An Examination of Factors Related to Taiwanese Adolescents' Reports of Avoidance Strategies

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ABSTRACT. The author examined how Taiwanese junior high students' perceptions of autonomy support from teachers and parents as well as autonomous and controlled motivations were related to their implicit theories of intelligence. The author also attempted to determine the ability of these constructs to explain students' reports of avoidance strategies including self-handicapping, avoiding help seeking, and avoiding novelty. A total of 461 8th-grade students completed a self-report survey related to the variables of interest. Results lent support to the applicability of the self-determination theory perspective to non-Western cultures. Students who perceived higher levels of autonomy support from teachers displayed more adaptive achievement striving than did their counterparts perceiving lower levels of autonomy support in the learning environment.

Keywords: autonomy support, avoidance strategies, implicit theories of intelligence, self-determination theory, self-regulation

Researchers and theorists studying achievement behaviors have acknowledged the distinction between approach and avoidance motivations for more than half a century. The classic achievement motivation theorists (Lewin, Dembo, Festinger, & Sears, 1944; McClelland, Atkinson, Clark, & Lowell, 1953; Murray, 1938) proposed that achievement behaviors may be driven by dispositional tendencies to seek success and avoid failure. In the past few decades, the motive to avoid failure (fear of failure) often has been synonymous with test anxiety (Ceranski, Teevan, & Kalle, 1979; Gelbort & Winer, 1985; Goldberg, 1973; Herman, 1990; Simons & Bibb, 1974; Watson & Siegel, 1966). By adolescence, students struggling to escape appearing incompetent adopt avoidance strategies to deflect attention from low ability (Covington, 1992). Several strategies that students use to protect them from negative judgments by others include self-handicapping, avoiding of help seeking, and resisting novel approaches to learning. However, in comparison with test anxiety, there has been less discussion of such avoidance behaviors.

Self-handicapping refers to the use of strategies that serve as ready-made excuses for potential failure (e.g., putting off studying until the last moment, fooling around the night before a test; Covington, 1992). Because others may infer that a lack of ability causes failure, it is crucial for handicappers to avoid such negative implications about ability. In addition to self-handicapping, many adolescents engage in the avoidance of help seeking when they notice their need for help with academic work but do not actively seek it (Newman, 1990; Newman & Goldin, 1990). The need for help may also be perceived by these students as a threat to self-worth. They are concerned with negative judgments from their teachers and classmates regarding their abilities (A. M. Ryan, Pintrich, & Midgley, 2001).

Finally, some students tend to avoid novel approaches to solving problems and accomplishing learning tasks because of the fear that they may make mistakes (Turner et al., 2002). Because trying new ways of doing work often involves a challenge, these students may feel that their abilities are being evaluated when developing novel approaches to learning. Given that these maladaptive strategies not only undermine students' performance, but also limit their ability to learn, in the present study I attempted to explore the personal and contextual factors related to Taiwanese adolescents' use of avoidance strategies from the perspectives of the self-determination and implicit theories of intelligence. I hoped that the integration of these two prominent views would shed new light on the motivation behind students' avoidance behaviors within the Taiwanese classroom context.

Self-Determination Theory: Autonomous Versus Controlled Regulation

Self-determination theory (SDT; Deci & Ryan, 2000; R. M. Ryan & Deci, 2000) posits that motivated behaviors vary in the extent to which they are autonomous

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or controlled. Behaviors regulated by autonomous motivation involve the experience of volition and choice, whereas controlled behaviors are experiences that involve being pressured or coerced (Black & Deci, 2000; Williams & Deci, 1996). According to SDT, autonomy is a psychological need that is critical for optimal learning and achievement. Intrinsic motivation is regarded as the prototype of autonomy. Intrinsically motivated behaviors are undertaken out of inherent interest and enjoyment in the activity. In contrast, extrinsically motivated behaviors are carried out for the outcome that is separate from the activity itself. SDT differentiates extrinsic motivation into several types of regulation that vary in their degree of relative autonomy (R. M. Ryan & Deci; Vansteenkiste, Zhou, Lens, & Soenens, 2005).

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. Actions determined by these external forces are represented by an external perceived locus of causality (deCharms, 1968). With *introjected regulation*, a second type of extrinsic motivation, people engage in activities for the pursuit of self-aggrandizement or the avoidance of feelings of guilt and shame. Because these actions are regulated by internal pressure, they are also experienced as coerced and are represented by an external perceived locus of causality. Accordingly, introjected regulation is often combined with external regulation to form a controlled motivation composite (e.g., Vallerand, Fortier, & Guay, 1997; Vansteenkiste et al., 2005). Last, *identified regulation* occurs when an individual identifies with the value of an activity and thus accepts regulation of the activity as his or her own. Whereas identified regulation is considered by SDT to be a form of extrinsic motivation, it is relatively volitional and, in this sense, close to intrinsic motivation. Hence, this type of regulation is often combined with intrinsic motivation to form 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 motivation for learning compared with controlled motivation. 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 (R. M. Ryan & Connell, 1989), lower dropout rates (Vallerand et al.), and higher academic achievement (Black & Deci; Soenens & Vansteenkiste, 2005).

By differentiating autonomously motivated behaviors from behaviors regulated by controlled motivation, SDT explains why people have true versus contingent self-esteem (Deci & Ryan, 1995). *Contingent self-esteem* requires that the individual continually match some standards of excellence or live up to some interpersonal or intrapsychic expectations to feel worthy. By contrast, *true self-esteem* is more securely based on a solid sense of self. With true self-esteem, one does not have to dutifully achieve some types of outcomes to feel like a good and worthy person. Deci and Ryan suggested that contingent self-esteem is linked to external and introjected regulation. Conversely, as one acts with an internal perceived locus of causality, the autonomously motivated behaviors promote a stronger sense of true self-worth. Because true high self-esteem reflects secure feelings of self-worth that do not depend on continual validation, individuals high in autonomy are found to exhibit less defensive coping to maintain self-esteem (Knee & Zuckerman, 1998).

Social Contexts and Self-Determination

SDT suggests that autonomy-supportive environments promote the development of volitional or self-governing functioning. Self-determined regulation, in turn, leads to optimal learning outcomes. In autonomy-supportive contexts, an individual in a position of authority takes another person's perspective, allows opportunities for self-initiation and choice, provides a meaningful rationale for the requirement, and acknowledges the other person's feelings while minimizing the use of pressures and demands (Deci, Eghrari, Patrick, & Leone, 1994).

Previous empirical evidence has indicated that an autonomy-supportive teaching style is positively related to more school engagement (Assor, Kaplan, & Roth, 2002), better conceptual learning (Grolnick & Ryan, 1987), and school adjustment (Patrick, Anderman, & Ryan, 2002; Wentzel, 2002), as well as higher academic competence and achievement (Soenens & Vansteenkiste, 2005). Similar to the optimal effects of an autonomy-supportive teaching style, parental autonomy support has been found to be positively associated with such adaptive outcomes as children's greater identification with achievement tasks (Grolnick & Ryan), academic competence, and school achievement (Allen, Hauser, Bell, & O'Connor, 1994), and negatively associated with learning problems and distress in emotion regulation (Grolnick, Deci, & Ryan, 1997) as well as the avoidance of help seeking (A. M. Ryan, Gheen, & Midgley, 1998).

Challenge to the Universality of SDT

Despite the consistently reported positive relation between autonomy support and a variety of adaptive outcomes in the Western literature, several cross-cultural researchers (Chirkov & Ryan, 2001; Ford, 1992; Iyengar & De Voe, 2003; Markus & Kitayama, 1991, 2003; Triandis, 1995) have argued that the experience of autonomy is less encouraged by instructors and parents in Eastern societies. For instance, within the Chinese cultural context, high emphasis is placed on conformity and family interdependence

because of prevailing Confucian values. Individuals with this cultural background often feel obligated to maintain social harmony instead of exercising their personal choices (Chao & Tseng, 2002; Tseng, 2004). Accordingly, a concept so central to Western psychology as autonomy may be less applicable in Eastern cultures (Chirkov & Ryan). In a cross-cultural study, Vanskeenkiste et al. (2005) questioned the universality of SDT.

In response to the challenge, SDT distinguishes the concept of autonomy from that of independence. Instead of nonreliance on others, implied in the concept of independence, autonomy reflects the experience of volition and choice. SDT contends that experiences of volition should bring forth optimal consequences across cultures (R. M. Ryan & Deci, 2003). Hence, in the present study, I intended to examine the contention of SDT with respect to the adaptive effects of experiences of autonomy on Taiwanese students' reports of avoidance strategies.

Implicit Theories of Intelligence and Avoidance Strategies

In addition to self-determined motivation, students' implicit theories of intelligence have provided a lens through which one can understand how students' avoidance behaviors result from their attempt to protect self-esteem. As a cognitive framework that guides how people interpret and react to achievement situations, implicit theories refer to one's deeply held, but rarely articulated, thoughts about the nature of intelligence (Dweck, 1999; Dweck & Leggett, 1988; Hong, Chiu, & Dweck, 1995). Entity theorists believe that intelligence is a fixed permanent entity. Negative performance outcomes are likely to be interpreted by entity theorists as indicators of intellectual inadequacy. In contrast, incremental theorists believe that intelligence is malleable and can be increased. They are oriented toward developing their intellectual ability rather than diagnosing it. Therefore, incremental theorists are less likely than entity theorists to make negative ability inferences following failure (Dweck & Leggett; Henderson & Dweck, 1991). When the ability is perceived as fixed, poor performance easily gives rise to serious anxieties because of the implied negative evaluation of the self. These concerns may lead entity theorists to adopt avoidance strategies for concealing incompetence. Nonetheless, when intelligence can be increased, failure suggests the need for improvement through further attention and effort. For incremental theorists, it clearly is not sensible to sacrifice ability development to avoid a demonstration of incompetence (Dweck & Molden, 2005).

Prior evidence (Grolnick, 2001) indicated a significant correlation between mothers' controlling behaviors (e.g., giving directives to her child on a task without the child's requesting them) and their children's entity theories. In a child's socializing environment, adults often make their love or esteem contingent on living up to some standards. As a consequence, the child is likely to internalize requirements of fulfilling adults' expectations and thus espouses an entity theory (Dweck & Molden, 2005). Put differently, some researchers speculate that being autonomy supportive is associated with lower levels of endorsement of an entity theory and thereby ameliorates the orientation toward avoidance strategies. These intriguing relations appear to provide fertile ground for exploration (Dweck & Molden).

In sum, I devised the present study to examine how Taiwanese junior high school students' perceptions of autonomy support from teachers and parents as well as autonomous versus controlled motivation were related to their implicit theories of intelligence, and also to determine the ability of these constructs to explain students' reports of avoidance strategies (i.e., self-handicapping, avoiding help seeking, and avoiding novelty). Specifically, in the present study, I attempted to answer the following research questions:

Research Question 1: Do students' perceptions of autonomy support from teachers and parents along with autonomous versus controlled motivation predict their implicit theories of intelligence?

Research Question 2: Do students' perceptions of autonomy support from teachers and parents, autonomous versus controlled motivation, and implicit theories of intelligence predict their reports of self-handicapping, avoiding help seeking, and avoiding novelty?

Research Question 3: After controlling for perceived autonomy support from parents, do students' autonomous versus controlled motivation; implicit theories of intelligence; and reports of self-handicapping, avoiding help seeking, and avoiding novelty differ according to their perceptions of autonomy support from teachers?

Method

Participants

Participants were 461 eighth-grade Taiwanese students (224 girls [49%], 237 boys [51%]; *M* age = 13.50 years, *SD* = 3.51 months; age range = 12.83–14.08 years) from 16 classes in three junior high schools. Participants were recruited using a cluster sampling procedure. First, I made a list of all the school districts in the northern part of Taiwan. Second, from that list, a sample of school districts was randomly drawn. For the selected school districts, I made a list of junior high schools. Third, from the list, three schools were randomly selected. Last, from the selected schools, 16 eighth-grade classes were randomly selected. The students in these classes were the participants in this study. All of the school principals granted initial consent for data to be collected in their schools. 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

Data were collected at the beginning of the school year (September). Students were required to fill out a few questionnaires (described subsequently in greater detail) during regular class time. 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 5-point Likert-type scales ranging from 1 (*not at all true of me*) to 5 (*very true of me*). I also used a Chinese version of this self-report survey. To ensure adequate translation, I followed the guidelines of the International Test Commission (Hambleton, 1994). All questionnaires were translated into Chinese and then back-translated into English.

Autonomous versus controlled motivation. I used the Self-Regulatory Style Questionnaire–Academic (SRQ-A; R. M. Ryan & Connell, 1989) to assess the extent to which students perceived themselves to be autonomously or 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 following four subscales differentiated along a continuum of autonomy according to SDT: external regulation (e.g., "because I'll get in trouble if I don't"; nine items; Cronbach's α = .77), introjected regulation (e.g., "because I will feel bad about myself if I don't do it"; nine items; Cronbach's α = .86), identified regulation (e.g., "because I want to understand the subject"; nine items; Cronbach's α = .86), and intrinsic motivation (e.g., "because I enjoy doing my homework"; seven items; Cronbach's α = .86). R. M. Ryan and Connell used a mathematical model to test whether these four types of regulatory styles were intercorrelated according to a quasi-simplex pattern. In a simplex pattern, variables are ordered in terms of conceptual similarity so that those sharing similar concepts correlate more highly than do those that are hypothesized to be more discrepant (Guttman, 1954). According to R. M. Ryan and Connell, the assessment approach offers such advantage over the traditional factor analytic approaches as preserving the integrity of various categories of regulation while displaying their interconnection. The validity of this measure in the Taiwanese sample has been sustained in d'Ailly's (2003) study.

As Vansteenkiste et al. (2005) pointed out, in the case of exploring effects of these forms of regulation through regression analyses, it may not be appropriate to enter all four self-regulatory styles simultaneously in the regression. Because the two controlled and the two autonomous motivation subscales are supposed to be highly correlated, suppression effects that may lead to unreliable and inconclusive results are likely to occur (Tacq, 1997). The creation of an autonomous and controlled motivation composite in such a case is therefore advised. Given that, in the present study, the correlations between the two autonomous (r = .66, p < .001) and two controlled (r = .52, p < .001) motivation subscales were rather high, in response to Vansteenkiste et al.'s suggestion, I created an autonomous motivation composite by averaging the scores for identified and intrinsic motivation (Cronbach's α = .91 for items across the two scales) and formed a controlled motivation composite by averaging the scores for external and introjected regulation (Cronbach's α = .52 for items across the two scales).

Perceived autonomy support from teachers. I used the short version of the Learning Climate Questionnaire (LCQ; Williams & Deci, 1996) to assess students' perceptions of autonomy support provided by their teachers. The LCQ comprises six items that measure the degree to which students perceive instructors as supporting their autonomy (e.g., "I feel that my instructor provides me choices and options"; Cronbach's α = .80). Higher scores represent a higher level of perceived autonomy support in the classroom context. To evaluate the assumption that these items represented a single underlying factor, I conducted a confirmatory factor analysis (CFA) using LISREL 8.52 (Jöreskog & Sörbom, 2002). I used maximum likelihood as the estimation method (Hoyle & Panter, 1995). In the model tested, the six items were hypothesized to load onto one latent factor. Results suggested that this model represented an adequate fit to the data, $\chi^2(7, N = 461) = 19.89$, $p < .01$; $\chi^2/N = 0.04$; root mean square of approximation (*RMSEA*) = 0.06; goodness of fit index (GFI) = 0.99; normed fit index (NFI) = 0.98; nonnormed fit index (NNFI) = 0.98; comparative fit index (CFI) = 0.99; incremental fit index (IFI) = 0.99; relative fit index (RFI) = 0.96. Although the value of *RMSEA* was greater than 0.05, a number of researchers have suggested that values in the range 0.05–0.08 indicate reasonable fit (Browne & Cudeck, 1993; McDonald & Ho, 2002). Further, the χ^2/N ratio was less than 5.00, showing a good fit. In addition, any model with a fit index above 0.90 was considered acceptable (Hu & Bentler, 1999).

Perceived autonomy support from parents. I used the child version of the Perceptions of Parents Scale (POPS; Grolnick, Ryan, & Deci, 1991) to assess students' perceptions of autonomy support provided by their parents. The scale assesses children's perceptions of the degree to which their parents are autonomy supportive. The POPS comprises 12 multiple-choice items (6 items for mothers and the same 6 items for fathers). Students were required to respond by circling the letter in front of the description of a parent that was most similar to their own parent (e.g., [a] "Some mothers always tell their children what to do," [b] "Some mothers sometimes tell their children what to do," [c] "Some mothers sometimes like their children to decide for themselves what to do," and [d] "Some mothers always

like their children to decide for themselves what to do"; Cronbach's α = .70). I converted each circled letter into a represented score (i.e., a = 1; b = 2; c = 3; d = 4). Higher scores represented a higher level of perceived autonomy support in the family context. In the model tested in the CFA, the six items for mothers were hypothesized to load onto one latent factor. The CFA yielded an excellent fit to the data, $\chi^2(5, N = 461) = 3.94$, $p > .05$; $\chi^2/N = 0.01$; *RMSEA* = 0.01; GFI = 1.00; NFI = .99; NNFI = 1.00; CFI = 1.00; IFI = 1.00; RFI = 0.98. The 6 items for fathers were also hypothesized to load onto one latent factor in the tested CFA model. Results suggested that this model provided a reasonable fit to the data, $\chi^2(5, N = 461) = 16.84$, $p < .01$, $\chi^2/N = 0.04$; *RMSEA* = 0.07; GFI = 0.99; NFI = 0.97; NNFI = 0.96; CFI = 0.98; IFI = 0.98; RFI = 0.94.

Implicit theories of intelligence scale. I adapted the Implicit Theories of Intelligence Scale for Children (Dweck, 1999) to assess students' implicit theories of intelligence. The scale comprises two three-item subscales of the entity (e.g., "Your intelligence is something about you that you can't change very much"; Cronbach's α = .83) and incremental theories (e.g., "You can always greatly change how intelligent you are"; Cronbach's α = .76). I performed a CFA to ensure the validity of this scale. In the model tested, items from each subscale were hypothesized to load only onto their respective latent variables. Results indicated that this model represented an adequate fit for the proposed structure of the scale, $\chi^2(17, N = 461) = 55.66$, $p < .01$; $\chi^2/N = 0.12$; *RMSEA* = 0.07; GFI = 0.97; NFI = 0.97; NNFI = 0.97; CFI = 0.98; IFI = 0.98; RFI = 0.95.

Self-handicapping. I used a five-item scale taken from the Patterns of Adaptive Learning Survey (PALS; Midgley et al., 2000) to assess students' use of self-handicapping strategies. These items were constructed to measure the extent to which students use a priori strategies to influence self-presentation. Rather than assessing cognitions, PALS measures students' use of active strategies and behaviors (e.g., "Some students put off doing their math work until the last minute. Then if they don't do well, they can say that is the reason. How true is this of you?"; Cronbach's α = .79). In the CFA model, all five items were hypothesized to load onto one latent factor. Results showed that this model provided a good fit to the data, $\chi^2(4, N = 461) = 6.96$, $p < .05$; $\chi^2/N = 0.02$; *RMSEA* = 0.04; GFI = 0.99; NFI = 0.99, NNFI = 0.99, CFI = 1.00; IFI = 1.00; RFI = 0.98.

Avoiding help seeking. I adapted a scale from the questionnaires of Newman and Goldin (1990) and Turner et al. (2002) to assess students' tendency to avoid seeking academic help. *Avoidance of help seeking* (seven items) refers to instances when students need help but do not seek it (e.g., "If the schoolwork is too hard, I just don't do it rather than ask for help"; Cronbach's α = .86). To test the validity of the scale, the seven items were hypothesized to load onto one latent variable in the CFA model. Results suggested that this model represented a reasonable fit for the proposed structure of the scale, $\chi^2(13, N = 461) = 43.85$, $p < .01$; $\chi^2/N = 0.09$; *RMSEA* = 0.07; GFI = 0.97, NFI = 0.98; NNFI = 0.98; CFI = 0.99; IFI = 0.99; RFI = 0.97.

Avoiding novelty. I used a five-item scale taken from the PALS (Midgley et al., 2000) to assess students' tendency to resist novel approaches to academic work. *Avoidance of novelty* refers to preferences to avoid novel ways of solving problems and doing schoolwork (e.g., "I don't like to learn a lot of new concepts"; Cronbach's α = .80). In the CFA model tested, all five items were hypothesized to load onto one latent construct. Results showed that this model provided an acceptable fit to the data, $\chi^2(4, N = 461) = 15.94$, $p < .05$; $\chi^2/N = 0.03$; *RMSEA* = 0.08; GFI = 0.99; NFI = 0.98; NNFI = 0.97; CFI = 0.99; IFI = 0.99; RFI = 0.96.

Results

Regression Analyses

Descriptive information and correlations for study variables are displayed in Table 1. Results from the regression analyses are presented first for outcomes regarding

TABLE 1. Descriptive Statistics and Correlations for Study Variables (N = 461)

Variable	1	2	3	4	5	6	7	8	9	M	*SD*
1. Autonomy support from teachers	—									3.11	0.82
2. Autonomy support from parents	.22**	—								2.53	0.47
3. Autonomous motivation	.58**	.21**	—							2.74	0.81
4. Controlled motivation	.33**	–.10*	–.08	—						2.55	0.66
5. Incremental theory	.34**	.09*	.43**	.08	—					3.12	0.89
6. Entity theory	–.13**	–.15**	–.16**	.16**	–.36**	—				2.00	0.92
7. Self-handicapping	–.12**	–.15**	–.19**	.08	–.15**	.35**	—			1.85	0.76
8. Avoiding help seeking	–.30**	–.20**	–.36**	.04	–.22**	.43**	.49**	—		2.26	0.85
9. Avoiding novelty	–.19**	–.19**	–.34**	.11*	–.17**	.34**	.31**	.56**	—	2.62	0.93

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

students' implicit theories of intelligence and then for their use of avoidance strategies. In these analyses, gender was entered first in the regression models. It turned out that gender failed to predict any outcome variable of interest. Therefore, in the present study, I intended to test theoretical assumptions across the analyses. I assigned the order of entry according to theoretical considerations. Predictors that were presumed to be causally prior were given higher priority of entry (Tabachnick & Fidell, 1996). Specifically, SDT suggests that autonomy-supportive environments foster the development of self-governing functioning. Self-determined regulation, in turn, leads to optimal academic engagement. Thus, the predicting variables were sequenced in the regression models on the basis of the SDT suggestion. The alpha level used to determine the significance of all of these analyses was set at .01. I selected this more conservative alpha level to reduce the possibility of making a Type-I error arising from the completion of a series of analyses with related outcomes (Wolters, 2004).

Hierarchical Regressions Predicting Implicit Theories of Intelligence

Incremental theory of intelligence. Table 2 provides the results of the hierarchical regressions predicting students' implicit theories. In the first step of the analysis, students' perceptions of autonomy support provided by their teachers and parents (independent variables) were entered and explained a significant amount of variance (12%) in an incremental theory of intelligence (dependent variable), $F(2, 458) = 30.25$, $p < .001$. Students' perceived autonomy support from teachers positively predicted the incremental theory of intelligence. Results from Step 2 indicated that adding autonomous and controlled motivations (as the independent variables) increased the amount of variance explained by 8% for an incremental theory (as the dependent variable), $F(4, 456) = 27.41$, $p < .001$. When other predictors were accounted for, students who reported higher levels of autonomous motivation tended to be incremental theorists. Perceived autonomy support from teachers remained a significant predictor of the incremental theory.

Entity theory of intelligence. Students' perceived autonomy support from teachers and parents were entered in the first regression model as independent variables and accounted for a significant amount of the variance (3%) in an entity theory of intelligence (the dependent variable), $F(2, 458) = 7.79$, $p < .001$. Perceived autonomy support provided by teachers and parents predicted the entity theory negatively. Adding autonomous and controlled motivation as independent variables in Step 2 increased the amount of variance explained for an entity theory of intelligence (the dependent variable) by 6%, $F(4, 456) = 11.84$, $p < .001$. Autonomous motivation was a negative predictor of the entity theory of intelligence, accounting for other predictors. In contrast, controlled motivation positively predicted the entity theory.

Hierarchical Regressions Predicting Avoidance Strategies

Self-handicapping. Table 3 shows results from the regressions predicting students' reports of avoidance strategies. In terms of self-handicapping (the dependent variable), students' perceptions of autonomy support from teachers and parents were entered as the independent variables in Step 1 and predicted a significant portion of the variance (4%), $F(2, 458) = 7.00$, $p = .001$. Perceived autonomy support provided by teachers and parents predicted self-handicapping negatively. Results from Step 2 suggested that adding autonomous and controlled motivation as independent variables increased the amount of variance explained in self-handicapping by 5%, $F(4, 456) = 9.34$, $p < .001$. When other predictors were accounted for, autonomous motivation was a negative predictor of self-handicapping,

TABLE 2. Summary of Hierarchical Regression Analyses Predicting Implicit Theories of Intelligence (N = 461)

	Incremental theory			Entity theory		
Variable	B	β	R^2	B	β	R^2
Step 1						
Perceived autonomy support from teachers	0.37	.34***	.12***	–0.12	–.11**	.03***
Perceived autonomy support from parents	0.03	.02		–0.25	–.13**	
Step 2						
Perceived autonomy support from teachers	0.16	.14**	.20	–0.10	–.09	.09
Perceived autonomy support from parents	0.02	.01	**.08*****	–0.12	–.06	**.06*****
Autonomous motivation	0.38	.34***		–0.23	–.20***	
Controlled motivation	0.00	.00		0.37	.27***	

Note. Values in bold are changes in R^2.
**$p < .01$. ***$p < .001$.

TABLE 3. Summary of Hierarchical Regression Analyses Predicting Avoidance Strategies (*N* = 461)

	Self-handicapping			Avoiding help seeking			Avoiding novelty		
Variable	B	β	R^2	B	β	R^2	B	β	R^2
Step 1									
Perceived autonomy support from teachers	–0.10	–.11**	.04***	–0.28	–.27***	.11***	–0.18	–.16**	.06***
Perceived autonomy support from parents	–0.19	–.12**		–0.26	–.14**		–0.30	–.16**	
Step 2									
Perceived autonomy support from teachers	–0.03	–.03	.09	–0.17	–.16**	.19	–0.02	–.02	.20
Perceived autonomy support from parents	–0.11	–.07	**.05****	–0.14	–.07	**.08****	–0.13	–.06	**.14****
Autonomous motivation	–0.22	–.24***		–0.36	–.34***		–0.50	–.44***	
Controlled motivation	0.21	.19***		0.29	.23***		0.42	.30***	
Step 3									
Perceived autonomy support form teachers	–0.01	–.01	.19	–0.14	–.14**	.30	–0.01	–.01	.25
Perceived autonomy support from parents	–0.08	–.05	**.10****	–0.09	–.05	**.11****	–0.09	–.05	**.05****
Autonomous motivation	–0.18	–.18***		–0.31	–.29***		–0.47	–.41***	
Controlled motivation	0.12	.11**		0.17	.13**		0.32	.23***	
Incremental theory	0.02	.03		0.06	.05		0.06	.06	
Entity theory	0.26	.31***		0.34	.36***		0.26	.26***	

Note. Values in bold are changes in R^2.
**$p < .01$. ***$p < .001$.

whereas controlled motivation positively predicted self-handicapping. In Step 3, incremental and entity theories of intelligence were entered as independent variables. Adding these variables increased the amount of variance explained for self-handicapping (the dependent variable) by 10%, $F(6, 454) = 14.19$, $p < .001$. After controlling for the other predictors, students espousing an entity theory were more likely to be self-handicappers.

Avoiding help seeking. The amount of variance (11%) explained by students' perceived autonomy support from teachers and parents (the independent variables) in the first step of the analysis was significant for avoidance of help seeking (the dependent variable), $F(2, 458) = 28.49$, $p < .001$. Perceived autonomy support provided by teachers and parents predicted help avoidance negatively. Adding autonomous and controlled motivations as the independent variables in Step 2 increased the amount of variance explained for this type of avoidance strategy by 8%, $F(4, 456) = 27.55$, $p < .001$. After controlling for other variables, autonomous motivation negatively predicted students' reluctance to seek help. In contrast, controlled motivation emerged as a positive predictor. In the final step of the model, students' implicit theories of intelligence were included as independent variables. Adding these variables increased the amount of variance (11%) for avoiding help seeking (the dependent variable), $F(6, 454) = 33.06$, $p < .001$. When other predictors were accounted for, students who endorsed the entity view of intelligence were more likely to avoid seeking academic help.

Avoiding novelty. The independent variables entered in Step 1 (i.e., perceived autonomy support from teachers and parents) predicted a significant amount of the variance (6%) in avoiding novelty (the dependent variable), $F(2, 458) = 14.36$, $p < .001$. Students with higher perceptions of autonomy support in the classroom context were less likely to avoid novelty while doing schoolwork. Also, perceived autonomy support from parents predicted novelty avoidance negatively. Results from the second step of the analysis indicated that adding autonomous and controlled motivations as independent variables increased the amount of variance (14%) in novelty avoidance (the dependent variable), $F(4, 456) = 28.42$, $p < .001$. After controlling for the other predictors, autonomous and controlled motivations were significant predictors of avoiding novelty, but in opposite directions. In Step 3, implicit theories of intelligence were included as independent variables in the model. Adding these variables increased the amount of variance (5%) for novelty avoidance (the dependent variable), $F(6, 454) = 25.62$, $p < .001$. Results from this step showed that, in addition to autonomous and controlled motivations, the entity theory of intelligence significantly predicted students' tendency to avoid novelty.

Differences Between Students' Perceiving Different Levels of Autonomy Support in the Classroom Context

To determine the differences in key variables of interest between students' perceiving high and low levels of autonomy support provided by their teachers, a multivariate analysis of covariance (MANCOVA) was performed and included students' perceived autonomy support from parents as a covariate. By taking into account the likely confounding effects of perceived autonomy support in the family context, I hoped that the effects of perceived autonomy support in

the classroom setting on students' motivation, implicit theories of intelligence, and use of avoidance strategies would be detected with greater precision. To form the low and high categorical variables, students were clustered on the basis of their scores on perceived autonomy support from teachers. Those who scored above the 67th percentile (i.e., the top one third of the scores) were identified as high autonomy-support students, whereas students scoring below the 33rd percentile (i.e., the bottom one third of the scores) were categorized as low autonomy-support students. In total, 309 of 461 students met the criteria, including 164 high and 145 low autonomy-support students. Table 4 presents the means and standard deviations of the dependent variables according to these students' group membership.

Before running the MANCOVA, preliminary analyses of variance (ANOVAs) had been performed to compare students of the three junior high schools with each of the variables examined. Using the Bonferroni method to correct for inflated probability levels associated with significance when conducting multiple tests (family-wise Cronbach's $\alpha = .05$), I found no significant difference among students of the three schools. Additionally, *t* tests were performed to determine gender differences in the same variables. I also used the Bonferroni method when making the comparisons. Again, I found no gender difference in any of these investigated variables. Consequently, school and gender were not included as independent factors in the subsequent analyses.

Two assumptions for the MANCOVA had been examined before the analysis was performed. Because cell sizes for the independent variables were unequal, I first conducted Box's M test to check for the homogeneity of covariance matrices. The result of this test was not significant ($F = 1.65$, $p > .05$), suggesting the confirmation of this assumption. Additionally, the test for homogeneity of regression also yielded insignificant results. Hence, using a common regression coefficient to adjust for the covariate in all groups was appropriate. The MANCOVA revealed significant effects for perceived autonomy support in the classroom context after controlling for students' perceptions of autonomy support from parents, Hotelling's $T = .53$; $F(7, 300) = 22.49$, $p < .001$, $\eta^2 = .34$. Results of the univariate analyses indicated significant effects of perceived autonomy support from teachers on autonomous motivation, $F(1, 306) = 134.28$, $p < .001$, $\eta^2 = .31$; incremental theory of intelligence, $F(1, 306) = 40.95$, $p < .001$, $\eta^2 = .12$; avoidance of help seeking, $F(1, 306) = 25.76$, $p < .001$, $\eta^2 = .08$; and avoiding novelty, $F(1, 306) = 8.16$, $p < .01$, $\eta^2 = .03$. High autonomy-support students scored significantly higher than did low autonomy-support students on autonomous motivation (adjusted M = 3.18 vs. adjusted M = 2.22, respectively) and incremental theory of intelligence (adjusted M = 3.42 vs. adjusted M = 2.76, respectively). Conversely, low autonomy-support students obtained significantly higher scores than did high autonomy-support students on avoidance of help seeking (adjusted M = 2.54 vs. adjusted M = 2.03, respectively) and avoiding novelty (adjusted M = 2.81 vs. adjusted M = 2.50, respectively). Evidently, students' autonomous motivation, incremental view of intelligence, and tendency to avoid help seeking and novelty varied as functions of their perceptions of autonomy support in the learning environment.

Discussion

Findings from the present study enhance our understanding of how constructs of SDT and implicit theories of intelligence are related to each other and to students' reports of avoidance strategies in the Taiwanese classroom context. As the present findings suggest, students' self-regulatory styles (i.e., autonomous or controlled regulation) and implicit views of intelligence have unique and differential effects on their use of avoidance strategies.

TABLE 4. Differences Between Students' Perceiving Different Levels of Autonomy Support from Teachers

	High autonomy support (n = 164)			Low autonomy support (n = 145)			
Variable	M	*SD*	Adj. M	M	*SD*	Adj. M	$F(1, 306)$
Autonomous motivation	3.20	0.76	3.18	2.19	0.67	2.22	134.28***
Controlled motivation	2.34	0.72	2.31	2.27	0.59	2.26	3.55
Incremental theory	3.42	0.84	3.42	2.75	0.91	2.76	40.95***
Entity theory	1.89	0.91	1.92	2.17	1.02	2.14	3.86
Self-handicapping	1.73	0.63	1.75	1.94	0.84	1.93	4.15
Avoiding help seeking	2.00	0.74	2.03	2.57	0.97	2.54	25.76***
Avoiding novelty	2.46	0.93	2.50	2.85	0.96	2.81	8.16**

Note. Adj. M = adjusted mean.
**$p < .01$. ***$p < .001$.

Autonomous motivation was associated with less use of avoidance strategies, whereas controlled motivation and an entity theory were positively related to students' reports of avoidance strategies. Moreover, results of the present research lend support to the applicability of the SDT perspective on autonomy versus control to non-Western cultures. Even in such a collectivistic society as Taiwan, the provision of autonomy support in family and classroom contexts was inversely related to adolescents' tendency to adopt avoidance strategies. I subsequently discuss several important findings.

The Relations Between SDT Constructs and Implicit Theories of Intelligence

Results of the hierarchical regression analyses indicate that perceived autonomy support from teachers and autonomous regulation were positively associated with the incremental theory of intelligence. Altogether, SDT constructs (perceived autonomy support and personal autonomous regulation) accounted for 20% of the variance in an incremental theory. The amount of explained variance in this case is similar to findings of the study conducted by Pelletier, Fortier, Vallerand, and Briere (2002). In their study, they found that almost 20% of the variance in Canadian competitive teenage swimmers' persistence could be accounted for by perceived coaches' autonomy support and their own intrinsic motivation. In contrast, students' perceptions of autonomy support from teachers and parents, as well as their autonomous regulation, were negatively related to the entity theory of intelligence. Nonetheless, the amount of the variance in an entity view explained by these SDT constructs is rather small (less than 10%), indicating that SDT constructs do not play a significant role in students' beliefs that intelligence is a fixed permanent entity.

Students with experiences of volition and choice are not pressured to meet adults' expectations to earn praise or recognition. They are not required to demonstrate their competence or intelligence by living up to some established standards. As expected, these students are less likely to endorse an entity view of intelligence.

Factors Related to Avoidance Strategies

Results from the hierarchical regressions indicate that SDT constructs and implicit theories of intelligence independently contributed to Taiwanese students' use of avoidance strategies. Perceived autonomy support from teachers and parents as well as autonomous regulation versus controlled motivation only explained a fairly small amount of variance in self-handicapping (9%). Yet, these SDT constructs accounted for around 20% of the variance in avoiding help and novelty. Compared with self-handicapping, students' tendencies to avoid seeking help with schoolwork and new methods of learning were more tightly linked to their experiences of autonomy. Vansteenkiste et al. (2005) found that the passive-avoidant behaviors of Chinese college students studying in Belgium explained 17% of the variance in students' autonomous and controlled motivation. The findings of the present study validate a similar degree of effects of SDT constructs on such avoidance strategies as avoiding help seeking and avoiding novelty. When students engage in schoolwork out of intrinsic interest or self-determination, the concern with mastering new materials or skills is supposed to override other considerations such as defending the self. Hence, they may be less likely to avoid asking for academic help or resist new ways of learning because of fear of the embarrassment of looking incompetent. In brief, results of the present study show that non-Western students can also benefit from autonomous or volitional functioning when it comes to addressing their avoidance behaviors because the experiences of autonomy satisfy rather than forestall students' basic psychological need (Vansteenkiste et al.).

SDT constructs aside, implicit theories of intelligence also contribute to the explanation of Taiwanese adolescents' use of avoidance strategies. However, the amounts of the incremental variance were rather small, suggesting a relatively minor role of this set of constructs in students' avoidance behaviors. Notably, a closer look at the amounts of variance explained by autonomous and controlled motivations along with the entity theory indicates differential strengths of association between these predicting variables and the predicted avoidance strategies. In terms of self-handicapping, the entity theory of intelligence alone accounts for the largest amount of variance (10%). In contrast, autonomous versus controlled motivation explained the largest amount of variance in avoiding novelty (14%). In other words, the relative contributions of each set of predictors appear to vary with the nature of the avoidance strategies. Students espousing an entity theory are inclined to construe poor performance as an indicator of their incapability and thus are likely to use self-handicapping to deflect others' perceptions away from their lack of ability if poor performance occurs (Urdan & Midgely, 2001). As for avoiding novelty, autonomous motivation may enable students to experiment with new methods of learning. Students are less likely to avoid novel approaches to solving problems under these circumstances. An implication that can be drawn from these findings is that when devising intervention plans to address students' tendency to use avoidance strategies, it is pivotal for one to take the nature of strategies into consideration.

Profiles of Students with Different Levels of Autonomy Support from Teachers and Implications for Classroom Practice

Results of the MANCOVA show that, irrespective of whether students perceive autonomy support in the family environment, those who perceived higher levels

of autonomy support from teachers scored higher on autonomous motivation and incremental theory of intelligence than did their counterparts perceiving lower levels of autonomy support in the learning environment. Moreover, students with higher levels of autonomy support from teachers were less likely to avoid seeking academic help and to resist novel approaches to learning than were students with lower levels of autonomy support from teachers. These findings underscore the powerful effects of perceived autonomy support provided by teachers on the cultivation of Taiwanese adolescents' adaptive achievement striving.

Consistent with the proposition of SDT, students' perceptions of autonomy support from teachers accounted for a fairly large amount of variance (31%) in their autonomous motivation. The explained portion is too significant to overlook, suggesting the considerable effects of the provision of autonomy support in the classroom context on Taiwanese adolescents' adaptive self-regulation. In addition to the enhanced self-determined functioning, students who perceived higher levels of autonomy support from teachers were inclined to be incremental theorists. The vast majority of research on the socialization of implicit theories of intelligence has focused on how the messages that parents convey to their children may give rise to implicit views of intelligence (e.g., Dweck & Lennon, 2001; Grolnick, 2001; Smiley, Coulson, & Van Ocker, 2000). Instead, the present findings illuminate the critical role of autonomy support from teachers in students' endorsement of an incremental theory, thereby minimizing the potential confounding influence of parents' rearing practices.

The profiles of students with different levels of autonomy support documented in the present research show that adolescents are attuned to cues from the environment that shape the beliefs and strategies they apply to a given situation (Grant & Dweck, 1999; Hong & Chiu, 2001). Moreover, interventions to address avoidance strategies would benefit from altering the theories from which defensive coping may arise, rather than simply attempting to modify strategies directly. For instance, the belief that competence can be enhanced and improved through one's effort cultivated in the autonomy-supportive classroom context may lead the student to view asking for academic help or trying new approaches to learning as important ways to develop ability. Consequently, as results of the MANCOVA indicated, the adolescents' inclination to avoid seeking help or to resist novel approaches to accomplishing learning tasks may be reduced.

Limitations and Future Research

Although the results of the present study provide significant information about factors related to avoidance strategies as well as insights into teacher practices, there were several limitations that need to be addressed by future researchers. First, I examined the effects of students' perceptions of autonomy support in the classroom and family contexts on their use of avoidance strategies. Another context that may affect avoidance behaviors, during adolescence in particular, is the peer context. Adolescents are particularly concerned with how they look to peers (Berndt, 1979; Coleman, 1961). Put differently, students may be more likely to use avoidance strategies to protect self-worth when being judged by peers than when being judged by adults (Urdan & Midgley, 2001). Further research focusing on the impact of the peer context should provide additional insight into the influences of social contexts on students' avoidance behaviors.

Second, in addition to avoidance strategies, different emotions also appear to arise more readily in particular implicit theories of intelligence. Researchers have found that anxiety tends to arise more quickly from an entity view, whereas enjoyment seems to last longer in the incremental system (Lewis & Sullivan, 2005). Little attention has been paid to the influences of implicit theories of intelligence on emotions and their regulation. This line of research is supposed to strengthen the much-needed link between the study of emotion and the study of motivation (Dweck & Molden, 2005).

Third, I assessed students' tendency to use avoidance strategies at a single point in time. However, if the use of avoidance strategies is a dynamic process related to contextual factors, longitudinal studies are needed to capture the fluctuations in students' perceptions of autonomy support from adults and their effects on avoidance behaviors over time and across contexts (i.e., when students change classrooms). This method would allow researchers to explore the stability of the tendency to adopt avoidance strategies while determining the influence of different contexts on avoidance behaviors with greater precision. Such research has the potential to help teachers to create a classroom climate of self-determination that ameliorates maladaptive patterns of learning.

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Among Those Present

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