study. The considerable amount of shared variance between this type of goal and self-regulation may explain why the effect of performance-approach goals is statistically insignificant when self-regulatory styles are controlled for.

Effects of performance-avoidance goals on academic engagement found in this study are congruent with the familiar view of this type of goal as detrimental (Elliot & McGregor, 2001; Middleton & Midgley, 1997). Students who are focused on avoiding the appearance of incompetence report more avoiding, anxiety, and boredom while studying. All in all, when constructs related to autonomy are accounted for, mastery-approach and performance-avoidance goals remain important for explaining Taiwanese students' academic functioning.

Profiles of Behaviorally Engaged Students With Different Levels of Emotional Engagement

A unique finding of this study is that behaviorally engaged students with higher levels of emotional engagement report higher perceptions of autonomy support from teachers, identified regulation, intrinsic motivation, and mastery-approach goal orientation than do behaviorally engaged students with lower levels of emotional engagement. The high consistency between levels of behavioral and emotional engagement suggests that these students engage in academic work out of inherent interest and personal conviction about competence development, such that they are likely to experience positive emotions for the task. By contrast, students with lower emotional engagement do not perform learning behaviors because of perceiving choice, usefulness, and enjoyment. They engage in school activities because they think they should, despite not feeling free and not believing in the value of the task. Needless to say, these students are unlikely to find school activities enjoyable and experience adaptive emotions for them. Tensions between behaviors and emotions might therefore result (Deci et al., 1994). This finding further supports the positive effects of a fuller internalization of behavioral regulations on students' emotional well-being, as SDT suggests (Deci & Ryan, 2000; Ryan & Deci, 2000a).

Implications for Classroom Practice

In light of the advantages of the experience of autonomy even for non-Western students found in the current study, teachers should adopt an autonomy-supportive rather than controlling style to enhance students' self-determined motivation and academic functioning. If students feel pressured to engage in schoolwork, either because of external or introjected regulation, their emotional well-being is likely to be

undermined. According to SDT, the promotion of autonomy can be accomplished by understanding students' perspective, responding to their needs and concerns, encouraging them to solve problems in their own way, supporting their experimentation, and providing choice (Black & Deci, 2000; Vansteenkiste et al., 2006).

Another implication that can be drawn from the findings concerns the importance of cultivating students' mastery-approach goal orientation. As results of this study suggest, the beneficial effects of mastery-approach goals remain significant even when the advantages of autonomy-related constructs for students' academic engagement are accounted for. Findings from the present research call for learning contexts in which the adoption of mastery-approach goals is encouraged. In classrooms where personal improvement is emphasized; self-referenced standards are used; effort expenditures are valued; and challenging work is provided, students are more likely to espouse a mastery-approach orientation (Ames, 1992; Kaplan, Middleton, Urdan, & Midgley, 2002; Wolters, 2004).

Limitations and Future Research

Although the results of the present study provide insights into teacher practices, there are several limitations that need to be addressed in future research. First, the present study examines students' perceptions of autonomy support provided by teachers on their self-determined functioning and academic engagement. Other sources of autonomy support (e.g., parental autonomy support) may also play a vital role in determining the individual's self-regulation. Future research focusing on multiple sources of impact is expected to provide a more comprehensive understanding of the influences of social contexts on students' achievement striving.

Second, the regression procedure employed in the current research does not allow to illuminate the pathways among students' perceived autonomy support, self-regulatory styles, achievement goal orientations, and academic engagement. It is likely that self-regulatory styles and achievement goal orientations serve as mediators of the impact of the social environment on the person's academic functioning. Future research using structural equation modeling to test the hypothesized pathways is encouraged.

Finally, because of the correlational nature of the design, conclusions regarding clear causal relations between autonomy support and other variables of interest cannot be drawn. Experimental research that involves manipulating autonomy support and

longitudinal studies that explore the long-term effect of autonomy-supportive contexts on student motivation might help clarify the direction of this effect. Such research has the potential to help teachers create a classroom fostering self-determined motivation as well as adaptive patterns of learning.

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Table 1

Descriptive Statistics and Correlations for Study Variables (N =343)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Mastery-approach goal	__											
2. Mastery-avoidance goal	.62**	__										
3. Performance-approach goal	.60**	.54**	__									
4. Performance-avoidance goal	.05	.63**	.65**	__								
5. Perceived autonomy support	.50**	.35**	.30**	.02	__							
6. External regulation	.15**	.21**	.35**	.33**	.06	__						
7. Introjected regulation	.49**	.50**	.66**	.63**	.36**	.56**	__					
8. Identified regulation	.69**	.57**	.56**	.50**	.56**	-.10	.65**	__				
9. Intrinsic motivation	.57**	.21**	.46**	.04	.40**	-.10	.24**	.72**	__			

10.Involved	.63**	.46**	37**	-.07	.55**	-.03	.33**	.65**	.48**	__		
11.Persisting	.61**	.36**	.42**	-.08	.39**	.07	.34**	.55**	.50**	.59**	__	
12.Avoiding	-.35**	-.13*	-.15*	.03	-.18**	.16**	-.08	-.28**	-.24**	-.51**	-.50**	__
13.Ignoring	-.40**	.24**	-.20**	.02	-.34**	.12*	-.17**	-.35**	-.23**	-.56**	-.30**	.57**
14.Participating	.57**	.45**	.43**	.10	.46**	.15**	.45**	.58**	.50**	.62**	.51**	-.25**
15.Curiosity	.65**	.45**	.42**	.11	.56**	.05	.47**	.68**	.67**	.58**	.60**	-.31**
16.Anxiety	-.20**	.02	-.01	.12*	-.29**	.21**	.07	-.14**	-.06	-.38**	-.22**	.50**
17.Anger	-.37**	.47**	.44**	.42**	-.10	.16**	.35**	-.22**	-.17**	-.27**	-.20**	.01
18.Enjoyment	.45**	.19**	.22**	-.14**	.54**	-.02	.19**	.41**	.37**	.48**	.35**	-.32**
19.Boredom	-.50**	-.28**	-.29**	.08	-.42**	.09	-.24**	-.51**	-.37**	-.61**	-.41**	.60**
M	3.56	3.33	3.15	3.12	3.33	2.91	2.80	3.31	2.47	3.43	3.13	2.69
SD	.83	.93	.93	.83	.82	.72	.84	.85	.87	.70	.90	.87

Variable	13	14	15	16	17	18	19
13.Ignoring	__						
14.Participating	-.31**	__					
15.Curiosity	-.32**	.62**	__				
16.Anxiety	.48**	-.13*	-.27**	__			
17.Anger	.04	.07	-.17**	.21**	__		
18.Enjoyment	-.42**	.40**	.54**	-.57**	-.05	__	
19.Boredom	.68**	-.38**	-.50**	.60**	-.03	-.60**	__
M	2.64	3.30	2.88	2.32	3.14	3.66	2.61
SD	.91	.93	.90	.84	1.08	.83	.90

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

Table 2

Summary of Hierarchical Regression Analyses Predicting Self-Regulatory Styles (N = 343)

	External regulation[a]			Introjected regulation[b]			Identified regulation[c]			Intrinsic motivation[d]		
Variable	B	*SE*B	β	B	*SE*B	β	B	*SE*B	β	B	*SE*B	β
Step1												
Intercept	.09			.04			.04			.03		
Perceived autonomy support	.07	.06	.07	.38	.05	.37***	.57	.05	.56***	.42	.05	.40***
Step 2												
Intercept	.09			.06			.05			.05		
Perceived autonomy support	-.01	.06	-.01	.18	.05	.17***	.29	.04	.28***	.17	.05	.16**
Mastery-approach goal	-.12	.08	-.12	.01	.06	.01	.34	.05	.34***	.38	.07	.36***

Mastery-avoidance goal	.01	.07	.01	.08	.06	.07	.15	.05	.15**	.01	.07	.01
Performance-approach goal	.28	.07	.28***	.43	.06	.42***	.16	.05	.16**	.17	.06	.16**
Performance-avoidance goal	.23	.07	.23**	.25	.05	.24***	.06	.05	.06	.05	.06	.05

Note. [a] $R^2 = .01$, $p > .05$ for Step 1; Change in $R^2 = .16$, $p < .001$ for Step 2.

[b] $R^2 = .14$, $p < .001$ for Step 1; Change in $R^2 = .38$, $p < .001$ for Step 2.

[c] $R^2 = .31$, $p < .001$ for Step 1; Change in $R^2 = .27$, $p < .001$ for Step 2.

[d] $R^2 = .16$, $p < .001$ for Step 1; Change in $R^2 = .20$, $p < .001$ for Step 2.

** $p < .01$. *** $p < .001$.

Table 3

Summary of Hierarchical Regression Analyses Predicting Behavioral Engagement (N = 343)

	Involved[a]			Persisting[b]			Avoiding[c]			Ignoring[d]			Participating[e]		
Variable	B	*SE*B	β	B	*SE*B	β	B	*SE*B	β	B	*SE*B	β	B	*SE*B	β
Step 1															
Intercept	-.11			-.09			-.07			.09			-.05		
Perceived autonomy support	.58	.05	.55***	.41	.05	.39***	-.19	.06	-.18**	-.36	.06	-.34***	.48	.05	.46***
Step 2															
Intercept	-.10			-.07			-.04			.09			-.03		
Perceived autonomy support	.32	.05	.30***	.13	.05	.12	-.01	.06	-.01	-.20	.06	-.18**	.24	.05	.23***
Mastery-approach goal	.47	.06	.44***	.55	.07	.52***	-.47	.08	-.44***	-.37	.08	-.35***	.34	.07	.33***

Mastery-avoidance goal	.13	.06	.11	-.06	.07	-.06	.02	.08	.02	-.05	.08	-.05	.06	.07	.06
Performance-approach goal	-.03	.06	-.03	.11	.06	.11	-.06	.07	-.06	.01	.08	.01	.04	.06	.04
Performance-avoidance goal	-.04	.06	-.04	.01	.06	.01	.29	.07	.28***	.13	.08	.13	.12	.06	.12
Step 3															
Intercept	-.10			-.08			-.04			.07			-.05		
Perceived autonomy support	.25	.05	.24***	.06	.05	.06	.04	.06	.03	-.18	.06	-.17**	.17	.05	.17**
Mastery-approach goal	.32	.07	.30***	.42	.07	.39***	-.37	.08	-.34***	-.32	.09	-.29***	.24	.07	.23**
Mastery-avoidance goal	.12	.06	.11	-.08	.06	-.08	.03	.08	.03	-.05	.08	-.05	.04	.06	.04
Performance-approach goal	.01	.06	.01	.09	.07	.09	-.09	.08	-.09	-.05	.08	-.05	-.01	.06	-.01

Performance-avoidance goal	-.02	.06	-.02	.01	.06	.01	.25	.07	.24***	.09	.08	.09	.10	.06	.10
Controlled motivation	-.21	.05	-.20***	-.12	.06	-.11	.20	.07	.19**	.18	.07	.17**	.02	.06	.02
Autonomous motivation	.36	.06	.35***	.32	.07	.31***	-.24	.08	-.23**	-.12	.08	-.11	.26	.07	.26***

Note. [a] $R^2 = .30$, $p < .001$ for Step 1; Change in $R^2 = .18$, $p < .001$ for Step 2; Change in $R^2 = .06$, $p < .001$ for Step 3.

[b] $R^2 = .15$, $p < .001$ for Step 1; Change in $R^2 = .23$, $p < .001$ for Step 2; Change in $R^2 = .04$, $p < .001$ for Step 3.

[c] $R^2 = .03$, $p < .01$ for Step 1; Change in $R^2 = .14$, $p < .001$ for Step 2; Change in $R^2 = .03$, $p < .01$ for Step 3.

[d] $R^2 = .11$, $p < .001$ for Step 1; Change in $R^2 = .08$, $p < .001$ for Step 2; Change in $R^2 = .03$, $p < .01$ for Step 3.

[e] $R^2 = .21$, $p < .001$ for Step 1; Change in $R^2 = .18$, $p < .001$ for Step 2; Change in $R^2 = .04$, $p < .001$ for Step 3.

** $p < .01$. *** $p < .001$.

Table 4

Summary of Hierarchical Regression Analyses Predicting Emotional Engagement (N = 343)

	Curiosity[a]			Anxiety[b]			Anger[c]			Enjoyment[d]			Boredom[e]		
Variable	B	*SE*B	β	B	*SE*B	β	B	*SE*B	β	B	*SE*B	β	B	*SE*B	β
Step 1															
Intercept	-.03			.06			-.01			-.10			.10		
Perceived autonomy support	.57	.05	.56***	-.31	.05	-.29***	-.11	.06	-.10	.57	.05	.54***	-.44	.05	-.42***
Step 2															
Intercept	-.02			.05			.002			-.10			.08		
Perceived autonomy support	.32	.05	.31***	-.26	.06	-.25***	-.12	.06	-.11	.44	.05	.42***	-.23	.06	-.21
Mastery-approach goal	.47	.06	.46***	-.28	.08	-.27***	.07	.07	.07	.38	.07	.36***	-.45	.07	-.42***

Mastery-avoidance goal	.04	.06	.04	.11	.07	.11	.33	.07	.31***	-.14	.07	-.12	-.02	.07	-.02
Performance-approach goal	.01	.06	.01	.01	.07	.01	.24	.07	.24***	.01	.06	.01	-.08	.07	-.08
Performance-avoidance goal	.03	.03	.03	.30	.07	.29***	.05	.06	.05	-.11	.06	-.11	.22	.06	.21***
Step 3															
Intercept	-.04			.03			.003			-.10			.09		
Perceived autonomy support	.20	.04	.20***	-.28	.06	-.27***	-.10	.06	-.10	.41	.06	.39***	-.17	.06	-.16**
Mastery-approach goal	.27	.06	.26***	-.26	.08	-.25***	.11	.08	.11	.30	.07	-.29***	-.31	.08	-.29***
Mastery-avoidance goal	.01	.05	.01	.11	.07	.10	.33	.07	.32	-.14	.07	-.12	-.01	.07	-.01
Performance-approach goal	-.04	.05	-.04	-.07	.08	-.07	.25	.07	.24	.02	.07	.02	-.10	.07	-.09

Performance-avoidance goal	.02	.05	.02	.25	.07	.24***	.05	.06	.05	-09	.06	-09	.19	.06	.18
Controlled motivation	-.09	.05	-.09	.21	.07	.21**	.03	.06	.03	-.11	.06	-10	.19	.06	.18**
Autonomous motivation	.52	.05	.51***	-.02	.08	-.02	-09	.07	-.09	.19	.07	.19**	-.32	.07	-.31***

Note. [a] $R^2 = .31$, $p < .001$ for Step 1; Change in $R^2 = .19$, $p < .001$ for Step 2; Change in $R^2 = .11$, $p < .001$ for Step 3.

[b] $R^2 = .09$, $p < .001$ for Step 1; Change in $R^2 = .10$, $p < .001$ for Step 2; Change in $R^2 = .02$, $p < .01$ for Step 3.

[c] $R^2 = .01$, $p > .05$ for Step 1; Change in $R^2 = .27$, $p < .001$ for Step 2; Change in $R^2 = .01$, $p > .05$ for Step 3.

[d] $R^2 = .29$, $p < .001$ for Step 1; Change in $R^2 = .07$, $p < .001$ for Step 2; Change in $R^2 = .02$, $p < .01$ for Step 3.

[e] $R^2 = .17$, $p < .001$ for Step 1; Change in $R^2 = .14$, $p < .001$ for Step 2; Change in $R^2 = .05$, $p < .001$ for Step 3.

** $p < .01$. *** $p < .001$.

Table 5

Differences Between Behaviorally Engaged Students with Different Levels of Emotional Engagement

	High-behavior/high-emotion (n = 129)		High-behavior/low-emotion (n = 42)		F
	M	*SD*	*M*	*SD*	(Univariate Analyses)
Perceived autonomy support	3.79_{a}	.67	3.31_{b}	.63	16.09***
Mastery-approach goal	4.06_{a}	.70	3.65_{b}	.59	11.12**
Mastery-avoidance goal	3.59_{a}	.89	3.54_{a}	.72	.12
Performance-approach goal	3.44_{a}	.85	3.37_{a}	.92	.26
Performance-avoidance goal	3.16_{a}	.64	3.36_{a}	.65	3.25

External regulation	2.84_{a}	.79	2.99_{a}	.75	1.21
Introjected regulation	3.01_{a}	.82	2.93_{a}	.75	.25
Identified regulation	3.85_{a}	.65	3.47_{b}	.70	10.66**
Intrinsic motivation	2.95_{a}	.78	2.42_{b}	.79	14.42***

Note. Different subscripts denote significant differences ($p < .05$) on means according to Tukey's criteria.

** $p < .01$. *** $p < .001$.