

**GOAL ORIENTATION AND TRAINING TRANSFER
INITIATION AND MAINTENANCE**

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(ABSTRACT)

Despite successful learning in the training environment, acquired skills are often not translated back to the job. Past research on training transfer has tended to measure the construct inconsistently and often disregarded its multi-faceted nature. In an effort to better investigate the determinants of successful transfer, the two temporal facets of training transfer, initiation and maintenance, were examined to evaluate their relationships with the trainee characteristics of goal orientation and self-efficacy. It was hypothesized that initiation mediates the relationship between goal orientation and maintenance, and that the relationship between performance goal orientation and initiation is moderated by self-efficacy. Participants were recruited from undergraduate psychology courses and trained on multiple-choice test-taking strategies. Results failed to support the main effect, moderation, or mediation hypotheses, although they support the contention that transfer is a multi-dimensional construct. The findings indicate that goal orientation and initiation may both best be conceived as predictors of transfer maintenance and interact to affect transfer behavior. The findings illustrate the value of examining individual difference variables in the prediction of training transfer.

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Chapter 1. Introduction

The ultimate goal of any training procedure is to successfully translate the knowledge, skills, abilities, or attitudes acquired in the training environment into improved performance on the job (Ford & Kraiger, 1995). Organizations spend large amounts of time and money pursuing this goal (“Industry Report,” 2000), and often assume that the mere implementation of a training program will produce the desired results. Many situational, contextual, and trainee variables, however, intervene to make this process complex.

To ascertain whether training is producing the desired outcomes, the effectiveness of the procedure must be evaluated. Training effectiveness is assessed in many conceptually distinct ways. Effectiveness is sometimes operationalized simply as the knowledge acquired during the training session, and is measured with a test of rote knowledge, rather than gauging whether that knowledge had any effects within the job context. Other training outcomes that are often evaluated include trainee reactions to training, whether they felt the training was positive, worthwhile, or useful; retention of knowledge, whether the learning that took place during training was maintained over time; behavioral skill display within the training environment and on the job, whether the individual gained the procedural knowledge to complement the declarative knowledge necessary to perform the behavior or skill; and the impact of training at the organizational level, including increases in unit productivity, decreases in incidents of accidents, or decreases in production costs (Kirkpatrick, 1967; Alliger, Tannenbaum, Bennett, Traver, & Shotland, 1997).

Though it is useful to focus attention at the reaction or learning levels, often it is not enough that the employee react positively to training or simply learn the material presented in the training environment – it is desired for them to actively use it on the job in order to improve their performance. The underlying assumption is that over time and across individuals, increases in performance as a result of training will lead to organizational improvements. Changes due to training on an organizational scale are difficult to assess because organizational outcomes are affected by many variables

unassociated with training. For example, an increase in departmental productivity may be influenced by a department-wide training procedure, but it is also affected by factors such as current economic conditions. It is therefore more appropriate and informative to focus measures of effectiveness at the individual level. With the goal of training being transfer of learned skills or abilities to the job, training effectiveness should gauge the degree to which training results in changes in job-related behavior (i.e., transfer of training).

Often, researchers evaluating training effectiveness simply assess reactions, knowledge acquisition, and knowledge retention over short periods. For example, in Baldwin and Ford's (1988) review, they noted that of the empirical studies of transfer of training they examined, the majority used learning and short-term retention as the criteria of training effectiveness. Of those that said they measured training transfer, it was operationalized in a variety of ways, including self-reported effort to apply the training, self-reported perceived success in transferring, self-reported motivation to transfer, supervisor- and self-reported attempts at transferring, and actual behaviors as gauged by trained observers, supervisors, self, peers, and subordinates. Clearly, these varied interpretations of the transfer construct are indicative of the need to further define what we mean when we talk about transfer.

Transfer Facets

Research in the area of training transfer has been hampered by the conceptual lack of clarity as to what constitutes transfer. This imprecision has restricted not only research in the area, but also the extent to which relevant findings can be applied to organizational environments. It is difficult to uncover reliable relationships among individual, organizational, and contextual variables and training transfer when the latter variable is measured inconsistently. This problem is exacerbated by the fact that common measurements of transfer may be too broad to adequately uncover interesting relationships among the variables in question.

Training transfer has been conceptualized as a multi-dimensional construct, though its facets remain unclear. Some researchers differentiate between whether the

trained behavior or skill is attempted on the job after training (initiation of transfer) and whether it is continually exhibited at the same level of performance over time (maintenance of transfer) (Laker, 1990). Others distinguish between generalization and maintenance of behavior (Baldwin & Ford, 1988), where training generalization is the aspect of training that requires that individuals take the information provided by the training program and use it in a context significantly different from the one in which it was acquired (i.e., the job context) or modify the behavior to fit the new situation. Laker (1990) expands upon Baldwin and Ford's conceptualization of training transfer by asserting two general dimensions of transfer, 'time' and 'distance,' where time gauges the initiation and maintenance facets of transfer and 'distance' gauges how different the context in which the trained skill is applied is from the training context (i.e., near or far.)

Clearly generalization and initiation are difficult to tease apart. An individual attempting a new behavior on the job is engaged in initiation of transfer, but is also generalizing learning from one environment to another. Moreover, generalization is dependent upon initiation; an employee must have taken the steps to perform the behavior on the job in order to generalize what they know to a far situation. The generalization facet is also a function of training design. The more similar the training environment is to the job environment, the less generalization needs to take place.

Thus initiation, maintenance, and generalization are conceptually distinct constructs, though this distinctiveness is frequently disregarded in the literature. The differences between initiation of transfer and maintenance of transfer in particular have not been examined thoroughly. The key difference between the two facets is their temporal ordering - initiation must occur before maintenance. Initiation therefore deals with the most proximal manifestations of transfer. Many studies have inadvertently examined maintenance of transfer simply because it is easier to do so, due to the difficulty in isolating the initiation component, and so fail to get at the immediate action of attempting a new behavior on the job. Transfer studies should ultimately look at both time and distance with respect to transfer to achieve a complete understanding of the transfer process.

Initiation is critical because once the trainee leaves the controlled setting of the training environment many environmental variables intervene to affect whether or not the next step in the training process takes place. Some variables that can influence the process of initiation include individual differences (e.g., goal orientation), the support of coworkers and supervisors, as well as simply having the materials or tools necessary to perform the behavior (Tziner, Haccoun, & Kadish, 1991). By restricting examination of the temporal facet to maintenance, we achieve only a limited understanding of why people transfer training to another context. Because of the temporal ordering of initiation and maintenance of transfer of training, it is hypothesized that initiation will mediate the relationship between predictors of transfer and maintenance of transfer. That is, the relationship between common predictors of transfer, such as goal orientation, and maintenance is at least partially a function of the relationship between initiation and maintenance, as it is necessary for initiation to occur for maintenance to occur. This relationship serves to illustrate the necessity of clearly differentiating among the different facets of training. It is possible that predictors of initiation, such as goal orientation, which is proposed herein, are not necessarily the best predictors of maintenance (Laker, 1990). By isolating the facet of initiation, we can perhaps better predict when transfer will be initiated, and also when it is likely to be maintained.

H1: Initiation of transfer will mediate the relationship between goal orientation and maintenance.

As we have seen, a host of variables influence the effectiveness of training. Training design, trainee characteristics, and characteristics of the work environment influence the learning and retention of the material, and it has been suggested that failure to transfer adequately to the job is a function of these components (Baldwin & Ford, 1988). Several researchers have examined the role of individual difference variables in predicting training outcomes. Some constructs that have been examined include goal orientation and self-efficacy.

Goal Orientation

Goal orientation describes the different ways individuals interact with and react to their environment. As first conceived by Dweck (1988), individuals can have a learning (or mastery) goal orientation or a performance goal orientation. Learning-oriented individuals are more likely to seek out challenging situations and to see ability as malleable and under their control. They tend to use themselves and their past performance as referents to gauge their success, as opposed to relying on social comparison, and react positively to failure experiences, seeing them as opportunities for improvement.

Performance-oriented individuals, on the other hand, are interested in either gaining positive or avoiding negative evaluations of their performance, and as such are socially oriented. They react to failure negatively because they see ability as a constant, and thus failure is proof of their lack of ability (Dweck & Leggett, 1988). Given a situation in which ability is perceived to be low, performance-oriented individuals are more likely to pass on chances to increase skill level, verbalize greater negative affect and attributions, and experience performance decrements. Perceived ability moderates the relationship between performance goal orientation and performance. If ability is perceived to be high, performance-oriented individuals also engage in a mastery-oriented response (Elliott & Dweck, 1988), which is characterized by persistence and strategy search (Dweck & Leggett, 1988).

Previously, goal orientation had been viewed as a uni-dimensional construct; individuals were thought to be either performance or learning goal oriented. Recently, however, work by Button, Mathieu, and Zajac (1996) has indicated that goal orientation is actually a multi-dimensional construct, and that learning and performance goal orientation should be thought of as two independent continuums on which an individual may fall. That is, an individual can be both high in performance goal orientation and learning goal orientation, low on both, or some other combination. Moreover, goal orientation has both dispositional and situational components. An individual can have

tendencies toward a learning goal orientation, but given situational pressures and constraints may respond to the environment in a performance-oriented manner.

Some researchers have also conceived of goal orientation as a three dimensional construct. Essentially this view breaks down the performance orientation dimension into two factors – one that stresses the desire to achieve positive evaluations of performance (ability-approach goal orientation) and one that focuses on the desire to avoid negative evaluations of performance (ability-avoid goal orientation); learning goal orientation is labeled a task goal orientation (VandeWalle, 1997). This position, however, has received limited support to date.

Dispositional goal orientation has been shown to have consistent relationships with performance. Phillips and Gully (1997) found that goal orientation is related to self-efficacy, which is related to self-set goal level, which in turn affects performance. That is, individuals with a learning goal orientation are more likely to display enhanced self-efficacy, whereas individuals with a performance goal orientation are less likely to exhibit strong self-efficacy generally speaking, leading indirectly to performance differences. It is not surprising that individuals who have a learning goal orientation, and thus are more likely to believe in the malleability of their own ability, also believe in their ability to achieve difficult goals. Specific, difficult goals have the effect of energizing and directing behavior, and their effect on performance is a robust finding in the goal setting literature (e.g., Wood, Mento, & Locke, 1987; Latham & Locke, 1991). Similarly, Vande Walle, Brown, Cron, and Slocum (1999) showed that goal setting, effort expended, and planning mediated the relationship between goal orientation and performance. Individuals with a learning goal orientation are more likely to set goals, and thus expend greater effort and strategically plan, resulting in higher levels of performance. It has also been found that goal orientation is related to training performance as mediated by content goals. Mastery or learning goal oriented individuals differ from their performance-oriented counterparts in the types of goals they adopt (e.g., to improve skill or avoid negative evaluation) and the content of the goal mediates the relationship between goal orientation and performance (Brett & Vande Walle, 1999).

In the training transfer literature, Ford, Smith, Weissbein, Gully, and Salas (1998) found that a learning goal orientation was related to training transfer, as mediated by meta-cognitive activity and training performance. Individuals with learning goals had higher levels of meta-cognitive activity, as indicated by reports of self-monitoring, which affected both performance at the end of training and transfer performance; however, transfer was operationalized as a more complex task that took place in the training environment, as opposed to task performance on the job (i.e., generalization). Relatedly, Farrell and Dweck (1985; in Dweck & Leggett, 1988) found that students with learning goals were more likely to attempt transfer tasks and also scored higher on those tasks than individuals with performance goals. It is evident that goal orientation has effects on training outcomes, and it appears that those effects are not limited to learning or knowledge/skill acquisition.

One goal of this study is to clarify the role of goal orientation with respect to transfer initiation. Given the relationships between goal orientation and performance and other measures of transfer, it is likely that goal orientation is also related to initiation of transfer. Moreover, unlike past studies, the treatment of goal orientation will be more in line with current conceptualizations of the dimensionality of the construct. Following the logic of Farrell and Dweck (1985), and Ford et al. (1998) it is hypothesized that individuals with a strong learning goal orientation will be more likely to attempt (i.e., initiate) transfer of trained material back to the job than individuals with a weaker learning goal orientation. Specifically, individuals who have a strong learning goal with respect to training are more interested in mastering the task at hand, rather than doing well per se. Whereas some researchers draw a distinction between learning and transfer facets, Ford and Kraiger (1995) argue that they are better thought of as ends of a continuum. That is, learning does not stop at the end of training, it continues with the transfer process. Individuals with a strong learning goal orientation should welcome the opportunity to challenge themselves and to continue the learning process on the job.

H2: Individuals with a strong learning goal orientation will be more likely to initiate transfer than individuals with a weak learning goal orientation.

If initiation of the trained behavior on the job precedes proceduralization and automaticity of behavioral performance, which is likely, initial attempts at transfer will most likely be slower, more error-prone, and stilted (Ford & Kraiger, 1995; Rackman, 1979). Generalization of a trained behavior, whether near or far, requires additional mental resources to be effective, which can further disrupt performance. Performance-oriented individuals have the tendency to see situations in which effort is required to perform well as evidence of low ability (Brett & Vande Walle, 1999), and because they desire to achieve positive performance feedback, would avoid engaging in a situation in which they would ‘display’ low ability. That is, given the likelihood that initiation will require effort and that performance will not be optimal, individuals with strong performance orientations will avoid engaging in transfer behaviors. Thus, individuals with strong performance goal orientations should be less likely than individuals with weak performance goal orientations to initiate transfer of trained material back to the job.

H3: Individuals with a strong performance goal orientation will be less likely than those with a weak performance goal orientation to initiate transfer.

Self-efficacy

Self-efficacy is another individual difference variable thought to play a role in the training process. Bandura (1991) describes self-efficacy as a mechanism of self-regulation that concerns our beliefs about our ability pertaining to a specific task, more specifically, our beliefs concerning our ability to control the outcomes associated with that task. Self-efficacy affects a broad range of behavioral and cognitive consequences, including behavioral choice, perseverance, effort, thought patterns, and causal attributions. For example, Silver, Mitchell, and Gist (1995) found that individuals high in self-efficacy tend to see their failures as due to lack of effort, whereas individuals low in self-efficacy tend to see their failures as due to low ability.

The effects of self-efficacy on performance are consistent (Latham & Locke, 1991). Self-efficacy may indirectly influence performance quality through a variety of mechanisms. For example, self-efficacy may influence goal setting effects by affecting the level of the goal chosen and the commitment that individuals have for a particular goal (Latham & Locke, 1991; Bandura, 1991), and specific, difficult goals lead to improved performance. Highly efficacious people will likely be more committed to goals because they are confident in their ability to achieve them. As mentioned previously, Phillips and Gully (1997) showed that self-efficacy was related to self-set goal level, and it had both direct and indirect effects on performance.

Self-efficacy may have its effects on performance as mediated by variables other than goal setting. For example, Wood, Atkins, and Tabernero (2000) investigated the mechanism by which self-efficacy influences performance outcomes and showed that self-efficacy was related to greater strategy search and usage. Alternately, Ford et al. (1998) showed that goal orientation influences self-efficacy, which has a direct affect on transfer performance. Moreover, self-efficacy has been postulated as a mediator between other training variables. Martocchio and Judge (1997) found that self-efficacy mediated the relationship between conscientiousness and learning, such that more conscientious individuals develop stronger self-efficacy, which directly results in improved learning.

Some researchers assert that training procedures influence performance by strengthening self-efficacy. Kraiger, Ford, and Salas (1993) suggested that developing competence on simpler tasks may increase self-efficacy and thus indirectly improve performance, and have even suggested using changes in self-efficacy as an indicator of learning or skill acquisition. Self-efficacy beliefs may moderate the relationship between knowledge acquisition and performance. That is, having the knowledge is not sufficient if you do not believe in your ability to successfully execute the task (Kraiger et al., 1993).

Specific to the training literature, Mathieu, Martineau, and Tannenbaum (1990) showed that self-efficacy was related to both training reactions and training performance. Mullins, Fisher, Howell, Schmitt, and Kozlowski (1998) found support for the hypothesis

that self-efficacy mediates the relationship between motivation to learn and intent to transfer. A trainee may be motivated to learn the material presented in training, but if they are not efficacious with respect to the task or skill to be acquired, they will be less likely to have intentions to attempt it on the job. Similarly, it is likely that individuals low in self-efficacy will be less likely to actually attempt to transfer learned material back to the job.

As stated, there is also evidence that self-efficacy moderates the goal orientation-performance relationship (Phillips & Gully, 1997). It is further expected that when self-efficacy is high, individuals who have a strong performance goal orientation will be as likely as individuals with a weak performance goal orientation to attempt transfer on the job. The desire of performance goal oriented individuals is twofold: to avoid negative evaluations of performance and to seek positive evaluations of performance. If self-efficacy is high, the individual is likely to perceive training transfer as an opportunity to garner affirmations of their ability.

H4: The relationship between performance goal orientation and initiation of transfer will be moderated by self-efficacy such that self-efficacy is high, there will be no differences in initiation between those individuals with strong and weak performance goal orientation.

The Present Study

The purpose of this study is to elucidate the training transfer process by more critically examining the role of training transfer initiation, which has been neglected in the research to date, and to evaluate the relationship between key trainee characteristics and the transfer of training. Specifically, it is hypothesized that goal orientation will influence the likelihood that individuals will initiate behavioral skill demonstration out of the training context, such that individuals with strong learning goal orientations will be more likely to initiate the behavior than those individuals with weak learning goal orientations, and that individuals with strong performance goal orientations will be less likely to initiate the behavior than those with weak performance goal orientations. It is

also hypothesized that transfer initiation will mediate the relationship between goal orientation and maintenance of the trained behavior. That is, the relationship between goal orientation and transfer maintenance will be attenuated when controlling for transfer initiation. Moreover, it is hypothesized that the relationship between performance goal orientation and transfer initiation is moderated by self-efficacy. It is expected that individuals with a strong performance goal orientation will be less likely to initiate transfer of training than individuals with a weak performance goal orientation when self-efficacy is low, but when self-efficacy is high, no difference in initiation is expected between the groups.

Chapter 2. Method

Participants

Based on the results of a power analysis, assuming $\alpha = .05$, $\beta = .20$ (power = .80), and a single interaction for which the associated R^2 values are less than .10 (the amount of variance explained by goal orientation alone is roughly .07; Ford et al., 1998), the sample size required to test the hypotheses was determined to be 150. Two hundred and ninety-eight participants were recruited from 2000-level undergraduate psychology courses and offered extra course credit for participation. After removing participants who had missing data on any of the variables, the final sample size was 149.

Procedure

Prior to the experimental procedure, participants were asked to sign an informed consent form, and were asked for permission to access psychology course tests and GPA scores, as well as to complete measures of goal orientation. Next, participants received approximately 15 minutes of instruction on multiple-choice test-taking strategies, the script for which can be found in Appendix A. Each test-taking strategy offered was accompanied with a pictorial representation and example. After the training session, participants were asked to take a short test of knowledge acquisition, and to complete measures of self-efficacy and intent to transfer. Training sessions were timed so that the participants' next psychology course exam took place less than one week after the training.

Independent Variables

The independent variables under investigation include goal orientation and self-efficacy. Goal orientation was measured using the scales developed by Button et al. (1996), which assess the two dimensions of performance and learning goal orientation with eight items each. Respondents indicate on a 7-point scale the degree to which they agree with each statement, one being strongly disagree and seven being strongly agree (e.g., "I prefer to do things that I can do well rather than things that I do poorly"). Each scale score is the average of the responses made to the scale items. In addition, situational

measures of goal orientation were also administered, as previous work has illustrated the value of context-specific measures of dispositional variables (e.g., Donovan & Swander, 2001). These items can be found in Appendices B and C, attached.

Self-efficacy was assessed using traditional procedures that evaluate the extent to which individuals feel they are capable of performing the behavior or skill at hand. In this case, individuals were asked whether they felt they could appropriately use the test-taking strategies on which they were trained. For each of the ten items, the participant rated on a scale from one to seven how confident they were in their ability to perform each strategy. These items can be found in Appendix D. Post-training knowledge was assessed as the number of test-taking strategies that the participant generated through free recall, so that the number of strategies listed that coincided with those presented during the training session was the post-training knowledge acquisition score. Scores thus range between zero and ten (Appendix E). Intent to transfer was assessed by asking the participants to respond on a five-point scale the likelihood of their performing each of the ten behaviors outlined in the training script (Appendix F).

Dependent Variables

The dependent variables under examination include initiation and maintenance of training transfer. Because these facets of transfer have been overlooked in the research to date, they are not associated with a standard form of measurement. According to Laker (1990), initiation and maintenance could be measured as the frequency, consistency, or intensity of the use of the skills or behaviors acquired during training. The primary measure of transfer initiation and maintenance is the total number of strategies the individual attempted on the transfer task (i.e., the exam), so that the value would range between zero and ten (the number of strategies taught). Specifically, each underscore, circle, or other type of mark that indicated that the participant was engaging in the test-taking strategies on which they were trained was assessed, and the total number of strategies they attempted became their initiation frequency score. Only marks that supported the strategies found in Appendix A were included in the initiation score. Maintenance of transfer was also gauged as the total number of strategies attempted, as

indicated by the notes on the hard copy of the participants' second exam, which was acquired approximately one month after training. In addition to the number of strategies used (i.e., frequency), the intensity of strategy use, which was the sum of all uses of each of the strategies, was also calculated for both initiation and maintenance (e.g., if participant A used strategy one 3 times, and strategy five 8 times, their frequency score would be 2, and their intensity score would be 11).

Other Variables

Because students were recruited from multiple lower-level undergraduate psychology courses, the effect of differences in courses was accounted for. Ability, assessed as participants' GPA scores, prior exposure to test-preparation courses (e.g., SAT prep), and test-taking anxiety were also accounted for. These variables were individually entered into regression equations in which initiation or maintenance was regressed onto each to see if there was any significant effect on those outcome variables.

Additional Analyses

In addition to the measures outlined above, the short form of the NEO-PI was also administered to the participants. The relationships among the Big Five personality characteristics (Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) and the other variables were investigated. There is no research evidence to date that relationships among these personality variables and training transfer exist, so these analyses are purely exploratory in nature. It is tentatively expected, for example, that Openness to Experience is related to initiation of transfer. Those individuals high on this construct are more likely to enjoy and seek out new experiences (Costa & McCrae, 1992) and thus may be more likely to attempt a new skill on the job. Conscientious individuals, who tend to be more dependable, organized, and achievement-oriented (Costa & McCrae, 1992) may also be more likely to transfer and maintain training.

Chapter 3. Results

Some students may use the multiple-choice test-taking strategies that were presented in this study without having participated in the training session. In order to assess whether the training had an effect, a base rate of strategy use was determined by obtaining and coding a random sample of undergraduate psychology exams ($n=50$). The coding method used in this study demonstrated a reliability of .92 ($p < .05$) for frequency of strategy use and .98 ($p < .05$) for intensity of strategy use. The mean number of strategies used in the random sample and the participating sample were 1.3 ($SD = 1.3$) and 2.17 ($SD = 1.5$), respectively, and $t(90) = 3.87$, $p < .05$, indicating that participants used a slightly greater number of strategies on their exams than did non-participants. Though in the right direction, the mean intensity of strategy use between the two groups was not statistically significantly different ($M = 10.36$, $SD = 16.12$ and $M = 14.06$, $SD = 13.21$ for the 'baseline' and 'real' groups, respectively; $t(69) = 1.49$, $p = .142$). Taken together, these findings show that those individuals exposed to the training did not use the strategies more frequently, but used a broader range of strategies.

Descriptive statistics for all variables are presented in Table 1, and the correlations among them can be found in Tables 2 through 5. The reliabilities of the measures were as follows: self-efficacy, .89; intent to transfer, .95; performance goal orientation and learning goal orientation, .86 and .90, respectively; situational performance goal orientation and learning goal orientation, .89 and .92, respectively. Slightly over sixty percent of the sample had had previous exposure to a test-taking course, and over half of the sample (59.1%) reported average or below average levels of anxiety during test-taking situations. The average GPA was 2.63/4.00. Finally, out of the ten strategies for which participants received training, six was the maximum number used on the transfer tasks. Approximately 16 percent of the sample did not use any of the strategies, another 16 percent used one, 30 percent used two strategies, and another 16 percent used three strategies; roughly twenty percent of the participants used between four and six strategies.

Tests of the Hypotheses

The effect of the two dimensions of goal orientation on initiation of transfer was determined by the direction and significance of the beta weights associated with them when they were entered into regression equations in which initiation (as assessed by frequency, or number of strategies used, as well as intensity of use) was regressed onto each component of goal orientation separately. To provide support for hypotheses two and three, the beta weights for learning goal orientation should be positive and significant and the beta weights for performance goal orientation should be negative and significant. To test for this, a series of regression equations were constructed.

Ability, as assessed by GPA, and knowledge acquisition were found to be significantly related to number of strategies used on the transfer task ($b = .515$ and $.139$, respectively, $p < .05$), and the class for which participants were seeking extra credit was significantly related to the intensity of strategy use. The R^2 when initiation intensity was regressed onto dummy vectors representing the class variable was $.16$, $p < .05$. In order to control for their effect, each variable was entered into the first block of variables in regression equations in which these variables had a significant effect on the regressor. The goal orientation measures were entered into the second block, and both measures of initiation of transfer were regressed onto both situational and dispositional measures of both learning and performance goal orientation separately.

None of the beta weights associated with either dimension of goal orientation were significant. For example, when number of strategies attempted (i.e., frequency of initiation) was regressed onto dispositional learning goal orientation, the unstandardized beta weight was $.080$ (ns); for dispositional performance goal orientation, $b = -.057$ (ns). When number of strategies used was regressed onto the situational measures of learning and performance goal orientation, the beta weights were $.002$ (ns) and $.065$ (ns), respectively. When intensity of strategy use was regressed onto the dispositional measures of learning and performance goal orientation, the resulting regression weights were $-.652$ (ns) and $-.754$ (ns), respectively; for the situational measures, the beta weights

were .049 (ns) and $-.911$ (ns), respectively. Thus, hypotheses two and three were not supported.

The hypothesis that training transfer initiation mediates the relationship between goal orientation and training transfer maintenance was tested using standard procedures for detecting mediation as discussed by James and Brett (1984). Specifically, a mediating relationship is supported when (a) the independent variable is significantly related to the mediator variable, (b) the mediator variable is significantly related to the dependent variable, and (c) when the influence of the mediator variable is held constant, the effect of the independent variable on the dependent variable is non-significant. For the purposes of this study, to provide evidence of mediation, goal orientation should be significantly related to transfer initiation and initiation should be related to transfer maintenance as determined by the significance of the beta weights associated with each variable when the other variable is regressed onto them. Finally, when goal orientation is entered into a regression equation in which maintenance is regressed onto goal orientation and the initiation measure is added, the beta weight associated with goal orientation should become non-significant and there should be a significant increase in R^2 . This analysis could not be performed, however, because although initiation was clearly strongly related to maintenance, neither performance nor learning goal orientation was related to transfer initiation.

The hypothesis that self-efficacy moderates the relationship between performance goal orientation and transfer initiation was tested similarly. In a regression equation in which initiation is regressed onto performance goal orientation and self-efficacy, if the addition of the interaction term of goal orientation and self-efficacy is significant and results in a statistically significant increase in R^2 , there is evidence of moderation. This relationship, however, was also not supported. The addition of an interaction term to the equation in which number of strategies attempted was regressed onto dispositional performance goal orientation (and the other variables) resulted in a non-significant increase in R^2 (R^2 change = .001, ns). When the interaction term for situational performance goal orientation and self-efficacy was entered into the equation in which

number of strategies attempted was regressed onto situational performance goal orientation, the increment in R^2 was again not statistically significant ($R^2 = .004$, ns). Likewise, when entered in equations in which intensity of strategy use was regressed on dispositional and situational performance goal orientation, the addition of the interaction terms was non-significant ($R^2 = .000$, ns, and $R^2 = .001$, ns, respectively).

Supplemental Analyses

Given the unexpected null findings from the tests of the hypotheses, further exploration of the effect of control variables (e.g., class, test-prep experience) on the variables of interest was warranted. Participants in the study were solicited from various 2000-level undergraduate psychology courses. In order to assess whether there were differences on any of the key variables as a result of course differences, a series of dummy-coded vectors were created, and the variable of interest was regressed onto the vectors. In addition to differences in intensity of strategy use on the initiation task, mean differences as a function of the class for which participants were seeking extra credit occurred for knowledge acquisition, self-efficacy, intent to transfer, and both measures of maintenance. Using independent samples t-tests, a series of mean comparisons were performed on the variables with which class was related. All possible comparisons were conducted, with the exception of one class group for which there was only a single observation.

Means on the knowledge acquisition measure ranged between 4.50 and 8.00 strategies recalled, and mean differences on that measure occurred for four comparisons, three of which involved comparisons with one class in particular (spring semester Psychology of Learning). The largest mean difference was for slightly over three strategies recalled out of ten. Self-efficacy means ranged between 4.88 and 5.85, which was generally high; self-efficacy was reported on a scale from one to seven, with five representing agreement with the statement “I am confident in my ability to...” Although there were seven statistically significant mean comparisons, the mean differences for each comparison were less than one. These differences occurred between summer and fall semester Introductory Psychology classes and several other classes; the

means for those classes were the only ones below five. Means on the intent to transfer measure ranged between 1.62 and 2.70. Ratings were made on a scale from one to five, where one was 'very likely' and five was 'not likely at all' in response to the question of whether the respondent planned on engaging in each of the behaviors presented in training.¹ Nine of the comparisons were significant; again we find that most differences occurred for comparisons with specific classes: spring semester Psychology of Learning and summer and fall semester Introductory Psychology classes.

Class means on the initiation intensity measure ranged between 6.30 and 36.00, and eight of the comparisons revealed significant mean differences. For example, students seeking extra credit for the Introductory Psychology course had a mean intensity score of 13.71, which was significantly lower than the mean for students' enrolled in a social psychology course, which was 28.78. The mean number of strategies maintained ranged between 1.30 and 6.00, and six of the comparisons were significant (for comparisons with spring semester Introductory Psychology, Social Psychology, and Psychology of Learning). Finally, mean intensity of strategy use on the maintenance task as a function of class varied between 6.60 and 50.00, and ten of the comparisons were statistically significant, with most differences occurring for the spring semester Introductory Psychology and Social Psychology classes and the summer Developmental Psychology class.

Examining the paired comparisons on the initiation intensity measure in conjunction with test-level information, we can see that it is possible that these differences occurred as a function of test construction. For example, one of the largest mean differences was between a social psychology course and a psychology of learning course (mean difference of 22 uses of all strategies). The exams for these courses were clearly quite different: in the first course, the exam was made of 60 multiple-choice items, contained four word pairs, and the instructor capitalized thought reversers for the students; in the second course, the exam was made of 15 multiple-choice items, contained

¹ Intent to transfer was measured on a scale from 1-5, with 1 representing a greater likelihood to transfer; thus, negative correlations indicate a positive relationship.

only one word pair and no thought reversers. In another example, significant differences were found between an introductory psychology course and a developmental psychology course. Again we see that the tests varied in terms of their structure: the former contained 50 multiple-choice items, had one word pair, and thought reversers were bolded by the instructor; the latter contained only 25 multiple-choice items, but contained four word pairs; one thought reverser was emphasized by the instructor and one was not. In order to address invariance in exam length, both operationalizations of both transfer facets were recomputed as the ratio of number of strategies used (or total number of times each strategy was used) to the number of items on the test, and the results were not significantly different. It therefore seems likely that differences in test construction other than the number of items it contained contributed to the differences between classes.

Differences in all variables as a function of previous exposure to a test preparation course were also examined. Those individuals who had prior exposure to a test preparation course did not have higher knowledge acquisition, initiation, or maintenance scores than those who had not had any such exposure. They also did not differ with respect to test-taking anxiety, GPA, or goal orientation. Interestingly, those who had *not* participated in a test-prep course reported significantly greater self-efficacy for using the strategies than those who had (means of 5.53 and 5.22, respectively).

Because the results indicated that initiation did not mediate the relationship between goal orientation and maintenance, it is possible that they are both useful in predicting maintenance of transfer. Closer investigation of this idea revealed statistically significant interactions between transfer initiation and goal orientation when maintenance was regressed onto them. Specifically, after controlling for self-efficacy and ability (GPA), the interaction between frequency of transfer initiation and situational learning goal orientation explained statistically significantly more variance in frequency of transfer maintenance (R^2 change = .018, $p < .05$). Likewise, when frequency of transfer maintenance was regressed onto the interaction between intensity of transfer initiation and situational performance goal orientation, the increase in variance explained was statistically significant (R^2 change = .034, $p < .05$). Therefore, those individuals who had

higher transfer initiation scores as well as higher goal orientation scores maintained a greater number of strategies than those who had high initiation scores but weak goal orientations or low initiation scores but strong goal orientations.

With intensity of transfer maintenance as the dependent variable, after controlling for GPA, there were statistically significant interactions between frequency of transfer initiation and situational performance goal orientation (R^2 change = .019, $p < .05$), intensity of transfer initiation and learning goal orientation (R^2 change = .039, $p < .05$), and intensity of transfer initiation and situational learning goal orientation (R^2 change = .034, $p < .05$). Figures one through six graphically depict these relationships.

Inspection of descriptive statistics indicated that several variables were skewed: knowledge acquisition, dispositional performance goal orientation, and self-efficacy were negatively skewed, and initiation and maintenance frequency and intensity and intent to transfer were positively skewed. Variables were identified as significantly skewed if the ratio of the skewness statistic to its standard error was greater than two. The extent of skewness of the data on these variables is further supported by results of Kolmogorov-Smirnov tests of normality, which indicated it is appropriate to reject the null hypothesis that the data were normal. For example, test statistics for initiation frequency and intensity were $t(159) = .190$, $p < .05$ and $t(149) = .142$, $p < .05$, respectively. All of the skewed variables underwent a log transformation to alleviate the effects of skewness, and the hypothesis tests were performed on the altered data. The transformed data continued to exhibit skewness, although to a lesser extent. For example, the skewness statistics and the ratio of the statistic to its standard error for initiation frequency and intensity were -.165 and -.76, and -.775 and -3.57, respectively. Tests of normality were again significant: $t(125) = .102$, $p < .05$, and $t(125) = .202$, $p < .05$, for frequency and intensity, respectively. The results of the hypothesis tests were not appreciably different – again the beta weights associated with all measures of goal orientation were non-significant and the addition of an interaction term for performance goal orientation and self-efficacy resulted in a non-significant increase in R^2 .

The correlations among all variables are shown in Table 2. All measures of goal orientation were interrelated. The correlations between situational and dispositional measures of learning goal orientation and performance goal orientation were .68 and .46, respectively. The correlations between all measures of learning goal orientation and performance goal orientation ranged between .35 and .52.

Both dispositional and situational measures of performance goal orientation were related to test-taking anxiety ($r = .18$ and $.19$, respectively). Performance goal orientation was also related to self-efficacy; the stronger the performance goal orientation, the greater the reported self-efficacy for performing the test-taking strategies ($r = .24$ and $.28$ for dispositional and situational measures, respectively), and dispositional performance orientation was related to knowledge acquisition ($r = .17$). Situational performance goal orientation was related to intent to transfer ($r = -.17$).

Both dispositional and situational learning goal orientation were related to GPA ($r = .23$ and $.16$, respectively). Learning goal orientation was also related to knowledge acquisition: the greater the learning goal orientation, the higher the knowledge acquisition following training ($r = .18$; $r = .23$ for situational learning goal orientation). Learning goal orientation was related to self-efficacy, such that the stronger the learning goal orientation, the stronger the reported self-efficacy for the transfer task ($r = .38$ and $.43$ for dispositional and situational measures, respectively). Situational learning goal orientation was related to reported test-taking anxiety ($r = .18$), and dispositional learning goal orientation was related to intent to transfer ($r = -.21$). Of all measures of goal orientation, only the situational measures of learning and performance goal orientation were related to transfer: correlations for learning and performance goal orientation with number of strategies maintained were $.20$ and $.19$, respectively.

All measures of transfer were also interrelated, as would be expected. The correlation between frequency and intensity of strategy use on the initiation task was $.69$; the correlation between frequency and intensity of strategy use maintained was $.69$. The non-perfect correlations between the two measures of each facet suggests they are indeed

tapping different elements of the transfer construct. Correlations among all measures of initiation and maintenance ranged between .52 and .73. The only variables related to transfer initiation were ability, as assessed by participant GPA ($r = .22$), and knowledge acquisition ($r = .21$ for number of strategies). GPA was also related to both maintenance measures ($r = .22$ for number of strategies, $r = .24$ for intensity of strategy use), and self-efficacy was related to number of strategies used on the maintenance task ($r = .17$).

In addition to the relationships outlined above, having taken a test-preparatory course was inversely related to self-efficacy for strategy use ($r = .19$; those who had no such experience reported greater efficacy), and knowledge acquisition following training was positively related to self-efficacy ($r = .21$); self-reported anxiety levels during test-taking situations was inversely related to self-efficacy and intent to transfer ($r = -.24$ and $.21$). Finally, self-efficacy was positively related to intent to transfer ($r = -.38$).

Exploratory Analyses

Several of the variables were related to the personality facets. For example, scores on the Neuroticism scale were positively related to test-taking anxiety ($r = .40$), and negatively related to intent to transfer ($r = .22$). Extraversion was positively related to the intensity of strategy use on the maintenance of transfer task ($r = .16$). Openness to Experience was positively related to self-efficacy ($r = .28$), and Agreeableness was found to be positively related to number of strategies used on the initiation task ($r = .18$) and number of strategies used on the maintenance task ($r = .19$). Finally, Conscientiousness scores were also positively related to GPA ($r = .24$), number of strategies used on the initiation task ($r = .25$), and number of strategies used on the maintenance task ($r = .20$).

The reliabilities for the five scales of the NEO-FFI are reported in Table 2. The five subscales of this measure were moderately interrelated: Neuroticism was negatively correlated with Extraversion ($r = -.19$), Agreeableness ($r = -.25$), and Conscientiousness ($r = -.17$), and Extraversion was correlated with Agreeableness ($r = .41$). The relationships between the independent and dependent variables and the Big Five factors was also assessed. Learning goal orientation was found to be related to the Extraversion, Openness

to Experience, Agreeableness, and Conscientiousness scales of the NEO-FFI; correlations ranged between .17 and .27 for dispositional measures and .22 and .31 for situational measures. Situational performance goal orientation was related to Neuroticism ($r = .21$) and Conscientiousness ($r = .28$).

Chapter 4. Discussion

Despite lack of support for three of the four hypotheses, and the inability to test the fourth, there are meaningful trends in the data. Although none of the measures of goal orientation were related to transfer initiation, situational measures of both dimensions were related to transfer maintenance (operationalized as the number of strategies used, or, frequency of use). Other interesting and logical relationships include those between learning goal orientation and knowledge acquisition, self-efficacy, and intent to transfer. Highly learning goal oriented individuals should be more likely to acquire knowledge of the strategies on which they were trained, be more efficacious with respect to their use, and be more likely to attempt to transfer them, because they believe in the malleability of their ability and are more interested in mastering the task at hand than those with weaker learning goal orientations (Elliott & Dweck, 1988). The data support this assertion: the stronger an individual's learning goal orientation, the higher their knowledge acquisition scores, the greater their self-efficacy, and the stronger their self-reported intent to transfer the test-taking strategies on which they had been trained. Thus, although the hypothesized relationships between goal orientation and transfer initiation were not evident in this sample, the relationships outlined above support the rationale for expecting such a relationship.

Knowledge acquisition was also related to self efficacy, which is intuitive, as individuals who have greater knowledge of the strategies should be more confident in their ability to use them than those who acquired less knowledge. The relationship between knowledge acquisition and initiation of transfer is also understandable – all other things being equal, those individuals who know a greater number of strategies following training should be able to use a greater number of them in the transfer process. Self-efficacy was found to be related to intent to transfer – the more efficacious an individual felt, the greater the likelihood they would have intentions to transfer the strategies. It is interesting to note that, of all measures of transfer, only the number of strategies maintained, the single measure of transfer related to either situational measures of goal orientation, was related to self-efficacy.

Both dispositional and situational measures of learning goal orientation were related to GPA, whereas performance goal orientation was not; individuals with strong learning goals would be expected to have correspondingly high GPA scores, reflecting their desire to learn. This conclusion is upheld by previous work that revealed a significant correlation between learning goal orientation and GPA, but not performance goal orientation and GPA (Button, Matthieu, & Zajac, 1996). The relationship between self-efficacy and goal orientation was stronger for learning goals than performance goals (correlations for learning goal orientation ranged between .38 and .43, whereas correlations with performance goal orientation ranged between .24 and .28). These relationships also correspond with previous work on the construct of goal orientation. Phillips and Gully (1997) showed that individuals with a strong learning goal were more efficacious with respect to the training task than were performance-oriented individuals.

Performance goal orientation was related to test-taking anxiety and Neuroticism, highlighting the evaluative component of that dimension. As stated, the goal of performance-oriented individuals is two-fold: to avoid negative evaluations of performance and to seek out positive evaluations of performance. Any test-taking situation therefore presents the opportunity for evaluation, and if there is the chance that the evaluation will be negative, anxiety is likely to occur. The similar correlations between test-taking anxiety and both measures of performance goal orientation ($r = .18$ and $.19$, respectively) and the situational measure of learning goal orientation ($r = .18$) may say something more about the sample than anything about the nature of the constructs; student populations are notoriously performance-focused. It is reasonable to expect, based on the nature of the demands on students, that they are likely to adopt performance orientations in order to “get grades” and generally do well on tests and in high-evaluation situations.

In addition to being related to both dispositional and situational measures of performance goal orientation, test-taking anxiety was also positively related to the Neuroticism scores. It is also logical that self-reported test-taking anxiety is inversely related to self-efficacy and intent to transfer – the greater the reported levels of anxiety

when taking tests, the lower the reported self-efficacy for using the strategies, and the less likely the participant was to have intentions to transfer the material to their next exam.

Unexpected Findings

The most interesting unanticipated result is that although no relationship existed between goal orientation and initiation of transfer, a relationship did exist between goal orientation and maintenance of transfer, despite the fact that initiation temporally precedes maintenance of transfer (thus indirectly refuting the mediational hypothesis). That is, goal orientation did not influence initiation of transfer, but did affect maintenance of transfer. Given that transfer initiation does not mediate the relationship between goal orientation and transfer maintenance, it is possible that both goal orientation and initiation can be conceived of as predictors of transfer maintenance. In fact, supplemental analyses revealed statistically significant interactions between goal orientation and initiation when maintenance was regressed onto them. Thus, in some instances, being strongly goal oriented and having initiated transfer explained more variance in transfer maintenance than standing on either variable alone. It therefore seems more useful to examine goal orientation and transfer initiation as independent predictors of transfer maintenance, rather than causally ordered in a mediated relationship. It should also be noted that both situational learning and performance goal orientation were related to transfer maintenance, and to the same degree. This finding could be interpreted as indicating that being strongly goal oriented, regardless of the actual content of the goal, positively influences training transfer. Given the constraints of the situation, however, other interpretations are also plausible.

It was also unexpected that only the situational measures of goal orientation were related to transfer maintenance. That correlations existed between the situational measures of goal orientation and not the dispositional measures illustrates the value of using situational measures in this type of research. Situational measures may be more informative because they more adequately tap the immediate nature of the transfer phenomena.

Yet another unexpected discovery was that intent to transfer was not related to a single measure of transfer, which could partially explain the lack of relationship between goal orientation and transfer. Although goal orientation was related to knowledge acquisition, self-efficacy, and intent to transfer, the link between intent to transfer and transfer did not exist. It is postulated that a factor not under control intervened between the participants' intentions to transfer the behavior and the actual behavioral act. The absence of this expected relationship illustrates the fact that intentions do not equate with actual behavior: participants who stated it was likely that they would use each of the test-taking strategies on their next multiple-choice exam did not actually do so (in the training situation, the strategies were presented in such a way that if used as instructed, evidence of their use would be obtainable from the hard-copy of the exam).

As would be expected, dispositional learning goal orientation was positively related to intent to transfer. Situational performance goal orientation, however, was also related to intent to transfer. This relationship may best be explained by the nature of the transfer task, which was an exam. If performance-oriented individuals thought that using the test-taking strategies could help them improve their test-taking performance and, as a result, improve their performance on the exam, they would be likely to have intentions to do so, regardless of the effect on their performance on the transfer task, which likely was prioritized behind exam performance. This result also reveals another potential reason for the lack of relationship between goal orientation and transfer. The expectation that highly performance goal oriented individuals would be less likely to initiate transfer is tied into the emphasis that performance-oriented individuals place on social evaluation – they want to seek out affirmations of their ability and avoid negative evaluations. Though a test-taking situation does raise performance evaluation issues, the participants' performance that was being evaluated was primarily on competencies other than the skills on which they were trained. Therefore, the primary constraint on transfer behavior for highly performance goal oriented individuals may have been a non-issue because of this study's design.

Another finding relating specifically to the sample under investigation was that in this sample, situational learning goal orientation was significantly correlated with dispositional performance goal orientation ($.43, p < .05$), though Button et al. (1996) report a non-significant, negative correlation ($-.11$). Similarly, situational performance goal orientation was related to dispositional learning goal orientation ($r = .48, p < .05$) in this sample, and Button et al. (1996) report a non-significant relationship ($r = .10$). (Correlations between situational and dispositional measures within and across dimensions were similar for the two studies, as were correlations with both dispositional learning and performance goal orientations with university GPA; i.e., learning goal orientation was positively and significantly related to GPA, whereas performance goal orientation was not).

These discrepant relationships may be explained by other unexpected findings. Although performance goal orientation was positively related to test-taking anxiety, which was inversely related to self-efficacy, both measures of performance goal orientation were positively related to self-efficacy. Recall that situational learning goal orientation was positively related to test-taking anxiety, and was also positively related to self-efficacy for transfer. The strong relationship between situational learning goal orientation and dispositional performance goal orientation may be a function of their shared relationships with test-taking anxiety and self-efficacy for transfer. Though the relationships may seem counterintuitive, given the nature of the transfer tasks it is not surprising that students who are particularly anxious when taking tests would report greater efficacy for strategies that would help them improve their exam performance because they may be more motivated to use them.

It is also interesting to note that GPA, a proxy for ability, was not related to knowledge acquisition, although it was related to both initiation and maintenance of transfer. This result may simply indicate that GPA was a poor proxy for ability, and that it better assesses adequacy of study skills and strategies than actual cognitive ability, which may also explain its relationship with transfer maintenance – those with better study skills have higher GPA scores, and those with better study skills were better

situated to use the test-taking strategies. It is also plausible that GPA was not related to knowledge acquisition but was related to the transfer tasks because the knowledge acquisition task required less cognitive ability than the transfer tasks, potentially because the knowledge acquisition task was administered shortly after the training session and the transfer measures were acquired approximately one week and one month after training.

Another possibility worthy of investigation is that one person may have used more strategies, but used each only once; another person may have relied on only one strategy, but did so on every single question. The possibility for such variability in transfer performance illustrates the value of gathering multiple indices of each facet of transfer. In this study, relationships between the independent variables and transfer only existed for the number-of-strategies-used operationalization, with the exception of the relationship between GPA and intensity of strategy use on the maintenance task. Nevertheless, future work should continue to explore multiple operationalizations of each facet of transfer because of the potential for uncovering differential relationships between different transfer ‘styles.’

Contributions

The fact that goal orientation was related to the maintenance measures of transfer and not to the initiation measures of transfer, given that the tasks were quite similar apart from their temporal ordering, provides some support for the contention that transfer is a multi-faceted construct, and that different variables may be differentially useful in predicting each. Furthermore, the results seem to depict the mechanism by which goal orientation influences transfer: learning goal orientation was related to knowledge acquisition, self-efficacy, and intent to transfer, although the link between intentions and behavior broke down. This study also highlights the benefits of obtaining measurements at the appropriate level of analysis: only the situational measures of goal orientation were related to transfer, reflecting the immediate nature of the construct.

It should be noted that although many of the drawbacks to this particular study’s methodology center around the use of a student population and student-oriented tasks, it

is also one of the strengths of the study. Students may have found it more challenging to actually implement the multiple-choice test-taking strategies on an exam because they did not want doing so to interfere with their exam performance. This problem exists in organizational environments as well; rather than trying out a new method for doing some aspect of one's job, employees may opt for the tried-and-true method so as to avoid a performance decrement. The prevalence of this situation further illustrates the value of examining the role of personality in the transfer process. It seems intuitive that particularly conscientious individuals, for example, may be more likely to attempt the strategies despite constraints to doing so.

Finally, although purely exploratory in nature, examining the potential for relationships among the Big Five personality factors and aspects of the transfer process was also valuable, not only in terms of validating the nature of some of the constructs under investigation (i.e., the relationships among performance goal orientation, Neuroticism, and test-taking anxiety), but also by tentatively outlining ways in which each factor could contribute to variability in transfer. For example, Openness to Experience was positively related to self-efficacy, Neuroticism was found to be negatively related to training transfer, Extraversion was positively related to the intensity of strategy use on the maintenance task, and Agreeableness and Conscientiousness were found to be positively related to number of strategies used on the initiation and maintenance tasks.

Limitations

The unexpected null findings in this study, upon reflection, may not be entirely surprising, and may be a function of the nature of the skills for which participants received training, as well as the characteristics of the transfer tasks themselves (i.e., the exams). The extent of use of multiple-choice test-taking strategies is likely dependent on the extent to which participants were prepared for the exam (i.e., the transfer task). Those individuals who knew the material well are less likely than those who knew the material less well to need to rely on the strategies, many of which are useful only when the answer is not known. Because ability is clearly related to success in mastering course material,

these constructs are inextricably intertwined: ability should be related to strategy use, but at the same time, strategy use can conceivably be inversely related to ability.

The mean differences in intensity of strategy use on the initiation task and the mean differences on the number of strategies used and intensity of strategy use on the maintenance task as a function of the class illustrate another issue that may have influenced the findings. These differences may be a result of differences in course difficulty, differences in the importance the instructor places on extra credit opportunities, or, more likely, differences in the ways instructors construct their exams. Some of the tests provided a greater opportunity for using the strategies than others, as certain tests simply contained more items than others or contained more items that were directly relevant to the training. For example, one of the strategies dealt with effectively using word pair answer options: some tests contained several word pairs and some contained none. Another strategy involved identifying and marking thought reversers or modifiers (e.g., ‘except for’, ‘least’) – some instructors highlighted such words for the student, whereas others did not. Finally, some instructors were more conscientious when constructing tests, making sure to avoid overlapping information, typos or errors, and developing attractive ‘wrong’ answer options.

A further limitation of this study was that of the ten strategies that were presented to the participants, only six of them appeared to be useful to the test-takers. That is, some of the strategies were simply less effective than others. For example, it is rare that an answer option does not fit grammatically into the structure of the question stem and unlikely that previous questions can be used to answer other questions. Though these strategies have the potential to be helpful on multiple-choice type exams, they have a lower probability of occurring, leading to restriction of range on the transfer measure. More elaborate pilot testing could have avoided this particular problem.

Given the variability in test construction and utility of the strategies, it is possible that the trainee may have been interested in or able to use the strategies but the opportunity did not present itself. It is also possible that the test-taker knew the strategies

and did in fact put them to use when taking the test, but found that it was not necessary to take the steps of writing things down, which each strategy called for (e.g., underlining thought reversers, etc.). That is, having knowledge of the strategies helped the examinee (1) slow down and avoid making foolish mistakes and (2) think more critically and read more thoroughly, without executing the strategies in precisely the manner in which they were trained. In fact, this result may be expected if the trainee not only acquired the knowledge presented in the training session, but also acquired the procedural knowledge to perform them more fluidly and automatically. Research shows that with increased ability or skill development, it is not necessary for a trainee to go through the discrete steps required to execute a behavior once the behavior is learned well (Ford & Kraiger, 1995). In fact, forcing the trainee to follow through each step may result in a decrement in performance because it is forcing what had become automatic to be controlled, making it appear awkward. Choosing skills that are more complex would certainly allay this problem.

It is also possible that the participants engaged in the strategies on which they were trained because of desire to 'help the experimenter', and not because of their standing on the latent traits of interest, or that this effect washed out the small effects of goal orientation. It may be that participants surmised that the training was a key part of the experimental results and acquiesced by using the strategies, though they might not have done so otherwise. This explanation would help clarify the relationships between Extraversion and intensity of strategy use on the maintenance task and the relationship between Agreeableness and number of strategies used on the initiation and maintenance tasks. When coding exams, it was clear that some participants tried very hard to use the strategies on which they were trained, sometimes underlining or circling thought reversers and key words even when the instructor had already done so for them. This thoroughness also elucidates the relationship between Conscientiousness and number of strategies used on both the initiation and maintenance tasks. The postulation that variability in strategy use may have been influenced by social desirability is strengthened when you consider that it was likely participants knew that their exams would be

evaluated for evidence that they engaged in the strategies, as they had to provide permission for the experimenter to access the exams.

Directions for Future Research

Most researchers would agree that there are two facets or dimensions of transfer, usually generalization and maintenance, but in fact they often only measure transfer in a broad sense, and do so inconsistently across studies. Despite the limitations of this particular study and the lack of support for the hypotheses, it is argued that more stringent methods that critically examine the dimensionality of the transfer construct are necessary to further training transfer research. In order to better investigate the relationships among the variables presented in this study, the skills on which participants will be trained and the transfer tasks should be carefully thought out. Clearly, having a standardized measure of both facets of transfer is necessary; the variability in test construction in this study made it disproportionately likely that some students would be able to use the strategies than others, irrespective of their standing on the variables of interest. Also, it is advisable to select a task for which it is more clear as to whether or not participants were engaging in the trained behavior. Again, it is possible that participants in this study did engage in the test-taking strategies, but failed to do so specifically as they were shown in the training session.

Although a relationship between goal orientation and transfer initiation was not borne out in this study, the data do indicate interesting relationships among the individual difference variables and transfer and support the multi-faceted nature of the construct. The difficulty concerning the unstandardized transfer tasks also depicts well the importance of organizational variables in supporting transfer behavior: some students seemed unable to transfer the skills because of a lack of opportunity. This finding illustrates an additional possibility not investigated in this study, that different transfer facets are better predicted by information at different levels of analysis. For example, it may be that organizational climate (i.e., support for transfer) best predicts when transfer is attempted, but that individual difference variables predict when the behavior is maintained over time. None of the individual difference variables in this study were

related to either operationalization of initiation, but situational measures of both learning and performance goal orientation was related to number of strategies attempted on the maintenance task. Moreover, perhaps frequency of transfer is best predicted by ability but intensity of transfer is better predicted by available resources or personality (number of strategies used, but not intensity of use, on the initiation task was related to GPA and knowledge acquisition; the class variable, which is best considered a proxy for test construction, and by extension, ease of transfer, was found to be related to intensity of use but not frequency of use). Future work that examines the relationships between the different facets of transfer and other individual difference variables, organizational variables, and contextual variables is recommended.

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Tables

Table 1. Descriptive Statistics for all Variables

	Range	Min	Max	Mean	SD	Variance
Learning Goal Orientation	3.88	3.13	7.00	5.25	0.89	0.79
Performance Goal Orientation	4.25	2.75	7.00	5.33	0.91	0.82
Situational Learning Goal Orientation	4.25	2.75	7.00	5.10	1.08	1.16
Situational Performance Goal Orientation	6.00	1.00	7.00	4.72	1.26	1.58
GPA	3.00	1.00	4.00	2.63	0.64	0.41
Test Prep Course Participation	1.00	1.00	2.00	1.40	0.49	0.24
Self-reported Test-taking Anxiety	4.00	1.00	5.00	3.23	1.06	1.11
Knowledge Acquisition	10.00	0.00	10.00	6.75	2.27	5.15
Self-efficacy	3.90	3.10	7.00	5.34	0.82	0.67
Intent to Transfer	6.00	1.00	7.00	1.93	0.94	0.88
Number of Strategies Initiated	6.00	0.00	6.00	2.17	1.53	2.33

	Range	Min	Max	Mean	SD	Variance
Intensity of Strategy Initiation	76.00	0.00	76.00	14.01	13.10	171.66
Number of Strategies Maintained	6.00	0.00	6.00	1.95	1.36	1.86
Intensity of Strategy Maintenance	76.00	0.00	76.00	13.89	14.52	210.59
Neuroticism	2.00	1.92	3.92	2.91	0.40	0.16
Extraversion	2.17	2.33	4.50	3.47	0.46	0.21
Openness to Experience	2.08	2.17	4.25	3.05	0.32	0.10
Agreeableness	2.00	2.50	4.50	3.29	0.37	0.14
Conscientiousness	2.50	2.00	4.50	3.52	0.50	0.25

Note. n = 149 for all variables.

Table 2. Correlations Among Predictors

	1	2	3	4	5	6	7	8	9	10
1. Learning Goal Orientation	(.90)	.35**	.68**	.48**	.23**	-.00	.07	.18***	.38**	-.21**
2. Performance Goal Orientation		(.86)	.43**	.46**	.09	.04	.18*	.17*	.24**	-.10
3. Situational Learning Goal Orientation			(.92)	.52**	.16*	.01	.18*	.23**	.43**	-.16
4. Situational Performance Goal Orientation				(.82)	.08	-.06	.19*	.11	.28**	-.17*
5. Grade Point Average					1.00	.08	-.07	.12	.11	-.10
6. Test Prep Course Participation						1.00	.00	-.01	.19*	-.06
7. Self-reported Test-taking Anxiety							1.00	-.03	-.24**	.21*
8. Knowledge Acquisition								1.00	.21*	-.10
9. Self-efficacy									(.89)	-.38**
10. Intent to Transfer										(.95)

Note. Scale reliabilities are reported on the diagonal. *p<.05, two-tailed. **p<.01, two-tailed.

Table 3. Correlations Between Predictors and Criteria

	Initiation		Maintenance	
	Frequency	Intensity	Frequency	Intensity
Learning Goal Orientation	.12	-.02	.15	.04
Performance Goal Orientation	.02	-.01	.08	.02
Situational Learning Goal Orientation	.08	.05	.20*	.12
Situational Performance Goal Orientation	.09	-.02	.19*	.07
Grade Point Average	.22**	.15	.22**	.24**
Test Prep Course Participation	-.02	-.07	.04	-.04
Self-reported Test-taking Anxiety	-.03	.01	.10	.04
Knowledge Acquisition	.21*	.04	.15	.02
Self-efficacy	.13	.03	.17*	.03
Intent to Transfer	-.12	-.00	-.06	-.03

Note. * $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Table 4. Correlations Among Criteria

	Initiation Frequency	Initiation Intensity	Maintenance Frequency	Maintenance Intensity
Initiation Frequency	1.00	.69**	.60**	.52**
Initiation Intensity		1.00	.55**	.73**
Maintenance Frequency			1.00	.69**
Maintenance Intensity				1.00

Note. *p<.05, two-tailed. **p<.01, two-tailed.

Table 5. Correlations Between Big Five and Criteria

	Initiation		Maintenance	
	Frequency	Intensity	Frequency	Intensity
Neuroticism	.01	.07	.09	.09
Extraversion	.14	.11	.16	.16*
Openness to Experience	-.01	-.01	.04	.07
Agreeableness	.18*	.09	.19*	.13
Conscientiousness	.25**	.16	.20*	.15

Note. * $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Figures

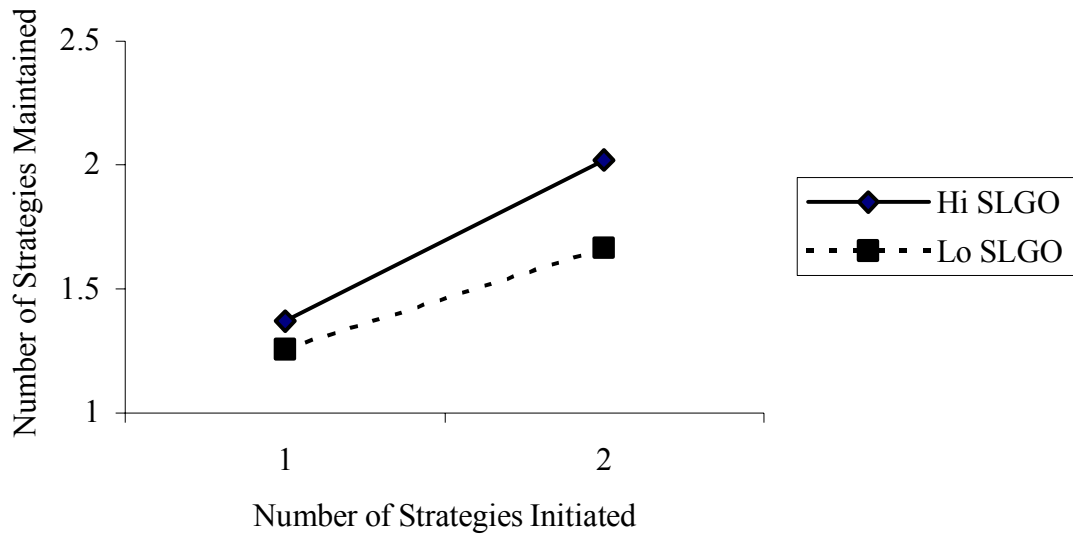


Figure 1. Interaction of SLGO and Initiation Frequency on Maintenance Frequency

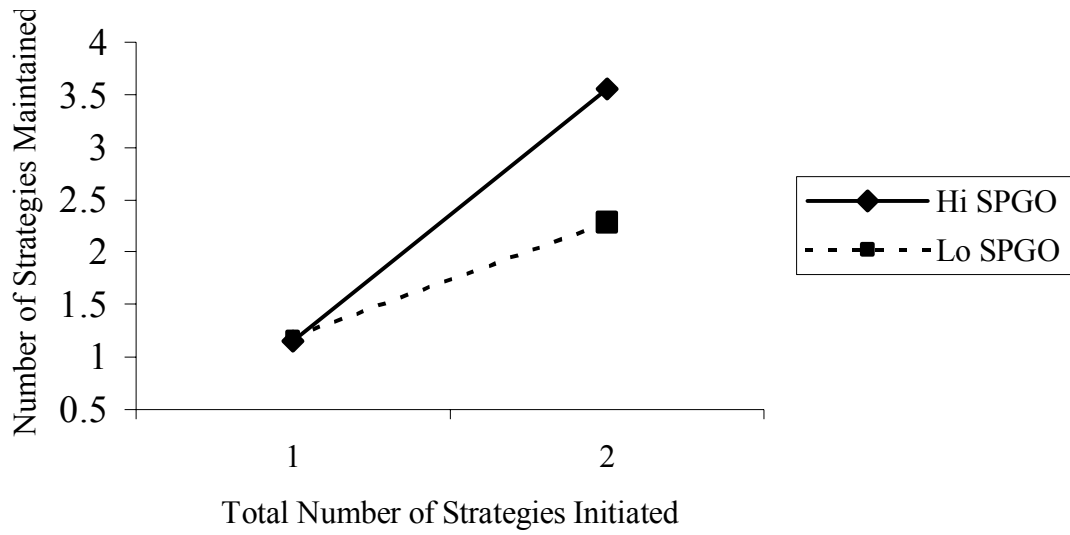


Figure 2. Interaction of SPGO and Initiation Intensity on Maintenance Frequency

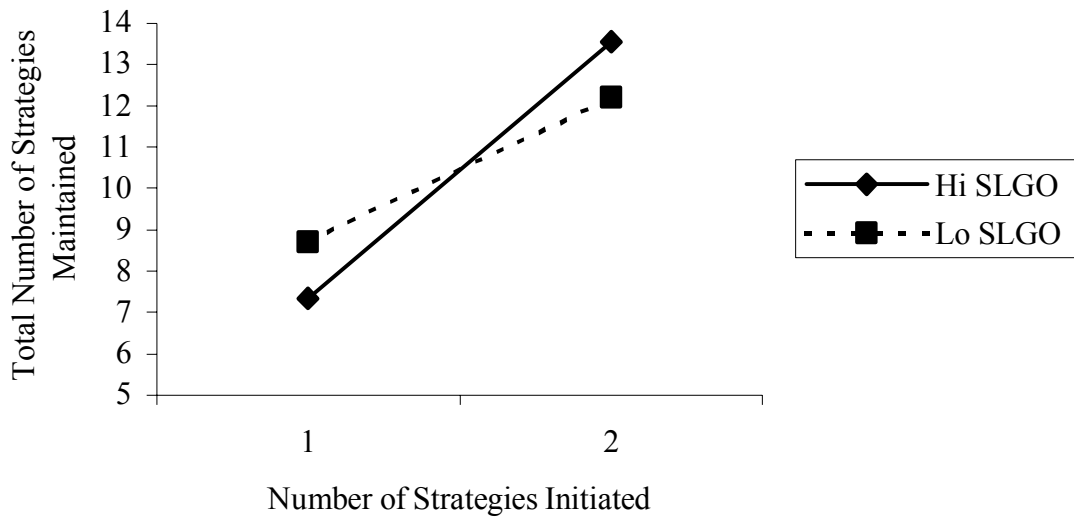


Figure 3. Interaction of SLGO and Initiation Frequency on Maintenance Intensity

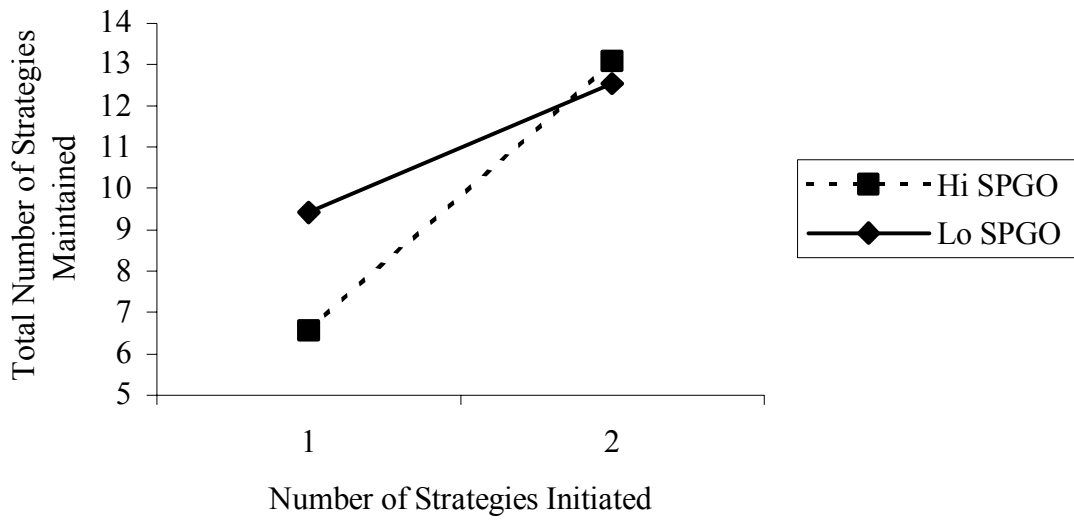


Figure 4. Interaction of SPGO and Initiation Frequency on Maintenance Intensity

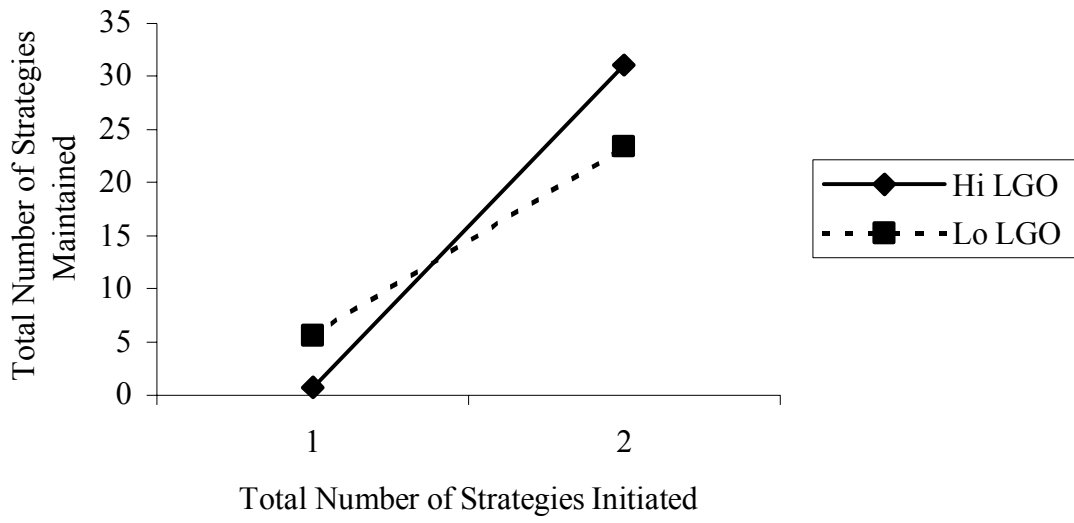


Figure 5. Interaction of LGO and Initiation Intensity on Maintenance Intensity

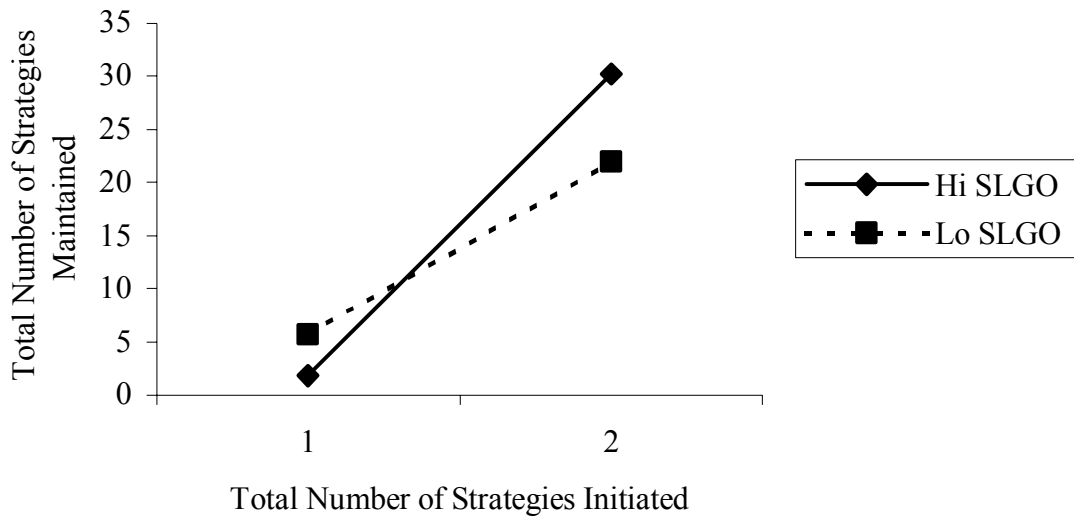


Figure 6. Interaction of SLGO and Initiation Intensity on Maintenance Intensity

Appendices

Appendix A – Training Script

Multiple Choice Test Taking Strategies

The goal of all tests is to tap the knowledge that the student has acquired, that is, to differentiate between people who have learned the information and those who have not. Some tests do this better than others and some students take certain kinds of tests better than other students. Acquiring multiple-choice test taking skills will not allow you to outsmart the exam; you still need to study the information to perform well, but it will allow you to be more efficient with your time, and will help you avoid making common errors that often occur by rushing from question to question or failing to read critically or thoroughly.

I am going to provide you with some strategies that may help you improve your exam performance. Feel free to take notes, though I will be giving you a small booklet to take with you when you leave. I encourage you to use these strategies when taking your exams in the future. Many of you may already have test-taking strategies at your disposal; today's training will help you use them more deliberately and effectively.

Generally, multiple choice exams consist of a question stem and a list of potential ways to answer or complete that stem. Usually there is one correct answer option and several 'distracter' options. The strategies we'll discuss focus on helping you quickly match the appropriate option with the stem.

- Answer the questions that you are more confident about first; star or make some note next to the ones you are unsure of and go back to them if you have time. Rather than spending too much time on a question that you may not get right, you can spend the time answering several questions you have a greater chance of getting right, making more efficient use of your time.
- Come up with your own answers first, after reading the question stem, but before reading any of the options, and write them in the margins of the exam sheet. This strategy will prevent you going with the first answer option that 'feels' right, rather than answering based on your knowledge of the material. Remember, aside from the truly correct option, the others have been placed there to distract you.
- Cross off answer options that you know are wrong right off the bat – this helps you to focus on a narrower list of options from which to choose, thereby increasing the probability of a answering correctly. There is one correct answer, and several other possibilities, some of which are 'more correct' than others.
- Underline key words in the question stem to help you to identify the important point of the question. Often, an option may sound or be technically correct,

but doesn't truly answer the question at hand. Read carefully to make sure you understand what the question is asking for before answering.

- Analyze the prefix, root, and suffix of key words by underlining and noting on the exam sheet what they mean. This tactic helps you to clarify the meaning of the question, which is necessary to find the most correct answer. A thorough list of prefixes, roots, and suffixes and their meanings can be found in the booklet you will receive before leaving.
- Circle 'thought reversers' in the question stem. Thought reversers are words that transform or modify the meaning of a sentence. These include words such as 'only', 'but', 'exactly', and 'except'. If you are going too quickly to notice these, you can incorrectly answer a question, even if you know the right answer.
- Use information from previous questions to help you answer other questions. Though in general most exam makers try to avoid this situation, there is often information presented in the question stem of one item that can be found as an answer option for another item. If you are confident in your response to one of the items, you can increase the probability of answering correctly on another item.
- Use your knowledge of grammar and sentence structure to eliminate options. If an answer option doesn't fit into the structure of the sentence, it can probably be discarded.
- Word pair answer options provide the chance to quickly eliminate options. If one item in the pair doesn't fit, the whole option can be crossed out. This is especially useful when the pair is in temporal order; that is, one logically follows from the other.
- Avoid answer options that seem extreme. Answer options that include words such as 'always' and 'never' are making strong statements and are more likely to be distracters. Remember, the goal is to choose the *most correct* or *best* option.

General Guidelines

- Take advantage of the nature of the exam to maximize your effort. If you know you have one hour to take the exam, and the exam is comprised of 60 questions, you know you can spend about a minute on each question.
- When you don't know the answer, don't leave it blank. That is, if you don't answer at all, you have no chance of getting it correct, whereas if you try, you know you have a $\frac{1}{4}$ chance of getting it right anyway by pure guesswork. If you can eliminate even one answer option, the odds increase in your favor.

Appendix B – Dispositional Goal Orientation Items

Performance Goal Orientation

61. I prefer to do things that I can do well rather than things that I do poorly.
62. I'm happiest at work when I perform tasks on which I know that I won't make any errors.
63. The things I enjoy the most are the things I do the best.
64. The opinions others have about how well I can do certain things are important to me.
65. I feel smart when I do something without making any mistakes.
66. I like to be fairly confident that I can successfully perform a task before I attempt it.
67. I like to work on tasks that I have done well on in the past.
68. I feel smart when I can do something better than most other people.

Learning Goal Orientation

69. The opportunity to do challenging work is important to me.
70. When I fail to complete a difficult task, I plan to try harder the next time I work on it.
71. I prefer to work on tasks that force me to learn new things.
72. The opportunity to learn new things is important to me.
73. I do my best when I'm working on a fairly difficult task.
74. I try hard to improve on my past performance.
75. The opportunity to extend the range of my abilities is important to me.
76. When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work.

Appendix C – Situational Goal Orientation Items

Situational Learning Goal Orientation

- 77. I intend to learn as much as I can in this part of the class
- 78. I want to really understand the material in this section of my class
- 79. I look forward to mastering the challenging material in this part of the course
- 80. If I don't understand the material in this section right away, I will keep trying until I do understand it

Situational Performance Goal Orientation

- 81. I am eager to prove to others how good I am at the content of this class
- 82. I wonder how my score on the next exam will compare with others
- 83. I am eager to show how much I know about the material in this part of the class
- 84. I want to appear competent in this class
- 85. I want to do better than others on the next exam

Appendix D – Self-efficacy Items

Using the scale provided, indicate the degree to which you agree with each statement.

Bubble in your responses in the opscan.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree somewhat	Neutral	Agree somewhat	Agree	Strongly Agree

I am very confident in my ability to:

86. identify questions I am more sure about and those I am less sure about, and to answer them in the appropriate order
87. generate my own answers to multiple choice questions before reading the answer options
88. eliminate incorrect answer options
89. identify the key words in the question stem
90. analyze the prefix, root, and suffix of key words
91. identify question modifiers
92. identify and use information from previous questions that may be helpful in answering subsequent questions
93. use my knowledge of grammar and sentence structure to eliminate answer options
94. take advantage of word pairs to eliminate answer options
95. avoid extreme answer options

Appendix E – Knowledge Acquisition

Without referring to any notes you may have taken, please list as many of the multiple choice test taking strategies that we discussed today as you can think of in the space provided below.

Appendix F – Intent to Transfer Items

How likely is it that you will engage in the following behaviors? Respond to the following items using the scale provided. Enter your responses on the answer sheet provided.

1	2	3	4	5
Very likely	Likely	Unsure	Not likely	Not at all likely

The next time I take a multiple-choice exam, I plan to:

96. identify questions that I am more sure about and those that I am less sure about, and
to answer them in the appropriate order
97. generate my own answers to test questions before reading the answer options
98. eliminate incorrect answer options
99. identify key words in the question stem
100. analyze the prefix, root, and suffix of key words
101. identify question modifiers
102. identify and use information from previous questions that may be helpful in
answering subsequent questions
103. use my knowledge of grammar and sentence structure to eliminate answer options
104. take advantage of word pairs to eliminate answer options
105. avoid extreme answer options

Curriculum Vita

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Education

M.S., Industrial / Organizational Psychology, May 2002
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B. S., Psychology, July 1999
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Academic Experience

Graduate Teaching Assistant, Engineering Writing and Communications
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Coordinate efforts with technical faculty to provide formal classroom
instruction in technical writing, public speaking, interpersonal
communications, engineering ethics, teamwork, and professionalism.
Team-teach a junior-level communications class. Maintain and evaluate
students' writing portfolios necessary for graduation. Assist in grant
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Program Assistant, Virginia Tech / Honeywell International Summer
Management Program for Women in Engineering, 5/00-7/00 & 5/01-7/01
Facilitated group discussion topics, including professional and scientific
writing, public speaking, and collaborative working skills. Helped select,
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Journal Publications

Hauenstein, N. M., *Swartz, D. E.*, & McBride, N. L. (paper under review).
Performing Exit Interviews and Surveys: A Review and Demonstration.

Harvey, R. J., Bess, T. L., & *Swartz, D. E.* (paper under review).
Hierarchical Confirmatory Factor Analysis of the Meyers-Briggs Type Inventory.

Hauenstein, N. M., Bess, T. L., *Swartz, D. E.*, & Byrd, T. G. (paper under
review). Combining Predictor and Criterion Strategies to Eliminate Adverse
Impact.

Conference Presentations

Swartz, D.E., McBride, N.L., & Hauenstein, N.M. (2002, April). Performing Exit Interviews and Surveys: A Review and Demonstration. Paper to be presented at the annual meeting of the society of Industrial / Organizational Psychology, Toronto, Canada.

Hauenstein, N. M., Bess, T. L., Byrd, T. G., Swartz, D. E., & Wagner, T. A. (2001, April). Combining Predictor and Criterion Strategies to Eliminate Adverse Impact. Paper presented at the annual meeting of the society of Industrial / Organizational Psychology, San Diego, CA.

Pappas, E. C., & Swartz, D. E. (2001, April). The Virginia Tech / Honeywell International Management Communications Skills Summer Program for Undergraduate Women in Engineering. Paper presented at the NAMEPA / WEPAN Conference, Alexandria, VA.

Technical Reports

Hauenstein, N.M., McBride, N.L., Swartz, D.E., Bess, T.L., Lemmond, G., Breland, B.T., Hollander, E., Robson, V.E., & O'Shea, P.G. (2000). Report on Exit Surveys of Retail Employees of Advance Auto Parts.

McBride, N.L., Hauenstein, N.M., Swartz, D.E., Bess, T.L., Lemmond, G., Breland, B.T., Hollander, E., Robson, V.E., & O'Shea, P.G. (2000). Report on Exit Surveys of Distribution Employees of Advance Auto Parts.

O'Shea, P.G., Hauenstein, N.M., McBride, N.L., Bess, T.L., & Swartz, D.E. (2000). Report on Exit Surveys of Administration Employees of Advance Auto Parts.

Professional Affiliations

Society for Industrial and Organizational Psychology – student affiliate, 2000
American Psychological Association – student affiliate, 2002

Relevant Coursework

Cognitive Psychology
Social Psychology
Personality Psychology
Research Methods
Industrial Psychology I and II (Selection and Training)
Organizational Psychology I and II (Leadership and Motivation)
Statistics in Research I and II
Advanced Statistics for Education (Multiple Linear Regression)
Application of Structural Equation Modeling in Education
Quantitative Topics in Applied Psychology (Factor Analysis)
Psychometrics (Item Response Theory)
Seminar in Test Development and Validation