ETHNIC DIFFERENCES AND DOMAIN SPECIFICITY IN YOUNG ADOLESCENTS' IMPLICIT BELIEFS ABOUT INTELLIGENCE

By

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Abstract

The present study examined the presence of ethnic and school - subject domain differences in implicit beliefs about the malleability of intelligence and in attributions for academic success and failure in a sample of 204 Asian -Canadian (N=146) and Caucasian- Canadian (N= 58) eighth-grade students. Students were given a questionnaire measuring their attributions for success and failure in the domains of math/science and language arts/social studies and their beliefs about the malleability of intelligence in general, as well as in the domains of math/science and language arts/social studies. The analyses of the data failed to detect ethnic differences in both attributions and implicit beliefs. The students, however, demonstrated different attributional patterns in the two academic domains. All students distinguished the two domains by attributing failure to effort more often in language arts/social studies and failure to ability in math/science. The study found that students could hold domain specific beliefs about the malleability of intelligence related to the different school - subject domains. Students demonstrating a maladaptive attributional pattern held predominantly the view that intelligence is not malleable, whereas students demonstrating an adaptive attributional pattern held predominantly the view that abilities can be changed through investment of effort. In addition, there was a domain - to - domain correspondence between attributional patterns and implicit beliefs about abilities. The study provides evidence that students perceive differently abilities in the domains of math/science and language arts/social studies, and they demonstrate different motivational tendencies in these domains. Variance in the attributions across domains was parallel to the changes in implicit beliefs in the

respective domains, indicating a relation between the two constructs, although additional variables should be considered for explaining the influence of beliefs about intelligence on academic motivation. The findings from the study are discussed in light of contemporary models of achievement motivation and potential educational implications are described.

TABLE OF CONTENTS

List of Tables

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Chapter One

Introduction

<u>Study Problem and Relevant Theoretical Models</u>

The purpose of the present study is to explore whether implicit theories of intelligence, associated with adaptive and maladaptive patterns of achievement behavior, are culture- and domain- specific. The answers to these questions have the potential to add a better understanding of the contributions of culture and subject-area organization of school activities to motivational tendencies that underlie academic performance.

Research on academic achievement motivation has identified two distinctive patterns of achievement behavior in school situations: adaptive--marked by persistence, curiosity, and exploration; and maladaptive-- characterized by anxiety, uncertainty, and nonpersistence. Studies under Weiner's (1972, 1979, 1985, 1994) attributional model of achievement motivation have consistently linked these behavioral patterns to specific patterns of attributions, that is, explanations of one's success or failure. Basically, Weiner's model contends that individuals attributing their failures to internal factors -- mainly to a lack of effort (unstable, internal causes) -- and their successes to a combination of high ability and effort, display an adaptive pattern of behavior. By contrast, persons that ascribe their failures to a lack of ability (stable, internal causes) rather than to insufficient effort are more vulnerable to a maladaptive pattern of behavior. In general, attributional research on academic achievement motivation supports these predictions (for a review, see Covington, 1992). In particular, children's causal attributions for failure were found to be reliable predictors of their responses to obstacles

in achievement situations (Andrews & Debus, 1978; Cauley & Murray, 1982; Diener & Dweck, 1978; Schunk, 1982; Weiner, 1972, 1974). Children who attribute their failures to invariant or uncontrollable factors, such as insufficient ability, tend to be debilitated by failure. In contrast, children who attribute their failures to variable or controllable factors, particularly insufficient effort, tend to perform at their best when confronting difficulty.

Another approach to the motivational antecedents and consequences of the two behavior patterns focuses on the construct of goals as an integration of cognitive and affective components of behavior. In Dweck's model of achievement behavior (Dweck & Leggett, 1988; Elliott & Dweck, 1988), goals are determined by individuals' understanding of abilities and attributes, namely, by the implicit theory of intelligence they hold. According to Dweck (e.g., Dweck & Bempechat, 1983), children who believe that their intelligence is a fixed entity (entity theory) tend to pursue the performance goal of securing positive judgments of that entity or preventing negative judgments of it and, when they are not confident in their abilities, they exhibit a maladaptive, helpless pattern. In contrast, children who believe that intelligence is a malleable quality (incremental theory) tend to pursue the learning goal of increasing their competence, and exhibit an adaptive, mastery-oriented pattern.

The two models, briefly described above, are aimed at explaining the same phenomena but approach them differently. Both models are concerned with an individual's cognitive representation of his or her environment, that is, perceptions, inferences, and interpretations of social experience as determinants of achievement behavior. Another similarity is that the cognitions postulated by the two models are

related to perceptions and beliefs about ability and control over it. In Weiner's model, however, these are perceptions and beliefs about one's own ability. According to Dweck, important is children's implicit conception of the nature of ability. An implicit notion of intelligence is viewed as a provision of a general framework within which children conceptualize their own attributes and ability. Further, both authors emphasize the importance of how ability is understood by children. According to Weiner, the understanding of one's own ability represents reference to internal, stable, and uncontrollable factors of behavior. Although Dweck does not exclude the possibility that children who dwell on ability and ability attributions might tend to view it in this way, a major point in her approach is that ability can be viewed either as stable or as unstable. The difference between entity and incremental theorists, by definition, is that they do not see ability in the same way (Dweck & Leggett, 1988). Attribution research has not given adequate attention to the possibility that ability may be perceived as an unstable determinant of achievement behavior (Graham, 1991).

In summary, there is a good deal of theoretical overlap between the two models. As a matter of fact, Dweck's model places attributions at the heart of adaptive and maladaptive patterns. In her research program children who were likely to display helpless or mastery-oriented patterns were identified by their responses to an attributional measure -- the Intellectual Achievement Responsibility Scale (Crandall, Katkovski, & Crandall, 1965). Thus, Dweck's model is rooted in the attributional approach. However, whereas the attributional approach deals with individuals' interpretations of the causes of achievement outcomes, Dweck's model attempts to identify the source of these

interpretations. Therefore, her model proposes a chain of processes beginning with individuals' implicit theories and resulting in response patterns that include attributions and their consequences.

Domain Specificity and Ethnic Differences

Both Dweck's and Weiner's models are widely recognized as an advancement of the understanding of psychological processes that presumably underlie various patterns of achievement behavior. The explanatory power of the models has been tested more vigorously in experimental settings and less consistently in natural educational environments. While the models' provision of theoretical frameworks for understanding dynamics of academic motivation was acknowledged by educational psychologists, the validity of the empirical findings for the classroom was questioned (for reviews see Graham, 1991; Stipek & Weisz, 1981). In recent years, however, studies addressed this issue by examining children's attributions related to a real educational context. Studies documented that causal attributions do not generalize across academic subjects (Marsh, Cairns, Relich, Barnes, & Debus, 1984; Ryckman & Mizokawa, 1991; Ryckman & Peckham, 1987; Stipek, 1984; Whitley & Frieze, 1985). In addition, the rapidly expanding cultural and ethnic diversity of public schools provoked greater sensitivity to cultural differences in the concepts espoused by the models. Differences in explanations for success and failure in mathematics were found in studies of Asian and American students (Hess & Azuma, 1991; Holloway, 1988; Holloway, Kashiwagi, Hess, & Azuma, 1986). Differences in attributions related to mathematics and reading achievement were documented in studies comparing Asian, Asian-American and American students (Hess,

Chang, & McDevitt, 1987; Lee, Ichikawa, & Stevenson, 1987; Stevenson et al., 1990) and in attributions related to different school subjects in studies comparing Asian-American and American students (Ryckman & Mizokawa, 1988; Whang & Hancock, 1994).

Some psychologists questioned the cross-cultural generality of attribution theory (see Duda & Allison, 1989; Maehr & Nicholls, 1980). It was suggested, for example, that some cultural groups do not necessarily view ability and effort as the dominant achievement causes nor do they classify these self-ascriptions in the manner proposed by the attributional approach. Weiner (1986) speculated that the repertoire of causes proposed by the attributional approach is universal. Cross-cultural research in the area of academic achievement attributions documented that children from diverse ethnic backgrounds relied mainly on factors such as ability, effort, task difficulty, and luck when interpreting the causes of achievement outcomes (Hess, Chang, & McDevitt, 1987; Holloway, 1988; Lee, Ichikawa, & Stevenson, 1987). This suggests that the repertoire of dominant achievement causes is indeed universal. Further, Weiner (1986) claimed that causal judgments are phenomenological: they depict the causal world as perceived by the actor. Thus, attributional content as well as causal meaning may differ between individuals even within a culture. Whereas research does not exclude the possibility of individual differences within a culture, the focus has been on predominant attributional patterns for specific cultural groups. Cross-cultural research is consistent across studies revealing that Asian children use effort as an explanation of success and failure more than they use ability (Hess & Azuma, 1991; Hess, Chang, & McDevitt, 1987; Holloway,

Kashiwagi, Hess, & Azuma, 1986). Similar findings emerged in cross-national research comparing Asian-American and American students on their achievement attributions for success and failure in the areas of mathematics/science and language arts/social studies (Mizokawa & Ryckman, 1988; Ryckman & Mizokawa, 1990). Thus, Weiner's model proved to be sensitive to the situational dynamics of motivation, as evidenced by the different intraindividual patterns of success and failure across academic domains, and to cultural differences in the tendencies for attributing causes for success and failure, as evidenced by comparisons of students from different cultures.

Dweck's model has been tested (see Goetz & Dweck, 1980; Henderson & Dweck, 1990) across broadly defined domains (intellectual, social, moral). Given the overlap between Dweck's and Weiner's models, and the sensitivity of causal attributions to subject-area domains and ethnic differences, it may be argued that analogous differences could be detected in students' notion of intelligence. It can be argued that individuals may hold different types of implicit beliefs in more narrow domains, for example, the area of mathematics achievement vs. language arts achievement. In addition, analyses of children's notion of implicit theories might provide a better understanding of sources of children's ascription of particular causes to success and failure across academic subject areas. In this respect, it is important to explore the relations between implicit beliefs and attributional patterns across different academic domains of achievement.

Wigfield and Eccles (1994) found that children's understanding of competence differed across activity domain. On the basis of these results, the authors suggest that "researchers should look at how children view competence or ability in specific activity

areas" (p. 114). In accord with this perspective, Stipek and Gralinski (1996) attempted to find subject-area differences in third-to-sixth grade student's implicit beliefs about intelligence in the areas of mathematics and social studies. Their study, however, failed to find significant differences between beliefs across the different subject areas. The present study attempts to explore the presence of such differences by means of methods that are closer to Dweck's operationalization of the implicit theories of intelligence, and in an age-group (high-school students), for which the subject-area differences in understanding one's own abilities and the causes of behavior should be more salient.

Further, Henderson and Dweck (1990) suggest that the notion of implicit theories of intelligence might be instrumental in explaining the different attributional patterns that studies have found in different ethnic groups. In brief, they suggest that culture-specific views about the nature of abilities in general may be responsible for the shaping of the understanding of one's own abilities and the other causes of behavior in the process of causal attribution. This possibility, however, has not been explored further from the standpoint of Dweck's model. In the present study, an attempt is made to trace the relation between the understanding of intelligence and the causal attributions for success and failure in representatives of different ethnic groups. In the light of this conceptualization, an exploration of cultural differences in implicit notions of intelligence might give insights into processes from which cultural differences in causal attributions arise.

In summary, the present study is an attempt to explore domain and cultural specificity of the link between implicit theories of ability and attributions. The study

replicates similar studies done within the frameworks of Weiner's and Dweck's models. The present study extends previous research by sampling students from an older age group and from diverse ethnic backgrounds. In addition, the same students are examined across academic subject areas.

Overview

In the following chapter, the theoretical context of achievement motivation research is considered first. The brief review of the major ideas in the field serves as a background against which the models of Weiner and Dweck are described. The emphasis in this section is on the basic theoretical assumptions of the models and empirical research findings that pertain to the questions of domain specificity and cross-cultural differences in attributional patterns and beliefs about ability. The final section attempts a comparison of the models. Particular hypotheses and research questions that guide the present research are stated. The descriptions of the method, results, and conclusions follow in the next chapters.

Chapter Two

Literature review

Theoretical Context of Achievement Motivation Research

The study of motivation is aimed at answering the questions of what incites behavior, what directs behavior, and what maintains its vigor and persistence (Dweck & Elliott, 1983). One specific type of motivation that has received considerable attention throughout the history of the field is achievement motivation. The interest in this type of motivation is determined by the fact that achievement, no matter whether intellectual or physical, has been valued highly by society, and that there are numerous situations where one's behavior is directed towards achievement.

There are different conceptualizations of achievement motivation but in general terms the field is concerned with the questions of motivational research as applied to situations that have the following characteristics: (1) an individual's behavior results in an observable product, which (2) has to be compared and evaluated against some socially accepted standard, and (3) there are personal consequences as a result of the evaluation (e.g., Atkinson, 1964; Heckhausen, 1982; Maehr & Nicholls, 1980). Described in this way, it is clear that most of the situations in the school context can be identified as achievement situations. Thus, it is not surprising that there is a considerable body of research on achievement motivation in school settings and that the topic is of constant interest within educational psychology and special education.

This research has provided convincing evidence for the importance of the motivational factor in school. First, the research has demonstrated that academic

achievement is determined not only by a child's intellectual ability level, but also by the motivational tendencies with which the child approaches the tasks at school (Brophy & Good, 1974; Dweck & Goetz, 1978; Licht & Dweck, 1984; Weiner, 1972). Children with equal abilities differ in their academic performance according to their assessments of their own skills, inferences about the causes of behavior, predictions and expectations about possible outcomes, their own and society's standards of performance, subjective value of the activity, and affective reactions. Second, it has been established that the motivational orientation associated with obtaining a particular outcome influences the interpretation and evaluation of the outcome. This interpretation further determines the choice, performance level, and expectations about subsequent behavior, as well as the inferences one makes about one's own abilities, competence, and efficacy in particular class situations (e.g., Dweck, 1975; Dweck & Reppucci, 1973; Weiner, 1972). In addition, research has revealed two behavioral patterns associated with the opposite poles of both achievement results and personal consequences. There are children who spend more time on tasks, persist in the face of difficulties, prefer challenging tasks, explore different strategies, and for whom failures trigger a renewed investment of effort. On the other hand, there are children who easily give up, avoid challenges by choosing too easy or too difficult tasks, and accept failures as proof of their low abilities.

These two patterns, labeled differently as approaching/avoidant (Heckhausen, 1967), mastery oriented/helpless (e.g., Diener & Dweck, 1978; 1980) or adaptive/maladaptive (Chiu, Hong, & Dweck,1994), have been related to distinct motivational tendencies. Furthermore, research has shown that seemingly equally

successful performance or adaptive behavior is determined by different goals, understanding of the criteria for success, and investment of effort (Ames, 1992; Nicholls, Patashnick, Cheung, Thorkildsen, & Lauer, 1989). Two contrasting goals have received the most attention in the literature. These two goals have been differentiated by their linkage to contrasting patterns of motivational processes and have been alternatively labeled learning and performance goals (Dweck, 1986; Dweck & Leggett, 1988), task-involvement and ego-involvement goals (Maehr & Nicholls, 1980; Nicholls, 1984), and mastery and performance goals (Ames & Archer, 1987, 1988). Because the conceptual relations among task, learning and mastery goals, and among ego, performance, and ability are convergent, these perspectives have been integrated and hereafter will be identified as mastery and performance goals, respectively (Ames & Archer, 1988). Each set of goals differs primarily in terms of whether learning is perceived and valued as an end in itself or as a means to a goal external to the task, such as gaining social approval, establishing superiority, or avoiding negative evaluation from others. The explanation of these motivational tendencies and the delineation of their basic components and conditions of functioning have been central parts of motivational research.

The different theoretical perspectives in the field, however, propose different constructs, mechanisms and methodologies. This diversity in theoretical conceptualization led to a great number of motivational constructs that lack discriminant validity (Graham & Golan, 1991). Many researchers were too quick to invent their own set of labels without carefully examining those found in the literature. As a result, the widespread unrecognized commonality among concepts, principles and methodologies

made the knowledge in this domain of inquiry extremely complicated. Moreover, despite this complexity and a proliferation of theories and models, no single model in the field captures all three components (i.e., energization, direction and persistence) of achievement oriented activity. Nevertheless, there appear to be families of constructs that cut across the most prominent theories in the field. The constructs and mechanisms that are relevant to this thesis are analyzed in the following discussion. Such an attempt serves to clarify in part the present complicated state of the field.

In general, there appear to be three general families of motivational constructs that are relevant to academic motivation (Pintrich & De Groot, 1990): (a) individuals' beliefs about their ability to accomplish a task (e.g. self-efficacy, competence, attributions, and control), (b) their reasons or purposes for engaging in a task (e.g. goals, interest, value, intrinsic orientation), and (c) their affective reactions to a task (e.g. feelings of anxiety, self-worth, anger, pride, shame, or guilt). The first two families of constructs are relevant to this thesis. Their description follows.

Perception of Competence

An underlying characteristic of most current motivational theories is the understanding of academic achievement motivation as psychological processes directed towards an attainment of a particular class of goals -- those involving increases in and judgments of intellectual competence (Bandura, 1991; Deci, 1992; Dweck, 1986; Harter & Connell, 1984; Heckhausen, 1982; Maehr & Nicholls, 1980). Self-perceptions of ability or competence are central constructs in virtually every contemporary cognitive theory of achievement motivation relevant to educational contexts, including self-efficacy

theory (Bandura, 1982; Schunk, 1984), effectance motivation theory (White, 1959; Harter, 1978), self-determination theory (Deci, 1975; Deci & Ryan, 1985), expectancy - value theory (Feather, 1982; Wigfield & Eccles, 1992), self-worth theory (Covington & Beery, 1976), attribution theory (Weiner, 1986), and goal orientation theory (Ames & Ames, 1984; Elliott & Dweck, 1988; Nicholls, 1984). All of these views share the common belief that children's understanding of concepts such as ability and effort affect their behavior and learning. Specifically, these theories convey the idea that this understanding "shapes" children's sense of how good they are at a given activity and how well they can organize and execute different behaviors. Thus, children's competence or ability beliefs relate to their achievement performance, choice of achievement tasks, amount of effort exerted, cognitive strategy use, achievement goals, and overall self-worth (see Bandura, 1986; Covington, 1984; Dweck & Elliott, 1983; Eccles, Adler, & Meece, 1984; Harter, 1982; Nicholls, 1984; Schunk, 1991; Stipek & Mac Iver, 1989 for reviews of this work). A large part of research done in the frameworks of these theories concerns the developmental aspects of competence perceptions. This research led to the emergence of important lines of evidence.

The first set of findings concerns the development of concepts of ability and effort. Younger children have undifferentiated concepts of ability and effort. They typically make judgments of effort and ability that are positively related (i.e., higher effort implies higher ability). As children grow older, they process and integrate achievement-related information in a more "logical" mature fashion (Leggett & Dweck, 1987, p. 3). More precisely, as children approach adolescence they reason about effort and ability as

inversely related when making achievement judgments (i.e., higher effort implies lower ability). As Stipek and Mac Iver (1989) pointed out, this process of evaluation is facilitated by developmental changes in cognitive competencies, and especially by the emergence of formal operations. The role of cognitive development in age-related changes in children's ability judgments is well documented in the literature (e.g., Nicholls & Miller, 1984; Surber, 1984). As children mature cognitively, their social comparison choices become more differentiated, as well. Research suggests that their criteria in evaluating competence shift from intra-individual to social comparisons (for a review, see Stipek & MacIver, 1989). In summary, students' beliefs and definitions concerning ability change substantially and significantly during late childhood and early adolescence. Students increasingly distinguish the role of effort and ability in determining achievement. As students approach adolescence they tend to view ability as a stable, internal trait, and as less related to effort than they did earlier.

In addition, there is evidence for a particularly steep decline in competence beliefs in early adolescence. Researchers speculated that the decline among older children, however, may be task-specific (Eccles, Adler, Futterman, Goff, Kaczala, Meece, & Midgley, 1983). Stipek and MacIver (1989) suggested that greater specificity in perceived competence may be explained primarily by experiences tied to certain academic subjects. Marsh (1986) found that by the fifth and sixth grades, perceptions of verbal and mathematics abilities were uncorrelated, despite a correlation in actual relative standing. Marsh proposed that older children engage in internal, across-domain comparisons. They compare their skills and achievement in math with their skills and achievement in reading

and they use this internal, relativistic frame of reference as a basis for their competence judgments in both domains. In support of this proposition, MacIver (1987) found evidence that many relatively low-performing upper elementary school students believed that they were competent in math. The study indicated that they based their math ability judgments on across-domain comparisons with reading.

Further, Wigfield and Eccles (1994) argued that an examination of both children's competence beliefs and their subjective valuing of and interest in various activities is needed to understand achievement patterns of behavior. In their model, the construct of values is the dynamic component that influences the formation of particular achievement goals when combined with the cognitive component of self-perceptions of ability.

Finally, Leggett and Dweck (1987) found systematic differences among upper elementary school-age children in the degree to which they used inverse versus positive rules of reasoning about the relation between effort and ability. In two studies with 13 and 14 year olds, individual differences in effort/ability reasoning were clearly apparent. The preferred reasoning rule was found to be a significant predictor of a motivational pattern. Children who employed reasoning typically associated with developmental maturity (i.e., inverse relation between effort and ability) were found to exhibit maladaptive motivational tendencies, whereas those who employed reasoning typically associated with developmental immaturity (positive relation between effort and ability) exhibited an adaptive motivational pattern. The authors concluded that the children's achievement behavior may be best understood by considering both developmental changes and individual differences in conceptions of ability and effort.

Achievement Goals

Another important family of constructs is achievement goals. Research shows that students pursue different achievement goals depending on their individual needs and competencies or on the demands of the situation. The salience of different goals can, in turn, influence students' choices. Achievement goal orientations are presumed to differ as a function of situational demands as well as to vary across individuals (Maehr, 1984). There is considerable research evidence that situational demands can affect the salience of specific goals, which results in differential patterns of cognition, affect and performance (Ames, 1984; Covington, 1984). For example, when social comparison is made salient, students focus on their ability and these self-perceptions mediate performance and affective reactions to success and failure. By contrast, when absolute standards, self-improvement or participation are emphasized students focus more on their effort and task strategies. The salience of different goals can, in turn, influence students' choice of academic tasks, definitions of and attributions for academic success and selection of learning or problem-solving strategies.

There are also studies of individual differences in goal setting and preference. Mastery and performance goals (Ames, 1992) represent different conceptions of success and different reasons for approaching and engaging in achievement activity, and involve different ways of thinking about oneself, one's task and task outcomes (Butler, 1987, 1988; Nicholls, 1984).

Central to a mastery goal is a belief that effort and outcome co-vary and it is this attributional belief pattern that maintains achievement-directed behavior over time

(Weiner, 1979, 1986). The focus of attention is on the intrinsic value of learning, as well as effort utilization. When students are mastery-oriented, self improvement or skill development is the goal. A sense of accomplishment can be derived from the inherent qualities of the task, such as its challenge, interest or enjoyment (Ames, 1992).

Central to a performance goal is a focus on one's ability and sense of self worth (Covington, 1984; Dweck, 1986; Nicholls, 1984). Ability is evidenced by doing better than others, by surpassing normative-based standards, and by gaining public recognition that one has done better than others. As a result, when students are ego-oriented, learning is viewed only as a way to achieve a desired goal (Nicholls, 1989).

All the concepts reviewed above are representative of the social-cognitive approach to the study of achievement motivation. The emergence of this approach is to a great extent related to the introduction of attribution analysis into the field of motivation.

Weiner' Attributional Model of Motivation Processes

Bernard Weiner (1979) is credited with making the shift in the study of motivation from focus on needs and drives towards attention to the motivational role of an individual's thoughts, beliefs, and perceptions of his or her environment. Unlike the early models of achievement motivation (e.g., Atkinson, 1964), Weiner's model emphasizes the cognitive bases of achievement strivings, rather than how motivational dispositions determine subsequent achievement strivings. His approach to achievement motivation uses assumptions, constructs and mechanisms from attribution theory (Heider, 1958; Kelley, 1967). Weiner accepts the guiding principle of attribution theorists that individuals search for understanding, seeking to discover why an event has occurred. The

search for understanding is more likely to be triggered when an outcome is negative, unexpected, or atypical (Weiner, 1985; Wong & Weiner, 1981). Weiner (1984) argues that causal search is necessary to reduce surprise and it is functional because it may impose order on a sometimes uncertain environment.

Within the broad area of research on causal inferences, the theory and research that are most relevant to classroom environment concern the perceived causes of success and failure, or what are known as achievement-related attributions. Weiner argued that the individual's causal attributions for achievement outcomes determine subsequent achievement strivings.

The Perceived Causes of Success and Failure

In achievement-related contexts such as the classroom, success and failure typically are ascribed to ability, effort, task ease/difficulty, luck, interest, mood, or others' influence, to name just the most popular ones. That is, in attempting to explain a prior success or failure, individuals might refer to their level of ability, the amount of effort expenditure, the magnitude or direction of luck, and so on. Most often, however, empirical research has focused on ability, effort, task difficulty and luck, which have been proposed as the major perceived causes of success and failure by Weiner (1972, 1977, 1979). As Covington (1992) points out, although many other perceived causes have been reported and have even been studied extensively, the four original attributes seem to predominate in the minds of most individuals.

<u>Causal Dimensions</u>

      Weiner developed conceptually and tested empirically a classification scheme of causes. The principal aim of this scheme is to reveal the underlying properties of the infinite number of causes that can be inferred. The classification gives a base to compare the causes and to delineate their similarities and differences.

      The causes of success and failure have been subsumed within a three-dimensional taxonomy (Weiner, 1979, 1980). One dimension is the internal - external description of causes, primarily associated with Rotter's (1966) construct of locus of control. This causal dimension is also captured by other labels such as person - environment or disposition - situation, and is evident in contrasts between origin - pawn (deCharms, 1968), and intrinsic - extrinsic motivation (Deci, 1975). Within the achievement domain, causes like aptitude (ability), effort, and mood are considered internal to the person, whereas the characteristics of the task, teacher's bias, and luck are among the perceived environmental determinants of the outcome.

      Research, however, showed that one dimension cannot explain disparate results such as when a failure, perceived as due to lack of ability, results in lower expectancies of future success than failure which is believed to be caused by a lack of effort (e.g., Weiner, Nierenberg, & Goldstein, 1976). This disparity shows that the two causes differ in one or more respects, although both are considered to be properties of the person. Thus, a second dimension was postulated -- "causal stability." The stability dimension differentiates causes on the basis of their temporal consistency. For example, aptitudes are perceived as relatively enduring. In contrast, luck and mood are temporary and can vary within short

periods of time. Because ability is perceived as more constant than effort, prior outcomes ascribed to ability are more predictive of future outcomes than are the outcomes ascribed to effort. According to Weiner, causal stability is but one aspect of a broader dimension that is referred to as constancy. It was pointed out by Abramson, Seligman, and Teasdale (1978) that causes differ in their cross-situational generality. For example, one can fail in math because of poor math aptitude (specific) or low intelligence (general). Abramson et al. (1978) labeled this causal dimension "globality." Globality is another aspect of causal constancy. Stability refers to temporal constancy, while globality is considered a cross-situational constancy.

A third dimension of causality has been called "controllability." Some causes, effort in particular, are perceived as subject to personal influence. One is held responsible for their presence or absence. Personality characteristics, such as patience or long-term mood, are also perceived by others as controllable. On the other hand, causes such as aptitude or luck are not seen as subject to volitional influence. Recently, a new dimension of causality has been suggested - "intentionality." Lack of effort and poor work strategies are both considered internal, unstable, and controllable causes. Yet failure due to a lack of effort would result in greater punishment from others than failure because of use of a poor strategy (Anderson & Jennings, 1980). Given low effort, but not poor strategy, the negative consequences are foreseeable and the behavior is considered irresponsible.

In brief, the causes that people use to explain the outcomes of their behavior in achievement situation can be classified as:

1. Locus

2. Constancy

    a) Temporal stability

    b) Cross-situational generality (globality)

3. Responsibility

    a) Controllability

    b) Intentionality

Causes, Underlying Dimensions and Behavioral Patterns

The distinction between approach and avoidant orientations from earlier models (e.g. Atkinson, 1964) is captured quite well by the attributional approach. Basically, attribution theorists predict that success-oriented persons and failure-prone individuals would give different explanations for their successes and failures. Further, attribution theorists claim that it is these differences in explanations that are the basis of individual differences in achievement motivation. These propositions have been generally supported by empirical research (for a review, see Graham, 1991).

It was shown that success-oriented individuals exhibit a pattern of attributions that can be called adaptive. They usually attribute their failures to internal, controllable, and unstable factors. In terms of perceived causes, these individuals most often refer to a lack of effort in their explanations of failures. Success is usually attributed to internal, stable factors. The choices of perceived causes usually present a mixture of high ability and high effort. This attributional pattern of success-oriented individuals is clearly adaptive. Because these individuals believe themselves capable of success, failures lose their threatening meaning. For them failure means that they have not tried hard enough or have

not taken the right path. Thus, failure does not imply incompetence or inability but rather not knowing or understanding - something that can be corrected by increasing one's efforts.

By contrast, failure-threatened persons ascribe their failures to stable, internal causes like ability. Additionally, they attribute their successes to unstable, external factors like luck or help from others. Their attributional pattern can be described as maladaptive: these individuals take little credit for success because they feel they are not worthy of it, and they blame themselves for failures.

Ethnic Differences

The potential of attribution theory for explaining ethnic differences in school performance is well recognized. Specific attributional patterns are found to underlie the underachievement of certain minority groups in school. One stable finding is that Blacks tend to exhibit an external locus of control (e.g., Graham, 1984; Murray & Mednick, 1975; Willig, Harnish, Hill, & Maehr, 1983). Black students, compared to Whites, behave in a more failure-oriented way. For example, in one study black elementary students rated luck and task difficulty as the most important causes of school performance compared to ability and effort, while the pattern for the white students was exactly the reverse (Friend & Neale, 1972). More recent studies (Graham, 1988; Graham & Long, 1986) that concentrate on processes of attributional thinking, however, found no evidence that Black children display a less adaptive attributional patterns than White children do.

On the other hand, several Asian ethnic groups have been found to exhibit more success-oriented patterns of attributions compared to other students, as evidenced by their

greater tendency to attribute academic success to effort. These findings come primarily from two programs of research comparing Asian, Asian-American and American families: that by Stevenson, Lee and associates (Lee, Ichikawa, & Stevenson, 1987; Stevenson et al., 1990) and that by Hess, Azuma, and associates (Hess, & Azuma, 1991; Hess, Chang, & McDevitt, 1987; Holloway, 1988; Holloway, Kashiwagi, Hess, & Azuma, 1986). Studies under these research programs are similar in their focus on mothers' and children's beliefs about school performance and achievement across different cultural settings (e.g., the United States, Japan, and China) and in their attempts to identify factors responsible for cross-cultural differences in mathematics achievement. Cross-cultural comparisons of academic achievements of Asian and American children showed that Asian students consistently outperformed their American peers, especially in the areas of mathematics and science (Stevenson et al., 1990). With respect to attributions, the findings were consistent across these cross-cultural studies revealing that Asian children used effort as an explanation of success and failure more than they used ability and exhibited a more success-oriented pattern of attributions compared to other students (Hess & Azuma, 1991; Hess, Chang, & McDevitt, 1987; Holloway, Kashiwagi, Hess, & Azuma, 1986; Stevenson et al., 1990).

One of the few studies (Hess, Chang, & McDevitt, 1987) within these research programs which compared Asian (i.e., Chinese), Asian - American (i.e., Chinese-American) and Caucasian - American students on their casual attributions for success and failure in the area of mathematics, found that Chinese students saw effort as a cause of math failure more than either of the American groups. Caucasian students believed that

lack of ability was more a cause of failure in mathematics than either Chinese group. The

authors concluded that Chinese-American students' attributional beliefs resembled those

of Chinese students more closely than those of their American peers. However, the

results, in particular, the fact that the Chinese - American students had lower effort

scores than their Chinese counterparts, and higher effort scores than their American peers,

provide evidence that not only are there cross-national differences but also that Chinese-

American students do not necessarily reflect either the attributional patterns of the

Chinese students nor the patterns of Caucasian students.

Other cross-national research comparing Asian-American and American students

on their achievement attributions for success and failure in the areas of

mathematics/science and language arts/social studies (Mizokawa & Ryckman, 1988) also

found that Asian-American students as a group tended to emphasize effort more than

Caucasian-American students, while Caucasian students tended to emphasize ability more

than effort. The study replicated the findings from previous research (i.e., Hess, Chang, &

McDevitt, 1987) with respect to attributions in the area of mathematics. The results

showed that Asian-American students believed effort was more a cause of their success

than their failures in math. Both groups saw effort as more a cause of failure than success

in language arts, though Caucasian-American students used effort attributions less than

Asian - American students for both outcomes (i.e., success and failure). The authors

suggested that their general finding that Asian American students used effort as an

explanation of success and failure more than they used ability provided evidence for

Asian students' apparent ability to resist learned helplessness (Mordkowitz & Ginsburg,

1987). However, Mizokawa and Ryckman (1990) found that distinct attributional patterns characterized smaller, national groups within the larger group of Asian American students. These data, therefore suggest that generalizations about Asian American students may not be very meaningful and that attribution research may benefit from a sounder unit of analysis.

Thus, these studies show the potential of the attributional approach for detecting ethnic differences in academic motivation and achievement. In addition, they provide evidence that different ethnic groups might reason differently about the nature of ability and effort.

Domain Specificity

Differences in belief patterns across context, especially academic context, have been noted by a number of researchers. In models of academic motivation that emphasize the roles of values, interests, or self-related cognitions (e.g., Bandura, 1977; Eccles et al., 1983; Schunk, 1984), context-specificity of motivational patterns associated with differentiation of student interests has been used to explain findings of a general decrease in motivation in early adolescence (e.g., Wigfield & Eccles, 1994). For example, in a study of students' beliefs regarding English and math as academic subjects, Eccles (Parsons), Adler, and Meece (1984) found that, overall, students in Grades 8 to 10 rated their perceived abilities as higher in English than in math. The researchers found that students believe math to be more difficult than English.

Because such differences imply a basis for causal ascription of success and failure in these school subjects, attributions for academic content areas might be expected to vary

as well. Within the attributional perspective on motivation, empirical tests of this prediction are relatively more recent. Several studies show that different attributional patterns characterize individuals across academic domains (Marsh, Cairns, Relich, Barnes, & Debus, 1984; Newman & Stevenson, 1990; Ryckman & Mizokawa, 1991; Ryckman & Peckham, 1987). Using an academically oriented attributional scale (The Survey of Achievement Responsibility -SOAR) Ryckman and Peckham (1987) found domain-area differences for students in grades 4 through 11. Significant domain area (math/science vs. language arts/social studies) by outcome (success vs. failure) interaction emerged. Students reported significantly higher ability attributions for success in language arts/social studies over math/science, and higher ability attributions for failure in math/science. For effort attributions, failure scores in language arts/social studies were higher than those for math/science. Similarly, Marsh, Cairns, Relich, Barnes, and Debus (1984) found differences in ability attributions between reading and mathematics. The students who believed that their successes in math were caused by high ability were not the same students as those who believed their reading successes were caused by ability. In addition, the authors found that these differences were related to specific dimensions of self-concept. In a follow-up study, Marsh (1984) found that ability attributions for math and for reading were significantly correlated with the students' self-concepts in each of these domain areas. Drawing on the findings from this research, Ryckman and Mizokawa (1991) proposed that self-concept may be viewed as a more inclusive construct that subsumes the constructs of attribution theory (p.198). Findings in the attributional literature might be therefore parallel to those in self-concept. In particular, context

(domain) may be as critical to considerations of causal beliefs as it is to self-concept. For example, Shavelson and Marsh (1986) proposed a multifaceted model of self-concept that is both hierarchical and developmental. Along with a general self-concept there are distinct self-concepts (e.g., self-concepts for specific content areas such as English, mathematics, and science). This model has received a substantial empirical support (see, for example Byrne, 1986; Marsh, 1984, 1986) and it is convergent in its findings with similar findings from other lines of research on domain specificity of self-concept (e.g., Harter, 1983).

To test the proposition that attributional beliefs would parallel the domain specific findings in self-concept research, Ryckman and Mizokawa (1991) examined students in grades 4 through 11 on their attributions for success and failure in two school areas: math/science and language arts/social studies. The results indicated that beliefs in the distinctiveness between success and failure outcomes and between domain areas became augmented with maturity. From Grade 5 on, a pattern of divergence between success and failure increased with age. Students in the upper grades reported a pattern of effort and ability attributions in math/science that represented a lack of confidence in their expectations for future successes. Scores for success due to ability decreased, while scores for failure increased across the grade levels. Thus, students' confidence in their abilities to successfully engage in math/science studies seemed to decline. The opposite pattern, however occurred in language arts. Here, they seemed to gain confidence in their abilities. The authors speculated that students come to believe, whether from preconceptions or direct personal experience, that math is more difficult than language

arts. It was concluded that a perceived hierarchy of abilities, wherein math and language abilities do not have the same status may account for the domain differences. Overall, the study findings supported both the hierarchical and developmental predictions derived from self-concept research.

Additional support for domain specificity of causal attributions was provided by Newman and Stevenson (1990) who factor-analyzed second, fifth, and tenth-grade students' attributional ratings of the causes for success and failure in mathematics and reading. It was found that attributions like mood, task difficulty, and mastery of specific skills were generalized across subject area and outcome, whereas ability and interest as causes of success or failure were specific to subject area and outcome. In addition, the likelihood of attributing success to stable causes and failure to unstable causes increased with an increase in children's achievement in the respective area.

Litch and Dweck (1984) also examined the possibility that attributions do not generalize across school subjects. In their study, fifth-grade children were identified as mastery- or helpless-oriented by their causal attributions to 10 hypothetical failure situations taken from the Intellectual Achievement Responsibility Scale (Crandall, Katkovski, & Crandall, 1965). The study found that mastery-oriented children performed better on a confusing, difficult task than did children who were identified as displaying helplessness with respect to achievement. The authors suggested that the difficulty of specific content areas, such as math, is quite important for differences in achievement between mastery-oriented versus helpless children. Litch and Dweck (1984), however,

did not extend this potentially fruitful line of research to an exploration of domain specificity in implicit beliefs of intelligence.

Dweck's Model

The origin of Dweck's model of achievement motivation (Dweck, Chin, & Hong, 1995; Dweck & Leggett, 1988) is related to her earlier work on learned helplessness (Diener & Dweck, 1978, 1980; Dweck & Reppucci, 1973). Her explanation of the observed behavioral patterns of learned helpless vs. mastery oriented children includes two main constructs: goals and implicit theories of intelligence. These constructs and selected research findings are presented below.

Maladaptive and Adaptive Behavioral Patterns

Dweck describes two distinctive behavioral patterns that emerge reliably in situations where the child's managing of a task is challenged: a mastery-oriented adaptive) pattern and a helpless (maladaptive) pattern. Diener and Dweck's (1978, 1980) studies provide a good description of the patterns. In the first study, both helpless and mastery-oriented children (as identified by means of their causal attributions for failure) were given a series of visual discrimination tasks. The first trials of the series contained problems that all children managed to solve successfully. The last four tasks were unsolvable. Children were instructed to verbalize aloud as they performed.

Helpless children very quickly began to interpret their errors as indicative of insufficient ability and as predictive of future failure, despite their successful performance on the previous series. They showed a progressive decrease in the use of reasonable strategies and engaged in irrelevant stereotyped activities. As Diener and Dweck's (1980)

next study indicated, after the experience of repeated failure, the helpless children revised

their earlier attributions from the successful trials and no longer recalled being competent.

By contrast, mastery-oriented children's pattern was characterized by intensified

effort in the face of difficulty. They tried to overcome their errors, employing not only the

same but even more sophisticated strategies than they had learned in the initial training.

These children did not seek attributions for failure but their verbalizations consisted

primarily of self-instructions and self-monitoring designed to aid performance. They

maintained positive affect and positive expectations about task outcomes.

Goals

According to Dweck (Dweck & Elliott, 1983; Dweck & Leggett, 1988), the

differences in the behavior patterns of helpless and mastery oriented children are due to

the different goals that they adopt in achievement situations. Performance goals, that is,

the tendency to aim at demonstrating ability or concealing the lack of ability, underlie the

helpless pattern. Learning goals, or the tendency to seek an increase of one's own skill, to

master the challenge and "become smarter," characterize the mastery oriented children's

behavioral pattern.

An unpublished study by Elliott and Dweck (1981, cited in Dweck & Bampechat,

1983) provides evidence for the relation between the two goals and the behavioral

patterns. In the study, children's goals (increasing competence vs. obtaining positive

judgment of competence or avoiding negative judgment of competence) were

manipulated by the different instructions that children received before choosing a

difficulty level of the task for the experiment. In addition, children's performance

expectations and confidence were manipulated by the feedback at a pre-test. After children made their choice of task, all children were given the same series of discrimination problems to solve.

When children were oriented toward skill acquisition they adopted a learning goal and displayed a mastery-oriented pattern, regardless of the feedback at pre-training. In contrast, for children who were oriented toward evaluation both the goal they adopted (seeking positive judgments or avoiding negative ones) and the pattern they displayed, were dependent upon the induced expectation of success. Those who received negative feedback at the pre-test manipulation displayed the helpless pattern; they tried to avoid judgments of incompetence (by succeeding on easier tasks), made negative ability attributions, and displayed negative affect. Children who received positive feedback at pre-training tried to "show off" (by succeeding on the most difficult task).

Implicit Theories of Intelligence

A major factor that determines the choice of a goal, according to Dweck (Dweck, Chiu, & Hong, 1995) is the way children understand abilities, or their implicit theories of intelligence. Of particular importance is whether abilities are viewed as relatively global and stable, or as something that can be changed.

The first theory, called "entity" theory, involves the belief that intelligence is a stable, global trait. Children who favor this understanding tend to view themselves as possessing a specific, fixed amount of intelligence, and to believe that this intelligence is displayed through performance and that the outcomes (or judgments of others) indicate

whether they are or are not intelligent. This theory increases the likelihood of adopting performance goals in achievement situations.

The second theory, called "incremental" theory, involves the belief that intelligence consists of a repertoire of skills and knowledge that can be increased. That is, incremental theorists focus on the idea that anyone can become smarter (more skillful and more knowledgeable) by investing effort. This theory increases the likelihood of adopting learning goals in achievement situations.

An unpublished study by Bandura and Dweck (1981, cited in Dweck & Bampechat, 1983) provides evidence about the relations between type of theory and goal orientation. Before performing a series of tasks, "entity" and "incremental" theory, children (as identified by a short questionnaire inquiring about their understanding of ability) were to answer a series of questions relating to their performance expectations, goals and concerns in the situation, as well as how they would react to different outcomes. "Entity" theorists showed significantly more concern than "incremental" theorists with not making mistakes, and with how smart other people would think they were. Children who displayed "incremental" theory focused on learning from the problem and were concerned that the problem might be too easy for them. When presented with a set of expectations about the task, these children ranked the learning option ["hard, new, and different so I can try to learn from them"] significantly higher. Further, "incremental" theorists reported significantly more often than "entity" theorists that they would be "disappointed" or "bored" as opposed to "relieved" or "proud" if the problems were easy and required little effort.

Summary

The development of Dweck's model has served the purposes of describing the individual differences in inferences, judgments and reactions, particularly in the face of negative events. A basic component of the model is the implicit theories of intelligence that people hold. These implicit theories refer to the two different assumptions that people may make about the malleability of intelligence. They may believe that intelligence is a fixed, non-malleable, trait-like entity (entity theory), or they may believe that intelligence is a malleable quality that can be changed and developed (incremental theory). The type of theory that one holds determines the type of goal that he or she will adopt in an achievement situation. Individuals who subscribe to an entity theory tend to form performance goals, that is, they aim at performing well or avoiding bad performance with their main concern being the evaluation of their performance abilities by others. Individuals who subscribe to an incremental theory tend to form learning goals in an achievement situation, that is, goals that focus on progress and mastery through effort. Finally, the type of goal in an achievement situation determines, together with the level of confidence in one's abilities, the behavioral pattern, outcome interpretation and outcome impact. Thus, individuals with a performance goal and low confidence are more likely to exhibit the maladaptive, learned helplessness pattern. A performance goal, combined with high confidence in one's abilities, leads to a sacrifice of learning opportunities (that involve risk of errors) for opportunities to look smart. Learning goals, regardless of children's assessment of their abilities, foster mastery and learning.

Cultural specificity

Although Henderson and Dweck (1990) suggest that the model may be sensitive to ethnic differences, this possibility has not been pursued further. Several cross-cultural and cross-national studies that trace the influence of factors similar to the implicit theories of intelligence provide ambiguous results.

In a recent article, Hess and Azuma (1991) discussed differences in the sources of motivation. They noted that socialization practices in Japan are oriented toward shaping the child to persist under all circumstances. Achievement motives center on the role of effort and on others' approval. Americans, in contrast, focus attention on shaping the environment to entice the child. Achievement motives are more individualistic, centering on self-perceptions of ability and interest. Despite the focus on others' reactions, the Japanese can be characterized as having a mastery orientation to learning (Stevenson & Stigler, 1992). One reason is that they adhere to what Dweck and Elliott (1983) termed an incremental rather than a trait theory of ability (Lee, Ichikawa, & Stevenson, 1987). Chen and Stevenson (1995) found in a study of Asian-American, Caucasian-American, and East-Asian high school students that there is a greater similarity between Asian-Americans and East-Asians, than between the two groups of Americans, on beliefs about effort and ability. The results suggest that values and culture specific beliefs about the role of effort for achievement are quite stable and are preserved despite the acculturation processes. In accord with these results, a study by Hess, Chang and McDevitt (1987) found that Asian-American beliefs resemble those of indigenous Asians more closely than those of their American peers. This was interpreted to mean that cultural beliefs are

stable and transmitted through the family. Overall, the results of the studies above suggest that certain cultures may favor the understanding of intelligence as a malleable quality that develops through effort and that these beliefs are manifested in representatives of these cultures who are away from the original ethnic environment.

On the other hand, a study by Whang and Hancock (1994) found that Asian-American students were more likely to say that they learn mathematics because they have to and because they do not want to look dumb (performance goals). In addition, these students were found to score lower on measures of self - concept and confidence in abilities. At the same time, these students outperformed their classmates on tests of mathematics achievement. The authors suggest that different expectations of performance and understanding of ability and effort function in the different cultures. Asian-Americans put an emphasis on learning mathematics and there is no choice for the student but to try to master the skills (see also Stevenson et al., 1990); their performance criteria may also be higher. Nevertheless, such results contradict the predictions that can be inferred from Dweck's model, namely, that individuals who endorse an incremental theory of intelligence would be oriented toward learning goals.

Domain specificity

In more recent works (Chiu, Hong & Dweck, 1994; Dweck, Chiu & Hong, 1995), Dweck has argued that psychological processes similar to those described for the intellectual domain may affect an individual's adaptiveness in the social and moral domains. The analogues of an implicit theory of intelligence in these areas are implicit theories of personality and implicit theories about the world and people's morality. The

theories that are functional in the social and moral domains may be "entity" or "incremental," depending on whether personality and morality are viewed as fixed or malleable. Further, Dweck assumes that different types of theories may co-exist in the different domains. That is, a person may hold an incremental theory of intelligence and an entity theory of morality.

It should be noted that Dweck depicts "domain" in a broader sense than it is used in the present work. According to Dweck, implicit theories are global (i.e., they pertain to all different manifestations of the attribute) and general (i.e., not confined to the quality of one's own attribute). From this point of view, the division of the study field into the broad domains of intelligence, personality, and morality is justified, and the question about differences in the understanding of the different manifestations of ability does not apply.

The intellectual domain, however, in the context of the school is divided into subject areas which often require quite specific skills for successful performance. Also, students are most often good in some subjects and not that good in others. Students perceive the different subject areas as varying in difficulty, for example, mathematics is consistently rated as a more difficult subject than language arts (Eccles [Parsons], Adler, & Meece, 1984; Eccles [Parsons], Midgley, & Adler, 1984; Gottfried, 1982; Wigfield & Eccles, 1994). Thus, children may think about their own and their classmates' intellectual performance more in terms of specific skill-domains. Given the differences in perception of these domains, the specific skills required, and the different inclinations of the individuals, it is possible that the nature of "intelligence" in the subject-domains is understood differently.

Stipek and Gralinski (1996) explored this possibility for elementary school children (grades three to six). Children were given measures that assessed their beliefs that: (1) ability is stable and unaffected by effort (similar to Dweck's entity theory); (2) performance is stable and only modestly affected by effort; (3) intelligence is a specific and global cause of academic performance; (4) effort is a cause of academic performance; and (5) effort increases intelligence (similar to Dweck's incremental theory). These beliefs were assessed for performance in mathematics and social studies. The results, however, indicated that the beliefs were consistent across subject-domains. Therefore, no support was obtained for the hypothesis that elementary-school age children have subject-specific beliefs about ability and performance.

As the authors suggest, the failure to find differences across areas may be due to the age of the participants. It is possible that as children enter adolescence and begin to engage in higher level mathematics, their beliefs about ability related to performance in math and other subjects become more differentiated.

Comparison of Weiner's and Dweck's models

The two models described above are similar in that both emphasize the importance of cognition for the motivational process in achievement situations. The cognitive component specified in each model is central and determines to a great extent the level of choice, persistence, and experience of the outcomes of subsequent performance. Further, the models are similar in that both place an emphasis on a cognitive component that is related to one's conception of ability, and it is the understanding of the characteristics (underlying dimensions) of ability that is the

important factor for motivation, according to both models. Another similarity is that the adaptive and maladaptive patterns of behavior in achievement situations have been a central concern for research generated under the framework of each model. In fact, earlier studies by Dweck (Diener & Dweck, 1978, 1980; Dweck & Reppucci, 1973) used the attributional approach extensively for identifying children with a learned helpless orientation.

Given these similarities and relations between the two models, it is surprising that there is practically no empirical research comparing directly the two models and delineating their scope and differences. One of the purposes of the present work is to provide data that will make possible the comparison between the central cognitive components of the two models.

The major difference between the models is in the character of the cognitions that determine the motivational orientation in achievement situations. In terms of Weiner's model, when asked to explain the reasons for their success or failure, children answer by referring to their own abilities, their own efforts, or the particular circumstances about their own performance. By contrast, the beliefs about the nature of intelligence, which are the central cognitive component in Dweck's model, are general, not necessarily based on the beliefs about one's own abilities.

At the same time, one should expect that there is a correspondence between understanding beliefs in general and understanding one's own beliefs. On the one hand, experience with one's own intellectual abilities is a basic source of information about what intelligence is; on the other hand, the way one understands intelligence in general

should influence the way one's own intelligence is understood. The two classes of beliefs have, most probably, different sources through which they develop. Thus, understanding of intelligence in general would be influenced not only by one's own experience but also by knowledge that is acquired and that is implied in the interaction patterns of society. By contrast, beliefs about the nature of one's own intelligence will depend not only on the understanding of intelligence in general but also (and mainly) on one's own experience.

In the present study, it is accepted that the two models not only overlap but also complement each other. This complementarity will be evident if the models show different sensitivity to questions that are relevant to the cognitive component in one of the models, but not to the cognitive component in the other model.

One difference, related to the different aspect from which the cognitive component of motivation is approached in the two models, is the meaning of ability that is ascribed to by children. It has been pointed out in the literature (Dweck, Chiu & Hong, 1995; Graham, 1991) that Weiner's dimensions, which underlie the choice of ability as cause of behavior, fail to differentiate between different possible interpretations of ability. Thus, according to the theoretically derived set of dimensions, the choice of ability indicates a choice of an internal, stable and uncontrollable cause. Dweck's interpretation of beliefs about intelligence (ability) is that it also can be understood as a malleable quality, controllable through effort (incremental theory). In this respect, Dweck's concept of different implicit theories of intelligence might be more adequate for capturing differences in the understanding of ability. Such differences, as discussed above, lead to questions about the validity of Weiner's method when applied to different ethnic groups.

At the same time, Dweck's model has not been tested across ethnic groups. In the present study, an attempt is made to provide information about the sensitivity of the method as compared to Weiner's attributional approach to cultural differences.

Finally, it has been shown that Weiner's model is sensitive to performance in different subject areas within the intellectual domain. On theoretical grounds, Dweck's model has not been explored in detail for the possibility of domain specific beliefs about intelligence, when domain is defined narrowly. Eventual sensitivity of the model to cross-domain differences as established by means of an attributional approach would indicate the dependence of general beliefs about intelligence on self-perceptions of intelligence.

In summary, the study that follows is an attempt to explore the relations between two classes of beliefs that are important for individuals' construction of their motivational orientation in achievement situations: beliefs about the nature of intelligence or abilities in general and beliefs about one's own abilities. It was argued that although the two classes of beliefs are mutually dependent on each other, each incorporates the influence of additional factors. Thus, their relation can be best described in terms of complementarity or reciprocity and the respective motivational models that are based on one or the other class of beliefs will be relevant to the study of different questions in the field of motivation.

It is expected that measures about beliefs about intelligence in general will be more sensitive to cultural differences than measures of beliefs about one's own intelligence. In contrast, beliefs about one's own intelligence will capture better

differences across domains than measures of beliefs about intelligence in general or

general beliefs about the nature of abilities in particular domains.

Chapter Three

Objectives, Hypotheses and Method

Objectives and Hypotheses

The primary objective of this thesis is to explore whether students' implicit beliefs about intelligence, associated with adaptive and maladaptive patterns of achievement behavior, are culture- and domain-specific. Achievement attributions provide "the means" for detecting cultural and domain differences in implicit beliefs about intelligence. As discussed in the review, research has shown that students' attributions about the causes of success and failure vary with ethnicity and across domains. At the same time, research within the framework of Dweck's model of achievement motivation has relied on attributional patterns for validating the importance of the "implicit theories of intelligence" construct but has failed to address empirically the questions of cultural and domain specificity. Thus, there is a need to explore the association between beliefs about intelligence and causal attributions across ethnic groups and subject areas.

The possibility that the cultural specificity of causal attributions is related to the beliefs about intelligence that a particular culture forms in its representatives has been discussed by Dweck (Henderson & Dweck, 1990) but has not been approached empirically. In the present study, it is hypothesized that if causal attributions are dependent upon the implicit notion of intelligence that prevails in a particular culture, then subjects from an ethnic group characterized by predominant effort-explanations in case of failure would also show a more expressed incremental theory of intelligence. Further, if the relations between intelligence beliefs and causal judgments are direct, then,

within a culture, the same subjects who show a strong effort-attribution pattern in case of failure will also show a strong belief in the malleability of intelligence.

The question of domain specificity has been addressed in Dweck's theory with respect to broadly defined domains. By definition, implicit beliefs about intelligence are global and cut across the boundaries of narrowly defined domains. It was argued in the previous chapter that if general beliefs about intelligence depend in their formation upon beliefs and perceptions of one's own ability in a specific domain, then a person will hold different theories about domain-specific abilities.

As demonstrated in the review, the question of ethnic differences in attributions has received considerably more attention in the literature and there are a number of research studies that have addressed this question. On the basis of these results, particular hypotheses about ethnic differences in attribution patterns can be formulated. In contrast, domain specificity (in a more narrow sense) has not been studied sufficiently. Therefore, this study will address the question of domain specificity in an exploratory fashion. In summary, three sets of hypotheses and research questions arise related to cultural- and domain- variation in attributions, implicit theories of intelligence, and the relation between the two constructs:

I. Hypotheses and questions related to causal attributions for success and failure outcomes:

1. It is hypothesized that students from different ethnic groups will show different predominant patterns of attributions. In particular, on the basis of research evidence reviewed, it is hypothesized that Asian-Canadian students will show greater reliance on

effort attributions when explaining the causes for success or failure outcomes across subject areas than their Canadian counterparts.

2. Do attributional patterns differ across subject-domains? If they do, what are the attributional patterns that characterize the different areas?

II. Research questions related to implicit theories of intelligence.

1. Are there beliefs about intelligence that dominate the views of the particular ethnic groups included in the study?

2. Do theories of intelligence differ across domains?

3. If they do, what are the relations between the theory of intelligence in general and the theories of specific beliefs?

III. Hypotheses and research questions about the relation between causal attributions and implicit beliefs about intelligence.

1. It is hypothesized that groups showing a maladaptive attributional pattern will show significantly greater endorsement of an entity theory of intelligence than groups showing an adaptive attributional pattern. Groups showing an adaptive attributional pattern will show significantly greater endorsement of an incremental theory of intelligence than groups showing a maladaptive attributional pattern.

2. Which theory (about ability in general, about abilities in the area of mathematics, or abilities in the area of language arts) is the better predictor of attributions for success or failure in the respective areas?

In the following section the selection procedure used to recruit participants for the study, the description of the participants in terms of demographics and ethnic categories and the measures used in the study are presented.

<div align="center">Method</div>

As revealed in the review, the bulk of research concerned with ethnic differences in achievement attributions has been conducted predominantly with children from East Asian ethnic backgrounds and primarily in the United States. According to the 1996 Canadian Census (Source: BCSTAT, 1997) British Columbia is the Canadian province with the largest Asian population in Canada and, in particular, the Lower Mainland has the highest concentration of individual representatives of this population. The review of the literature and these demographic data determined the choice of school districts. School districts with a high percentage of students from Asian backgrounds were invited to participate in the study. According to the 1991[1] British Columbia's Census data broken down by school districts, Vancouver and Richmond School Boards have the largest Asian school populations (Source: BCTF Information Handbook, 1995). These demographic data and previous research in the area of achievement attributions determined the steps undertaken in selecting and recruiting participants for the present study.

Selection Procedure

A three - step procedure was used in recruiting participants. At the first step, all nine public high schools in Richmond School Board were contacted. The choice of schools was restricted to public high schools in order to ensure relatively consistent

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[1] Data from the 1996 Census broken down by school districts were not available

educational contexts. In the Spring of 1997 the schools were invited to participate in the study. The invitations were channeled through the Richmond School Board. Only one public high school agreed to participate. The schools that declined invitation did so because of the overwhelming number of surveys being conducted on their premises at that time.

In order to ensure a balanced sample for the study in terms of representativeness of Caucasian student population, Vancouver School Board officials were consulted regarding the choice of appropriate schools. After consultations with the school board officials, one of the largest high schools in the Vancouver School Board was invited and agreed to participate in the study.

At the next step, parents and guardians of the prospective participants were informed about the study and their written consent to allow their children to participate was sought. Finally, the students themselves were given the free choice in deciding whether or not to participate.

Participants

Overall 340 parents were approached for consent. Pupils whose parents/guardians did not respond or responded with a "no" to the consent forms and pupils who declined participation were excluded from the study. Students who participated in the study totaled 228 (182 from Vancouver and 46 from Richmond) with a mean age of 13.27 years (SD = .93). There were 103 male (M age = 13.37, SD = .39) and 119 female (M = 13.30, SD = .36) participants. Six participants did not provide their gender.

Participants represented three ethnic categories (see the next section for a more detailed description of the questions used to categorize the students into these categories): East -Asian Canadians, Caucasian Canadians and other Canadians. The East-Asian Canadian group of students (N=146) included children born in China, Hong Kong, Vietnam, Malaysia, and Taiwan, as well as children born in Canada to Asian parents. The Caucasian Canadians group of students (N=58) included children born in Canada to parents of European descent. Six students were born in Europe but have lived in Canada for more than five years. The third group, with 24 participants, was the most diverse one. Due to this diversity, the results from these participants were not included in the analyses. Four participants were from mixed-race background (i.e., Asian/Caucasian). They were included in the group "other" and thus, the results from these participants were excluded from the analyses (see the rationale for this decision in the next section).

Measures

The different measures for the study were combined in one booklet to be filled out by the students. The booklet started with a demographic information section. Scales pertaining to students' attributions of success and failure in mathematics and language arts, and students' implicit understanding of intelligence followed. The order of the scales, after the demographic information section, was counterbalanced. This was achieved by designing an equal number of different booklets representing the different orders of the scales. Descriptions of the scales follow:

Demographic Information Section. This section included questions inquiring about participants' age, gender and ethnicity.

In order to maximize accuracy in determining students' ethnic group membership, as well as to achieve comparability of the results from this study to those of other studies concerned with ethnic differences, the following points were taken into account:

1. The labels (e.g. Asian Canadian, Caucasian Canadian) indicating students' ethnic group membership had to be parallel to the labels (e.g. Asian Americans, White/Caucasian Americans) used in other studies focused on ethnic differences in students' achievement attributions.

2. Consistent with the literature focused on ethnicity (see Phinney, 1996, for a review of this literature), the terms "ethnic background", "culture" and "ethnicity" were judged as interchangeable. These terms refer to broad groupings of Canadians on the basis of both race and culture of origin. In the study, "ethnicity" is used as a broad category to connote students' place of origin, namely the particular part of the world (continent) their parents came from. This approach was employed because a more fine grained categorization of the students into more homogeneous subgroups would have led to categories too small to be statistically viable (see Phinney, 1996, for a similar argument).

3. Practical guidelines and recommendations in the literature (Entwisle & Astone, 1994; Phinney, 1996) aimed at measuring youth's ethnicity provided the framework for the questions used in the study. As a result, two groups of questions inquiring about participants' ethnicity were constructed.

The first group included questions inquiring about (a) place (country) of birth of the student; (b) place of birth of the student's parents and (c) self-identification of race

(see Appendix A for the specific questions). According to Entwisle and Astone (1994) these types of questions help determine ethnic category unambiguously for research purposes. For instance, questions inquiring about place of birth of both parents are highly recommended in cases of mixed-race parentage (e.g. Asian/Caucasian). In addition, Entwisle and Astone (1994) point out that an important principle is to allow youngsters to identify themselves rather than be classified by a researcher. Following this principle, a question inquiring about students' self - identification of race was included. It should be noted that although the major purpose of this question was to get students' race unambiguously, it was not worded explicitly in terms of race. Phinney (1996) suggests that it is preferable to avoid the use of term "race" because of the wide disagreement in the literature regarding its meanings. The author argues that race is a socially construed concept and it is often associated with "the way in which one is responded to by others, on the basis of visible racial characteristics, most notably skin color and facial features" (p.919). In this study, these aspects of race were subsumed under the term ethnicity.

The second group included questions inquiring about (a) age at which immigration to Canada took place (if the student was born abroad), (b) native (first) language, (c) language spoken at home and (d) language used for discussing important issues with parents ("power language"). These questions were used to determine the level of acculturation. It has been increasingly recognized that ethnicity is a multidimensional construct requiring a consideration of additional variables that may explain its influence on psychological outcomes (Phinney, 1996; Sam, 1995). One such variable is a level of

acculturation. In general terms, acculturation refers to the extent to which individuals have maintained their culture of origin or adapted to the larger society (Berry, 1990). Berry, Kim, and Boski (1988) found that acquisition of the "dominant" language was one of the most important areas of immigrants' acculturation and one of the most rapidly changed acculturation areas from one generation to another. Hence, the main focus in this section of the questionnaire on "language variables". In addition, language used at home appears to be a core characteristic of the acculturation process that many accounts agree on (Berry, 1990; Rosental & Feldman, 1990; Sam, 1995). An example of the coding scheme used to determine level of acculturation can be found in Appendix B.

Finally, information about students' grades in the areas of mathematics, science, language arts, and social studies was obtained by means of self-report.

Students' Attributions for Success and Failure. (Appendix A) The attributions were studied by means of The Survey of Achievement Responsibility -- SOAR (Ryckman & Rallo, 1983). According to the authors, the development of this instrument was motivated by the need to distinguish between attributions a student might normally make in one content or subject-matter domain and others (e.g., math/science vs. language/social studies). The authors posit that this possibility was overlooked in the research on attributions. The general view expressed in different attribution theories of one's attributions of causes of success and failure to ability, effort, task, and luck might obscure any specific views that may be unique to one domain of academic endeavor but not to others. Weiner's (1975) attributional model is the basis for the structure of the SOAR, a group-administered, multiple-choice questionnaire. This questionnaire follows the four

attributions proposed by Weiner (i.e., ability, effort, luck and task ease/difficulty) and two of the dimensions -- locus of causality and stability dimension. The controllability dimension was proposed by Weiner (Weiner, 1985) subsequent to the development of the SOAR; hence this dimension is not measured in the SOAR.

The SOAR is a 40-item questionnaire designed to assess a student's causal attributions for success and failure in specific school-achievement situations. It is appropriate for students from grade four through grade twelve.

Each item on the SOAR describes a school-related scenario for which the respondent must choose one of four possible causal attributions leading to the described situation: ability, effort, luck and task. The choice made represents the student's best explanation for the success or failure outcome presented in the scenario. The SOAR is divided into three broad areas of school achievement : language arts/social studies (LA/SS), math/science, and physical education. The area of mathematics/science consists of 16 items equally divided between success and failure situations. Each success item is paired with a failure item but the kinds of items are dispersed randomly within the instrument. The same principle is used for the language arts/social studies area. The area of physical education consists of eight items overall, equally divided between success and failure outcomes. For the purposes of this thesis, only the LA/SS and math/science content areas were included in the questionnaire.

It should be noted that the instrument permits only one of four possible attributions to be made for any item and, thus, the four subscales (ability, effort, task and luck) within each situation would not be statistically independent if all the choices were

treated as separate outcome variables. In previous studies, Mizokawa and Ryckman (1990) analyzed only the effort and ability attributions aggregated over the eight replications thus removing the statistical constraints. In the present study, the same principle was employed not only to attributions to ability and effort but also to attributions to task and luck. Thus, the statistical analyses were performed separately for the first pair of attributions, namely ability/effort and for the second pair of attributions-- task/luck. In sum, for the purposes of the present study a total of 16 subscales was used: two outcomes (one success, one failure) by two subject areas (language arts/social studies, mathematics/science) by the four causal attributions (effort, ability, task, luck).

The scoring of the answers was done by giving one point to a chosen cause. No points were given for the causes that were not chosen. Thus, the relative weight for a cause within an outcome (success or failure) by subject area (mathematics or language arts) condition could range from zero to eight.

The choice of this particular measure was determined by the research goals pursued in this study. This measure is the only one that assesses directly domain specificity in students' attributional beliefs, a central research question of the present study. Further, the psychometric characteristics of the SOAR seem adequate. The two content areas and attributional responses are the most reliable scales of the SOAR (Ryckman, Peckham, Mizokawa, & Sprague, 1990). Internal consistency (alpha coefficients) for the Language Arts and Math/Science scales ranged from .39 to .75; test- retest reliability ranged from .44 to .75. A comparison of SOAR's reliability data and the reliability data of the study sample is presented in Table 1.

Table 1. Coefficient Alpha Reliabilities of the SOAR Subscales

Scales	No. of Items	Ranges and Median of SOAR's Coefficient Alpha Reliabilities (Based on three studies)		Coefficient Alpha Reliabilities for the Sample in the Study
		Range	Median	
Math/Science				
Success	8			
Ability		.64 - .75	.67	.71
Effort		.68 - .74	.70	.72
Task		.42 - .65	.47	.39
Luck		.48 - .56	.48	.50
Failure	8			
Ability		.57 - .75	.60	.62
Effort		.66 - .73	.69	.64
Task		.42 - .47	.45	.51
Luck		.28 - .50	.39	.44
Language Arts/Social Studies				
Success	8			
Ability		.60 - .76	.66	.54
Effort		.69 - .73	.71	.73
Task		.45 - .63	.47	.41
Luck		.36 - .56	.56	.63
Failure	8			
Ability		.52 - .75	.53	.54
Effort		.74 - .75	.75	.75
Task		.47 - .51	.48	.50
Luck		.47 - .51	.48	.50

Additional reliability and validity information for the three content areas was reported recently in research using the SOAR by Ryckman, Peckham, Mizokawa and Sprague (1990). Overall findings were that content validity is high with a high degree of interrater reliability among the judges. However, the only information provided by the authors is that the judgment of 17 raters on the content of the instrument was consistent, with agreement upon 28 items out of 40. The items that elicited disagreement were

subsequently revised. Internal consistency reliabilities for the whole instrument are adequate, ranging from .27 to .75. Test-retest reliabilities showed stability over a two-month interval (ranged from .32 to .83). These reliability data evinced that the SOAR effectively captures individuals' attributional characteristics persistent over time. The correlations between each of the SOAR scales and the self-report of ability in terms of self-reported grades were generated to check for congruence between self-perceived ability in a content area and the student's attribution profile for the same and for different content areas.

The authors reported that the mean correlations between the SOAR subject area scales and self-reported grades were higher within subject area than between subject area (within-subject area correlations ranged from .17 to .26; between-subject area correlations ranged from .09 to .13), providing modest support for subject area differentiation relative to one's own ability and self-reports of school grades. Correlations between the SOAR subject area scales and California Achievement Test percentile ranks in reading, language, and math were statistically significant, though low in magnitude, consistent with reports on other instruments. The correlations between a content-area subscale on the SOAR and measured achievement were generally greater than correlations between a content-area subscale and achievement in dissimilar areas of content. On the whole, attributions correlated less with measured achievement than with self-reported grades, which is consistent with prior research with others scales (for a review, see Stipek & Weisz, 1981).

In conclusion, the review of the reliability and validity data on the SOAR suggested that this instrument was sensitive to subject area differentiation and its use for the purposes of this thesis was justified.

Overview of Dweck's Assessment Approach to Implicit Theories of Intelligence. In Dweck's research, participants' entity versus incremental theory was assessed by a three-item questionnaire. According to Dweck, only three items were used because "implicit theory is a construct with a simple unitary theme, and repeatedly rephrasing the same idea may lead to confusion and boredom on the part of the respondents" (Dweck et al., 1995, p. 269). One possible disadvantage of having a small number of items in a measure is that it may lead to low internal reliability because, psychometrically, internal reliability of a measure is positively related to the number of items in the measure. Despite this possibility, Dweck's scale showed high internal reliability across studies (coefficient alpha ranged from .94 to .98). Thus, the possible psychometric disadvantage that a small number of items may lead to low internal reliability did not hold in this case.

The three items in the implicit theory of intelligence measure were: (a) "You have a certain amount of intelligence and you can't do much to change it"; (b) "Your intelligence is something about you that you can't change very much"; and (c) "You can learn new things, but you can't really change your basic intelligence." Respondents indicated their agreement with these statements on a 6-point scale from 1 (strongly agree) to 6 (strongly disagree). Therefore, only entity theory statements were included. Past studies (Boyum, 1988; Leggett, 1985, cited in Dweck et al., 1995) showed that the inclusion of incremental theory statements compelled respondents who endorsed items

depicting an entity theory to endorse also the opposite theory and their scores drifted toward incremental choices over items. At the same time, in a study by Henderson (1990, as cited in Dweck et al., 1995) respondents were given the implicit theory of intelligence measure and asked to explain their answers. Those who disagreed with the entity statements gave clear incremental theory justifications.

To score this questionnaire, Dweck and her associates (Dweck, Chiu, & Hong, 1995) averaged the scores on the three items to form an overall implicit theory score (ranging from 1 to 6), with a higher score indicating a stronger incremental theory. Further, the authors classified participants as entity theorists if their overall implicit theory score was 3.0 or below and as incremental theorists if their overall score was 4.0 or above. Using this criterion, about 15% of the participants, who scored in the middle, were typically excluded, and the remaining 85% tended to be evenly distributed between the two implicit groups.

As noted above, the authors reported high internal reliability for the implicit theory of intelligence measure (alpha ranged from .94 to .98). The test-retest reliability of the measure over a 2-week interval was .80. The results from six validation studies (Dweck et al., 1995) showed that implicit theory measures were independent of the respondents' sex and age. The intelligence theory measure is not confounded with the Paulhus (1984) Social Desirability Scale. As far as discriminant validity is concerned, the measure is not related to measures of cognitive ability (Scholastic Aptitude Test scores) or self-esteem (Coopersmith, 1967). Finally, a modest but significant association was found between a belief in internal control and an incremental theory of intelligence.

In summary, the implicit theory measure of intelligence appears to be a reliable and valid measure of the construct.

Notwithstanding the impressive array of psychometric evidence assembled by Dweck et al.(1995), there are a couple of measurement issues that need to be addressed.

1. A careful examination of the specific items reveals that when "intelligence" items are juxtaposed with "morality" items, the former are all phrased in terms of second-person pronouns ("You have a certain amount of intelligence and you can't do much to change it"), and the latter in terms of the impersonal, nonspecific "one", "a person" ("A person's moral character is something very basic about them and it can't be changed very much." (Dweck et al., 1995, p. 269). Does this make any difference? Perhaps not but as Peterson (1995) points out "the wording of specific items should be carefully examined vis a vis the abstract interpretation of the constructs they purportedly measure" (p. 308). As discussed in the literature review, Dweck et al. (1995) postulated that an implicit notion of intelligence provides a general framework within which people (children) conceptualize their own attributes and abilities. In addition, the comparison between Wiener's and Dweck's motivational models revealed that beliefs about one's own ability were best tapped by attributions, and beliefs about ability/intelligence in general were best reflected in implicit theories. This was one of the methodological concerns taken into account in the development of "implicit theory" items used in the present study. Efforts were directed towards achieving a maximum differentiation between these two sets of beliefs. It was decided to make this distinction more explicit by means of changing the referent in the statements. All items were worded in a more "impersonal fashion." ("some

kids", "every student"). This change was made in order to avoid any possible confusions with a reference to one's own abilities or intelligence. This is also consistent with Dweck's formulations of the items for her studies of the implicit theories of personality and morality, for example, "Everyone is a certain kind of person and there is not much that can be done to really change that" or "A person's moral character is something very basic about them and it can't be changed very much." (Dweck et al., 1995, p. 269).

2. Dweck et al.(1995) explained that they assessed only agreement with entity items, as opposed to entity <u>and</u> incremental items, because respondents presented with both types of items often agree with both: "Incremental items are highly compelling." While it is reasonable to accept the authors' rationale, supported in several studies, that disagreement with entity items means a greater likelihood of incremental thinking, it is equally possible that there may be students who could simultaneously entertain both sets of beliefs/theories. In addition, Dweck et al. (1995) use cutoffs to designate entity versus incremental theorists. About 15% of subjects in the middle are thereby ignored. Perhaps these individuals do not have a strongly held belief about intelligence fixedness versus malleability.

This point was particularly relevant to the present study. One of the purposes of the study was to explore whether students might hold simultaneously different types of implicit beliefs in more narrow domains, for example, entity beliefs in the area of mathematics achievement vs. incremental beliefs in the area of language arts achievement. Thus, it was decided to include items pertaining to both theories and to preserve data from students who scored in the middle range.

<u>Items Tapping Implicit Beliefs about Intelligence Used in the Study</u> (Appendix A).

Overall, 10 "implicit theory" items were developed. The following considerations were

taken into account in the construction process:

1. Since the anticipated domain specificity in implicit beliefs was "extracted"

from empirically obtained domain specificity in attributions, items pertaining to the areas

of math/science and language arts/social studies had to be developed.

2. The format of the instrument had to be such that both entity and incremental

items were included.

3. In contrast to Dweck's scoring procedure, the scoring had to allow the inclusion

of "the middle" of the study sample.

4. In accord with Dweck's approach, a small number of items had to be included.

5. Compared to the items used by Dweck and her associates (Dweck, Chiu, &

Hong, 1995), the nonspecific "some kids" had to be used here instead of the second-

person pronouns ("you", "yours") that were used in Dweck's formulations. The rationale

for this change was presented in the previous section.

As a result, students' implicit beliefs were studied by means of a 10-item self-

report measure. The measure was designed following closely the description of the scale

for measuring implicit theories of intelligence by Dweck, Chiu, and Hong (1995), namely

the emphasis was on stability/instability of intelligence/abilities. A "structured alternative

format" (Harter, 1980) was employed, designed to offset children's tendency to give

socially desirable responses and to include opposite statements. The students were

presented with two opposite statements. First, the students had to decide which one of the

statements reflected their beliefs the most and second, to decide whether the chosen statement was "sort of true" or "really true" (Harter, 1980) for them.

The statements pertaining to the areas of language arts and mathematics followed the same principle but particular abilities were specified rather than referring to intelligence and ability in general.

In summary, the scale tapped three different areas of student's implicit beliefs, along an unchangeable (stable) to changeable (unstable) continuum. One of the areas tapped issues involving what the students think about smartness or intelligence in general. The two items pertaining to this area were averaged to form a "general intelligence" score. Each of the two remaining areas consisted of four items that were averaged to form a "mathematics/science intelligence" score and a "language arts/social science intelligence" score respectively. Each item was scored on an ordinal scale from 1 to 4 where a score of 1 indicates the maximum "fixed or stable theory" of intelligence, and a score of 4 indicates the maximum "incremental or unstable theory" of intelligence.

Further, a pilot study with 29 students on the beliefs measures used in the present study showed internal reliability (alpha coefficients) of .60, for general beliefs (based on two items), .73, for beliefs about abilities in language arts/social studies (based on 4 items) and .70, for beliefs about abilities in math/science (based on 4 items).

Procedure

The study was conducted on different dates of the Fall Term of 1997 for the different schools, during the regular school time. Overall, the measures took

approximately 45 minutes to complete. The students for whom consent was not obtained were organized by the class teacher.

The questionnaire was administered by the researcher. Students were informed that all data files would be coded to preserve confidentiality. The researcher read the general instructions (see Appendix A) to the class and answered questions, if there were any. Once the students started working, any questions were answered individually by the researcher.

Design and Analyses

The hypotheses and research questions stated in Chapter 3 require:

1. Analyses that seek to detect ethnic and domain differences in attributions for success and failure situations.

2. Analyses that seek to detect ethnic and domain differences for beliefs about intelligence, as well as to describe the relations between the general and specific (i.e., intelligence/abilities in the areas of math/science and language arts/social studies) measures of beliefs.

3. Analyses that describe the relations that exist between attributional patterns, on the one hand, and beliefs about intelligence, both general and specific, on the other.

Ethnic and domain differences can be analyzed by comparing the ethnic groups on their scores for each of the ability, effort, task, and luck scales, across the two domains (math/science vs. language arts/social studies) and outcomes (success and failure). These comparisons, due to their large number and the multiple dependent measures are best carried out in the context of a multivariate analysis of variance. Further, frequency of

attributions to ability, effort, task, and luck and their underlying dimensions should be considered jointly when distinguishing the maladaptive and adaptive attributional patterns. Ethnic differences for "pattern" data would be reflected in different distributions of the ethnic groups across the maladaptive and adaptive pattern categories. Domain differences for "pattern" data would result in different distributions across the maladaptive and adaptive patterns for the domains of math/science and language arts/social studies. Nonparametric measures of association, Gamma coefficient and methods for comparing related-group means and distributions (Wilcoxon Matched-Pairs Signed-Rank test, Sign Test) are appropriate for approaching these data.

Ethnic differences in beliefs about intelligence would be reflected in the different distributions of the ethnic groups across the beliefs measures (χ^2), or in differences as established by independent groups t-tests, when beliefs variables are treated as representing a continuum. Relations between beliefs measures will be assessed by nonparametric measures of association. Comparisons of distributions for each pair of variables will provide a way of assessing differences between domains. Because of the nature of the data (categorical to ordinal), nonparametric methods for comparing distributions of related samples are appropriate for the latter task (for a review of these methods, see Bohrnstedt & Knoke, 1988, pp. 305-313). These analyses should be conducted for the group as a whole and for the two ethnic groups separately in order to account for eventual interactions between domain and ethnicity.

The analyses of the relations between attributional patterns and beliefs about intelligence require a test of the theoretically derived proposition that students who

demonstrate the maladaptive attributional pattern will be predominantly "entity" theorists, whereas students exhibiting an adaptive attributional pattern will be predominantly "incremental" theorists. This proposition, assuming underlying dimensionality of the beliefs measures, can be approached in the context of multivariate analysis of variance with the beliefs measures as dependent variables and attributional pattern as a between-subjects factor. Correlations between attributional patterns and beliefs about intelligence will allow the assessment of the strength of the relation. Multiple regression analysis with attributional pattern as the criterion variable and belief measures as predictors will allow further exploration of the relation between beliefs and attributions. In addition, by comparing the predictive power of the beliefs measures, multiple regression analysis would contribute to the evaluation of the domain differences in beliefs about intelligence.

Chapter Four

Results

<u>Analyses of Attributions</u>

The analyses in this section were aimed at detecting ethnic and domain differences in: (a) the attributions of success and failure to ability, effort, task, and luck, and (b) the distribution of participants across the levels of the attributional pattern variable, yielded by the joint consideration of these attributions.

Group means and standard deviations for all students as a group, as well as for the two groups separately, across the two domains and outcome situations are displayed in Table 2. The analyses, however, were performed for attributions of ability and effort separately from the analyses of attributions of task and luck in order to remove the statistical constraint discussed in the previous chapter.

<u>Effort and Ability</u>

Attributions to ability and effort were the dependent variables in a Multivariate Analysis of Variance (MANOVA) with domain (math/science vs. language arts/social studies) and outcome (success vs. failure) as within-subjects factors and group (Asian vs. Caucasian) as a between-subjects factor. For all multivariate tests, Pillai's criterion was used to evaluate multivariate significance because of its robustness (Tabachnick & Fidell, 1989, p.379).

The analysis revealed a significant main effect for outcome, multivariate $\underline{F}$ (2, 201) = 11.59, $\underline{p}$ < .01, that was significant for attributions to effort at the univariate level, $\underline{F}$ (1, 202) = 9.96, $\underline{MSe}$ = 4.23, $\underline{p}$ < .01. Overall, students attributed success outcomes significantly more to effort than failure outcomes to a lack of effort. This effect, however,

was qualified by a significant domain by outcome interaction, multivariate $\underline{F}$ (2, 201)=5.83, $\underline{p}$ < .01, indicating at the univariate level that the pattern of attributions to effort was not consistent across domains, $\underline{F}$ (1, 202) = 11.27, $\underline{MSe}$ = 1.53, $\underline{p}$ < .01. In addition, the three-way interaction of group by domain by outcome was significant, multivariate $\underline{F}$ (2, 201) = 3.28, $\underline{p}$ < .05, as was the two-way group by domain interaction, multivariate $\underline{F}$ (2, 201) = 3.42, $\underline{p}$ < .05.

Table 2. Group means (standard deviations) of attribution scores by domain and outcome.

Group	Math / Science		Language arts/Social studies	
Attributions	Failure	Success	Failure	Success
All students (N = 204)				
Ability	1.41 (1.57)	1.54 (1.75)	1.16 (1.36)	1.40 (1.49)
Effort	3.74 (2.02)	4.60 (2.25)	4.26 (2.38)	4.53 (2.30)
Task	1.36 (1.41)	.97 (1.14)	1.23 (1.35)	1.09 (1.18)
Luck	1.42 (1.32)	.84 (1.14)	1.28 (1.35)	.94 (1.37)
Caucasian (N = 58)				
Ability	1.55 (1.81)	1.43 (1.82)	1.16 (1.58)	1.97 (1.82)
Effort	3.59 (1.98)	4.33 (2.40)	4.21 (2.33)	4.17 (2.30)
Task	1.17 (1.20)	1.15 (1.35)	1.09 (1.19)	.95 (1.10)
Luck	1.62 (1.35)	.97 (1.14)	1.40 (1.35)	.81 (1.28)
Asian (N = 146)				
Ability	1.36 (1.47)	1.58 (1.73)	1.16 (1.28)	1.18 (1.27)
Effort	3.80 (2.01)	4.71 (2.19)	4.28 (2.40)	4.68 (2.30)
Task	1.43 (1.49)	.90 (1.04)	1.29 (1.41)	1.14 (1.21)
Luck	1.34 (1.30)	.79 (1.10)	1.24 (1.35)	.99 (1.41)

In order to explore these interactions in a greater detail, the following analyses were performed.

Attributions to effort and ability in failure situations only were the dependent variables in a MANOVA with domain (math/science vs. language arts/social studies) as a

within subjects factor and group (Asian vs. Caucasian) as a between subjects factor. The analysis revealed a significant main effect for domain, multivariate F (2, 201) = 6.76, p < .01. Univariate tests revealed that the students attributed failure outcomes to effort more often in language arts/social studies than in math/science, F (1, 202) = 13.57, $\underline{MSe}$ = 1.85, p < .01. On the contrary, attributions to ability for failure outcomes were made more often in math/science than in language arts/social studies, F (1, 201) = 4.35, $\underline{MSe}$ = 1.65, p < .05. Given that attributions to ability in failure situations are one of the defining features of the maladaptive attributional pattern, and that attributions to effort in failure situations are a defining feature of the adaptive attributional pattern, the differences described above clearly indicate that the two domains are perceived differently by students. The students seem to feel more confident in their abilities to manage language arts/social studies content.

Attributions to effort and ability in success situations only were the dependent variables in a MANOVA with domain as a within-subjects factor and group as a between-subjects factor. The analysis yielded a significant group by domain interaction, multivariate F (2, 201) = 6.23, p < .01, which was significant only for ability at the univariate level, F (1, 202) = 9.70, $\underline{MSe}$ = 1.89, p < .01. The effect was due to Asian students' attributing success to ability significantly less often in language arts/social studies success situations than in mathematics/science success situations. Their attributions to ability for language arts/social studies success were also significantly lower than those of Caucasian students. The latter maintained a constant level of ability attributions across the two domains.

<u>Task Ease/Difficulty and Luck</u>

Attributions to task and luck were the dependent variables in a MANOVA with domain (math/science vs. language arts/social studies) and outcome (success vs. failure) as within subjects factors, and group (Asian vs. Caucasian) as a between subjects factor. The analysis yielded a main effect for outcome, multivariate F (2, 201) = 12.97, p <.01, which held true only for attributions to luck at the univariate level, F (1, 202) = 21.82, $\underline{MSe}$ = 1.97, p < .01. Students made significantly more attributions to luck in failure situations than in success situations. For failure situations no differences were found across domains and groups in attributions to task and luck. For success situations the only significant result was the group by domain interaction, multivariate F (2, 201) = 4.74, p < .05, which indicated differences in the attributions to task at the univariate level, F (1, 202) = 5.45, $\underline{MSe}$ = .78, p < .05. The interaction reflects opposite patterns in attributing success to task ease/difficulty for the two groups: Caucasian students made more attributions to task easy for mathematics/science success than for language arts/social studies success; Asian students perceived their success as determined by task easy more often in the language arts/social studies domain than in the mathematics/science domain.

<u>Attributional Patterns across Acculturation Levels</u>

The possible influence of acculturation on attributions was tested with the same tests that were applied to the overall sample. The level of acculturation was determined by means of a coding scheme (see Appendix B). This coding scheme was applied only to the students from East-Asian backgrounds. Based on this scoring procedure, 49 students

were classified as "least acculturated" and 97 students were classified as "most acculturated."

<u>Effort and Ability</u>

Attributions to effort and ability were the dependent variables in a MANOVA with domain and outcome as within subjects factor and level of acculturation (least acculturated vs. most acculturated) as a between subjects factor. The analysis revealed a significant main effect for domain, multivariate $\underline{F}$ (2, 143) = 5.32, $\underline{p}$ < .01, that was significant for attributions to ability at the univariate level, $\underline{F}$ (1, 144) = 10.71, $\underline{MSe}$ = 1.04, $\underline{p}$ <. 01. Students attributed either their successes or failures to ability more often in the area of math/science than in the area of language arts/social studies. There was also a significant main effect of outcome, multivariate $\underline{F}$ (2, 143) = 11.14, $\underline{p}$ < .01. Univariate tests revealed that this effect was significant only for attributions to effort, $\underline{F}$ (1, 144) = 17.03, $\underline{MSe}$ = 3.85, $\underline{p}$ < .01. Overall, students attributed successful outcomes significantly more to effort than failure outcomes to a lack of effort. In addition, a significant domain by outcome interaction emerged, multivariate $\underline{F}$ (2, 143) = 4.50, $\underline{p}$ < .01.

In order to examine further this interaction, attributions to ability and effort in failure situations were the dependent variables in MANOVA with domain as within subjects factor and level of acculturation as between subjects factor. The analysis revealed a significant main effect for domain, multivariate $\underline{F}$ (2, 143) = 3.08, $\underline{p}$ < .05. Univariate analyses showed that students attributed their failures to lack of effort more often in language arts/social studies than their failures in math/science, $\underline{F}$ (1, 144) = 6.20, $\underline{MSe}$ = 1.82, $\underline{p}$ < .01.

Attributions to effort and ability in success situations only were the dependent variables in a MANOVA with domain as a within-subjects factor and group as a between-subjects factor. The only significant result was a main effect of domain, multivariate F (2, 143) = 3.68, p < .05, which was significant only for ability at the univariate level, F (1, 144) = 4.97, MSe = 1.79, p < .05. The students attributed their successes to ability more often in math/science than their successes to ability in language arts/social studies.

As revealed in these analyses the patterns of results for effort and ability attributions obtained with the whole sample were preserved when the analyses were applied only to East-Asian students. This was true also for the patterns of results for task and luck attributions and, therefore, they are not reported.

Attributional Patterns

The analyses of attributional data that follow are based on categorizing the subjects as exhibiting one of the three patterns: maladaptive, undetermined, and adaptive, in each of the domains of math/science and language arts/social studies. Students were classified as exhibiting the maladaptive attributional pattern if at least one of the following was met: they chose ability as an explanation of failure in at least 4 of the eight failure situations in each domain; they chose task ease and/or luck as an explanation of success in at least four of the eight success situations that they encountered in each domain. Students were classified as exhibiting an adaptive attributional pattern if at least two of the following criteria were met: they chose predominantly (4 times or more) effort as an explanation of outcome in failure situations, and they chose effort or ability 4 times or more as an explanation of outcomes in success situations. All subjects who did not

meet these criteria were classified as "undetermined." The few cases of "ties" within a

domain were classified as "undetermined," as well. The distribution of the students in the

three attributional pattern categories is described in Table 3.

Comparisons of the distributions across groups revealed that students were

uniformly distributed across the attributional patterns for both the areas of math/science

and language arts/social studies, $\chi^2(2) = 1.94$, n.s., for math/science, and $\chi^2(2) = .29$, n.s.,

for language arts/social studies. At the same time, there was a strong association between

the classifications of students in the two domains, $\gamma = .52$, $p < .01$, for the whole sample,

and $\gamma = .47$, $p < .01$ and $\gamma = .54$, $p < .01$, for Caucasian and Asian students, respectively.

Wilcoxon matched-pairs signed rank tests failed to find significant differences in

distributions for math/science and language arts/social studies within each of the ethnic

groups and the sample as whole.

Table 3. Frequency distribution (percentage) of subjects across atributional patterns by group for the domains of math/science and language arts/social studies

Domain	Attributional pattern		
Group	Maladaptive	Undetermined	Adaptive
Mathematics/Science			
Caucasian	13 (22.4 %)	21 (36.2 %)	24 (41.4 %)
Asian	21 (14.4 %)	57 (39.0 %)	68 (46.6 %)
All students	34 (16.7 %)	78 (38.2 %)	92 (45.1 %)
Language arts/Social Studies			
Caucasian	10 (17.2 %)	18 (31.0 %)	30 (51.7 %)
Asian	23 (15.8 %)	51 (34.9 %)	72 (49.3 %)
All students	33 (16.2 %)	69 (33.8 %)	102 (50.0 %)

These results indicate that the two groups exhibited similar incidence of maladaptive, adaptive and undetermined attributional patterns. The ratios did not change across domains. The comparisons of category frequencies, however, indicated that 92 students (45.1 %) had a different category membership in the two areas, with 17 (8.4 %) being included in opposite categories, that is, being classified as exhibiting the "adaptive" pattern in one area and "maladaptive" in the other.

Implicit Beliefs about Intelligence

The purpose of the analyses in this section is to explore the question of ethnic and domain differences in beliefs about intelligence. Ethnic differences will be evaluated by comparing the distributions of ethnic groups for the different belief measures. Next, the relation among the three belief measures will be assessed and the distributions of subjects for each pair of measures will be compared.

Students' responses to the "beliefs about intelligence" section of the questionnaire were categorized by means of a 3-point scale along the dimension "entity" (stable) theory -- "incremental" (unstable) theory, with 1 assigned to entity theory, 2 -- to undetermined, and 3 -- to incremental theory. Categorization was based on the mean response score across all items that pertained to a particular domain (beliefs related to "math/science intelligence", beliefs related to "language arts/social studies intelligence", and beliefs about intelligence in general). The distribution of the subjects across these categories is depicted in Table 4.

The first set of analyses on the "beliefs about intelligence" measures was aimed at identifying a predominant view of intelligence that might characterize a given ethnic

group. Crosstabulations of group and the measures of beliefs about general, math/science and language/social studies "intelligence" failed to find differences in the distributions of beliefs across groups, $\chi^2(2)$ = .49, .45, and 1.49, all non-significant. The same was the result when the beliefs variables were treated as representing a continuum: t-tests for independent samples with ethnicity as a grouping variable failed to detect differences in the prevalence of one or another theory in the views of the ethnic groups.

Table 4. Frequency distribution (percentage) of subjects across beliefs about intelligence categories by group and beliefs measure

Beliefs measure	Beliefs about intelligence		
Group	Entity theory	Undetermined	Incremental theory
General beliefs			
Caucasian	7 (12.1 %)	8 (13.8 %)	43 (74.1 %)
Asian	13 (8.9 %)	21 (14.4 %)	112 (76.7 %)
All students	20 (9.8 %)	29 (14.2 %)	155 (76.0 %)
Beliefs related to math/science			
Caucasian	5 (8.6 %)	6 (10.3 %)	47 (81.0 %)
Asian	12 (8.2 %)	11 (7.5 %)	123 (84.2 %)
All students	17 (8.3 %)	17 (8.3 %)	170 (83.3 %)
Beliefs related to language arts/social studies			
Caucasian	6 (10.3 %)	2 (3.4 %)	50 (86.2 %)
Asian	11 (7.5 %)	11 (7.5 %)	124 (84.9 %)
All students	17 (8.3 %)	13 (6.4 %)	174 (85.3 %)

The second set of analyses targeted the relations among the measures of beliefs about intelligence. All three measures were associated significantly as indicated by Gamma coefficients for the three pairs: general beliefs-beliefs related to language/social studies (γ = .75, p < .01), general beliefs--beliefs related to math/science (γ = .79, p < .01), and beliefs related to language/social studies -- math/science beliefs (γ = .84, p <

.01). The distributions of belief measures related to math/science and language/social studies did not differ, as indicated by Sign Test, Z = -.70. However, the comparisons of the general beliefs measure to each of the specific beliefs measures indicated significant differences, Z = -2.51, p < .01, for the comparison with beliefs related to language arts/social studies, and Z = -2.31, p < .05, for the comparison to beliefs related to math/science. These differences indicate that the general beliefs measure has a different distribution compared to the distributions of the specific beliefs measures.

In order to explore the nature of these differences, the same set of analyses was repeated for each group separately. The associations between the variables remained strong. Caucasian students had Gamma values of .90, p < .01, for the general beliefs -- beliefs related to math/science pair; .72, p < .01, for the general beliefs -- beliefs related to language/social studies pair; and .87, p < .01, for the beliefs related to language/social studies -- beliefs related to math/science pair. Asian students' data yielded Gamma values of .72, p < .01, .71, p < .01, and .83, p < .01, for each of the variable pairs, respectively. Sign tests, comparing distributions of the three pairs of belief measures for the Caucasian-Canadian group, yielded a significant difference between distributions for the general beliefs measure and the measure of beliefs in the area of language arts/social studies, p < .05. Sign tests for the Asian-Canadian group failed to yield significant results.

These differences reflect differences in categorization of subjects under each variable. Thus, for beliefs about math/science abilities and beliefs about language arts/social studies abilities pair, 33 (16.2 %) students had different category membership across variables, and 13 (6.3 %) held opposite "theories". For the general beliefs - beliefs

about language arts/social studies abilities pair these numbers were 46 (22.5 %) and 16 (7.8 %). For the general beliefs -- beliefs about math/science abilities pair the numbers were: 43 (20.6 %) and 14 (6.8 %).The ratios were similar within ethnic groups, ranging from 13.8 % to 23.3 % for all students with different categories, and from 5.1 % to 8.2 % for students with opposite theories according to the different classifications.

<div align="center">Relations between Attributions and Implicit Theories of Intelligence</div>

The first set of analyses was aimed at testing the proposition that an "entity" theory of intelligence will be observed predominantly in students demonstrating a maladaptive attributional pattern, while "incremental" theory will be shared more often among students classified as demonstrating an adaptive attributional pattern. In the context of the coding scheme for the implicit beliefs measures and if the proposition was true, one should expect that the mean scores of the theory measures for the maladaptive attributional pattern will be significantly lower than the mean scores for the adaptive pattern.

To test this, multivariate analyses of variance with the three theory measures as dependent variables and attributional pattern as a grouping variable were performed for the attributional patterns in the areas of math/science and language arts/social studies separately, as well as for all students and the ethnic groups separately.

The values of the scores for attributional pattern in the area of language arts/social studies differed significantly at both multivariate, F (6, 400) = 4.61, p < .01, and univariate levels, F (2, 201) = 5.61, MSe = .40, p < .01 for general beliefs; F (2, 201) = 12.15, MSe = .31, p < .01 for beliefs about intelligence in language arts/social studies,

and F (2, 201) = 5.12, MSe = .34, p < .01 for beliefs in math/science. For all three measures the differences were in the expected direction, namely, students classified as demonstrating a maladaptive pattern had lower mean values than students classified as exhibiting an adaptive attributional pattern (see Table 5).

Table 5. Language arts/social studies domain: Means and standard deviations by group, attributional pattern and dependent measure

Measure Pattern	All students			Caucasian			Asian		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
General beliefs									
Maladaptive	2.36	.78	33	2.30	.82	10	2.39	.78	23
Undetermined	2.62	.71	69	2.50	.86	18	2.67	.65	51
Adaptive	2.78	.52	102	2.80	.48	30	2.78	.54	72
Beliefs, Ma/Sc									
Maladaptive	2.45	.79	33	2.30	.82	10	2.52	.79	23
Undetermined	2.78	.57	69	2.83	.51	18	2.76	.59	51
Adaptive	2.82	.52	102	2.80	.55	30	2.83	.50	72
Beliefs, LA/SS									
Maladaptive	2.39	.86	33	2.50	.85	10	2.35	.88	23
Undetermined	2.71	.67	69	2.56	.86	18	2.76	.59	51
Adaptive	2.93	.29	102	2.97	.18	30	2.92	.33	72

Of the three measures of beliefs, the beliefs related to language arts/ social studies distinguished the attributional pattern groups the best: all three pair comparisons were significant, as revealed by Tukey HSD pair comparisons with a (3, 55^2) = 2.93, MSe = 31, p < .05. The other specific measure, that is, beliefs related to math/science-yielded

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[2] Harmonic mean (used when group sizes are unequal) was approximately 55.

significant differences between maladaptive and undetermined, a (3, 55) = 4.20, MSe = .34, p < .05, and maladaptive-adaptive pattern, a (3, 55) = 4.71, MSe = .34, p < .05 but failed to distinguish between undetermined and adaptive patterns. The general beliefs measure was least "sensitive." Tukey test yielded significant differences between the maladaptive and adaptive pattern groups only, a (3, 55) = 4.92, MSe = .40, p < .05.

Similar patterns of results were preserved in the analyses of the two groups. For Caucasian students there was a main effect for attributional pattern, multivariate F (6, 108) = 2.73, p < .05 but at the univariate level this effect was significant only for beliefs about intelligence in the language arts/social studies, F (2, 55) = 3.74, MSe = .36, p < .05. For Asian students, the multivariate main effect for attributional pattern, F (6, 284) = 3.26, p < .01 held true for both general beliefs about intelligence, F (2, 143) = 3.88, MSe = .39, p < .05, and for beliefs in the area of language arts/social studies, F (2, 143) = 9.64, MSe = .29, p < .01.

MANOVA of the measures in the area of math/science failed to identify significant differences at the multivariate level. At the univariate level only beliefs about intelligence related to math/science differed significantly across the levels of attributional pattern measure, F (2, 201) = 3.75, MSe = .20, p < .05. Respectively, this was a significant difference between the maladaptive and adaptive attributional patterns, Tukey a (3, 56) = 6.91, MSe = .12, p < .05 (see Table 6). These significant results, however should be treated cautiously given the nonsignificant MANOVA.

The exploration of the relations between attributional patterns and beliefs about intelligence requires analysis of their interrelations and predictive power. The patterns of interrelations for the sample as whole and the two groups are displayed in Table 7.

The intercorrelations for the overall sample indicate that while the language arts/social studies attributional pattern shows association with all three measures of beliefs, the pattern in math/science correlates only with the specific belief measure for this area-- beliefs about intelligence in math/science.

Table 6. Mathematics/science domain: Means and standard deviations by group, attributional pattern and dependent measure

Measure Pattern	All students			Caucasian			Asian		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
General beliefs									
Maladaptive	2.50	.79	34	2.31	.85	13	2.62	.74	21
Undetermined	2.68	.61	78	2.71	.64	21	2.67	.61	57
Adaptive	2.71	.62	92	2.71	.62	24	2.71	.62	68
Beliefs, Ma/Sc									
Maladaptive	2.50	.79	34	2.38	.77	13	2.57	.81	21
Undetermined	2.78	.55	78	2.86	.48	21	2.75	.58	57
Adaptive	2.82	.53	92	2.79	.59	24	2.82	.52	68
Beliefs, LA/SS									
Maladaptive	2.68	.68	34	2.46	.88	13	2.81	.51	21
Undetermined	2.73	.64	78	2.90	.44	21	2.67	.69	57
Adaptive	2.84	.50	92	2.79	.59	24	2.85	.47	68

Table 7. Correlations between attributional pattern and beliefs about intelligence.

Measure	All students (N=204)		Caucasian (N=58)		Asian (N=146)	
	LA/SS	Ma/Sc	LA/SS	Ma/Sc	LA/SS	Ma/Sc
General beliefs	.21**	.10	.28*	.20	.20*	.05
Beliefs, LA/SS	.36**	.11	.32*	.17	.33**	.08
Beliefs, Ma/Sc	.18**	.16*	.24	.22	.17*	.14

Note: * p < .05; ** p < .01

For the Caucasian group, this pattern was repeated but with weaker associations--the measure for attributions in language arts/social studies correlated with general beliefs about intelligence and beliefs related to language/social studies, while the attributional pattern for math/science failed to yield significant association. For the Asian group, the associations among all three measures of beliefs were significant for language/social studies, while the attributional pattern for math/science failed to reach significance.

Multiple regression with attributions as criterion and the three beliefs measures as predictor yielded the following results:

Attributional pattern in the area of language arts/social studies was predicted by the measure of beliefs in the area of language/social studies, $\beta=.28$, $t=3.56$, $p<.01$. None of the other predictors had a significant contribution to the overall prediction , multiple R = .34, $F(3, 300) = 8.84$, $p < .01$, although, as revealed by the correlations, these predictors did correlate significantly with attributions in language arts/social studies.

The overall regression with attributional pattern in math/science as a criterion and the three beliefs measures as predictors failed to reach significance when all three predictors were entered in the equation. Subsequent removal (partialling out) of the association of general beliefs measure increased the predictive power of the equation making the overall regression marginally significant, multiple R = .17, $F(2, 201) = 2.84$, exact $p = .0608$. Similarly, when the language/social studies beliefs measure was removed, the predictive power of the equation increased and the overall regression became marginally significant, multiple R = .16, $F(2, 201) = 2.80$, exact $p=.0629$. More

importantly, in both cases beliefs in the area of math/science were the strongest predictor

of math/science attribution pattern although only marginally significant, $\beta = .15$, t (2,

201) = 1.82, exact p = .0699, when general beliefs measure was removed, and $\beta = .15$, t

(2, 201) = 1.89, exact p = .0602, when the measure of beliefs about language arts/social

studies abilities was removed.

Chapter Five

Discussion

<u>Summary of Purpose, Research Questions and Results</u>

The purpose of the present study was to explore the relations between Weiner's

concept of "achievement attributions" and Dweck's concept of "implicit beliefs about

intelligence", with a special focus on ethnic and subject-domain differences as reflected

in Weiner's and Dweck's models of achievement motivation and behavior. Research

within the framework of Weiner's model has revealed that causal attributions do not

generalize across academic subjects (e.g., Marsh, Cairns, Relich, Barnes, & Debus, 1984;

Ryckman & Mizokawa, 1991). In addition, differences in attribution patterns were found

in cross-cultural studies of children from different cultures (e.g., Hess, Chang, &

McDevitt, 1987; Mizokawa & Ryckman, 1990; Whang & Hancock, 1994). Thus, there is

empirical support for the sensitivity of Weiner's model to the motivational dynamics

across domains and ethnicity.

Given the overlap between Dweck's and Weiner's models, and the sensitivity of

causal attributions to subject-area domains and ethnic differences, it was argued that

analogous differences could be detected in students' notions of intelligence. It is possible

that individuals hold different types of implicit beliefs in domains like mathematics vs.

language arts, and that different ethnic groups would be characterized by the

predominance of particular beliefs about intelligence. In particular, three sets of

hypotheses and research questions that pertained to ethnic and domain differences were

formulated for the three research areas of causal attributions, beliefs about intelligence, and the relations between the two constructs.

The analysis of attributions yielded the following results:

1. Students, in general, made more attributions to effort in situations of success than in situations of failure. On the contrary, there were significantly more attributions to luck in situations of failure than in situations of success.

2. With respect to domain, students attributed failure to effort more often in the language arts/social studies domain than in the math/science domain. Failure was attributed more often to ability in the area of math/science than in language arts/social studies area.

3. There were two significant results that pertained to the attributions of Asian-Canadian students: they made more attributions to effort in situations of success in the area of math/science than in the language arts/social studies area, but attributed language arts/social studies success to task ease more often than math/science success.

4. The analyses of the attributional pattern categories, based on the joint consideration of the attributions to ability, effort, task, and luck in success and failure situations, found that the two groups exhibited similar incidence of maladaptive, adaptive and undetermined attributional patterns; these ratios did not change across domains. It is noteworthy, however, that 92 students (45.1 %) of the students had different attributional pattern membership in the areas of math/science and language arts/social studies. Seventeen of them (8.4 %) exhibited an adaptive pattern in one area and a maladaptive pattern-- in the other.

The results from the analysis of the measures of beliefs about intelligence can be summarized as follows:

1. The three belief measures identified similar number of subjects for each of the three categories: entity, undetermined and incremental theory. All three measures were strongly associated with each other.

2. Comparisons of their distributions, however, revealed that only the specific beliefs measures (beliefs about math/science abilities and beliefs about language arts/ social studies) had similar distributions. The general beliefs measure differed significantly from the specific beliefs measures.

3. Students did not necessarily hold the same views about intelligence across domains. Comparisons of "category membership" across measures revealed that from 16.2% (33) to 22.5 % (46) of the overall sample changed "membership", and from 6.3% (13) to 7.8% (16) held opposite beliefs (entity vs. incremental) as classified by the different measures.

4. The pattern of results described in the paragraphs above was preserved in the separate analyses of the two ethnic groups.

Analyses that involved both attribution and beliefs measures yielded the following results:

1. For the attributional pattern classification in the area of language arts/social studies there was a clear support for the proposition that students who exhibit a maladaptive attributional pattern will hold a predominantly entity theory of intelligence, whereas students who demonstrate an adaptive attributional pattern will hold a

predominantly "incremental" theory of intelligence. The proposition was supported for

classifications under all three beliefs measures as well as for the sample as a whole and

the two groups separately. For the attributional pattern classification in the area of

math/science only the beliefs about math/science abilities revealed this correspondence

between attributional patterns and implicit theories.

2. The specific beliefs measures proved to be the best predictors for each

respective attributional pattern variable, as revealed by the multiple regression analyses

with attributional pattern as criterion and beliefs measures as predictors.

Ethnic Differences

The analysis of attributions failed to detect clearly expressed ethnic differences.

Overall, there were general findings that East Asian students used effort as an explanation

of success and failure more than they used ability, and success outcomes were attributed

significantly more to effort than were failure outcomes to a lack of effort. The effect of

outcome replicates findings from other research (e.g., Marsh, Cairns, Relich, Barnes, &

Debus, 1984; Mizokawa & Ryckman, 1990; Ryckman & Mizokawa, 1988;).

The above patterns of results, however, also held true for the Caucasian students.

Therefore, Asian students appeared more similar to than different from Caucasian

students in causal attributional beliefs, a result which is not consonant with findings in the

literature suggesting that Asian students can be characterized as demonstrating adaptive

attributional patterns and predominantly adaptive achievement motivation.

The two groups did differ when their attributions for success and failure were considered across the two domains: Asian-Canadian students showed more expressed distinction of the math/science and language arts/social studies areas. In success situations, they made more attributions to effort in math/science than in the language arts/social studies area; they also made more attributions to task ease in the language arts/social studies area than in the math/science area. Caucasian-Canadian students, on the other hand, were more consistent in their attributional patterns across areas. These differences, however, did not support the expectation for predominant effort attributions of Asian-Canadian students across areas in failure situations.

Further, the two groups did not differ in the incidence of the adaptive and maladaptive attributional patterns, when students were classified into pattern groups based on the joint consideration of their ability, effort, task, and luck attributions. These findings are important because they suggest that the differences described above, are differences in quantity rather than quality. That is, groups may differ on the frequency with which they attribute success and failure outcomes to one or another cause, but the differences are insufficient to define distinctive adaptive or maladaptive attributional patterns that will be expressed in different proportions of the pattern groups within the ethnic groups.

It should be noted that the latter type of analysis is not widely used in the literature on ethnic differences in attributions. Rather, it has been used in studies that concentrate on individual differences in motivational tendencies for the purposes of intervention (e.g., the "learned helplessness" studies by Diener & Dweck, 1980, Dweck, 1975). Studies on

ethnic differences in attributions usually compare groups on the individual causes and use these differences to infer broader group characteristics like Asian-American students' apparent ability to resist learned helplessness (Mordkowitz & Ginsburh, 1987). Although the present study does not invalidate the existence of such differences in the predominance of individual attributions, it suggests that the broader generalizations concerning group characteristics should be reexamined at the more general level of analysis.

The analyses of implicit theories failed to detect ethnic differences, as well. The possibility that East Asian students would predominantly "subscribe" to an incremental theory of abilities was not confirmed. As was discussed in the review, Henderson and Dweck (1990) suggested that their model may be sensitive to ethnic differences. There have been suggestions in the literature that ethnic differences found in attributions could be linked to ethnic differences in understanding of abilities or implicit theories of intelligence. This link has not been empirically researched. The present study's failure to detect ethnic differences in beliefs about intelligence, however, should not be considered as evidence that such differences do not exist, given that differences were not found in the patterns of attributions.

One possible reason for the failure to detect ethnic differences could have been the improper definition of the ethnic groups. A more fine grained categorization of the students, for example, one based on nationality, would have led to categories too small to be statistically viable. Another reason for the failure to detect ethnic differences could have been the influence of a confounding variable, for example, level of acculturation.

The analyses of the possible influence of acculturation, however, failed to provide support for this possibility.

Domain Differences

The analyses of attributions yielded a clearly expressed effect of domain in failure situations. Students attributed failure to effort more often in the language arts/social studies domain than in the math/science domain. On the contrary, failure was attributed more often to ability in the area of math/science than in the language arts/social studies area. It should be noted that effort and ability attributions in failure situations are considered to be the distinguishing criterion for classifying subjects as demonstrating an adaptive or a maladaptive attribution pattern. Thus the "double-dissociation" pattern of results clearly indicates that the two domains are sources of different experiences for the students in the sample. As it was argued in the analyses section, failure in math/science seems to be more anxiety provoking, and more a source of self-depreciating cognitions than is failure in language arts/social studies. These findings are in accord with domain differences in attributions found by others (e.g., Marsh, Cairns, Relich, Barnes, & Debus, 1984; Ryckman & Mizokawa, 1991).

In the present study, the comparisons of the attributional pattern categories in the domains of language arts/social studies and math/science revealed that a substantial number of students (92) had different "category membership" in the two domains, with 17 demonstrating an opposite attributional pattern. These results indicate clearly that it is

possible for students to entertain simultaneously opposite motivational tendencies in different domains.

The analyses of the beliefs measures yielded interesting results. At first glance, the measures did not differ substantially: they all correlated significantly with one another and no differences were found in the representation of one or another theory across measures. Related-group comparisons, however, revealed that behind these apparent similarities there were substantial differences. The general beliefs measure had a distinctively different distribution from the distributions of the specific beliefs measures. These findings were supported by the comparisons of the category frequencies across measures: from 33 (16.2%) to 46 (22.5 %) of the overall sample changed "membership", and from 13 (6.3%) to 16 (7.8%) held opposite beliefs (entity vs. incremental). The latter result clearly indicates that it is possible for students to entertain opposing beliefs related to different subject areas.

Further support for the domain effect in beliefs about intelligence came from the multiple regression analyses where the three belief measures were used as predictors for the attributional patterns in math/science and language arts/social studies. In both analyses the specific belief measure for the respective domain was the strongest predictor. This suggests that the specific measures differ from one another and that each one is related to an attributional pattern reflecting the same domain.

The results from the multiple regression analyses are also relevant for considering the relations between the two constructs - causal attributions and beliefs about intelligence. It should be noted that the relations that were found were rather weak,

especially for the area of math/science. This suggests that the relation between attributions and beliefs is not direct. Nevertheless such a relation exists, which was further confirmed by the test of the hypothesis that groups showing maladaptive attributional patterns will show significantly greater endorsement of an entity theory of intelligence than groups showing an adaptive attributional pattern and vice versa. The results of the test supported the hypothesized relation, and again, less distinctively for the area of math/science.

Summary and Conclusions

This study was designed to explore the relation between the constructs of implicit theories and attributions in motivation, with a special focus on ethnic and domain differences.

The study failed to detect substantial differences between broadly defined ethnic groups in their attributional patterns and beliefs about intelligence. Despite this failure, the results spoke to several research questions that seem a fruitful avenue for future research. First, there is a need for larger-scale studies that will allow for exploring differences between more precisely defined ethnic groups. Second, the influence of ethnicity on attributions should be studied at several levels of analysis if the eventual differences are to have an impact on school practice. The current research practice of tracing differences in the frequency of individual attributions does not allow for answering the question of whether "frequency" differences translate into maladaptive or adaptive motivational patterns.

The study provided evidence for the existence of domain differences in students' attributions of success and failure outcomes and implicit beliefs about intelligence. The former finding replicates results from studies in the field of attribution research; the latter finding is new when considered in the context of Dweck's model of academic motivation. With respect to theory and research, it indicates a need to explore not only the entity -- malleability distinction, but also to investigate the differences in motivation and achievement of students with generalized across- domain understanding of abilities and students who hold different implicit beliefs about intelligence in the different domains. Another important problem that needs further study is how exactly the different subject-domains, as construed in educational practice, differ from one another. This will allow for charting domain specific strategies for intervention and instruction that will optimize the effectiveness of students' performance and enhance their achievements.

<p style="text-align:center;"><u>Limitations of the Study</u></p>

The results from the analyses of ethnic and domain differences in the present study should be considered in the context of the sample and the particular measures that were used.

The selection procedure for the study reflected the attempt to capture the groups from ethnic backgrounds present in the public-school system of British Columbia. Due to the sample size, only two broad groups were formed -- East Asian Canadians and Caucasian Canadians, which corresponded to the groups most prominently represented in the 1991 Census demographic data broken down by school districts provided by the British Columbia Teachers Federation (Source: BCTF Information Handbook, 1995).

This precluded the possibility of a more fine grained analysis on a national-ethnic basis as recommended by Mizokawa & Ryckman (1990), as well as the inclusion of other prominent groups like students from East Indian and Hispanic ethnic backgrounds. Thus, the generalizing results with respect to ethnic differences should be confined to eighth-grade students in schools with ethnic composition similar to the study's.

With respect to domain differences, the results reflect the specifics of curricula in British Columbia's public schools, which are comparable to the curricula in the other provinces of the country despite some differences.

The attribution measure -- SOAR -- has been designed for use in the public school system of the United States. Similar structuring of domains and instructional methods, however, make the instrument applicable to Canadian school environment. Thus, the results from the present study are directly comparable with results from US studies that use the same instrument.

The measures of beliefs about intelligence, as constructed for the present study, differ from the measures applied by Dweck in three important aspects: (a) the present study included the "incremental theory" dimension in the items; (b) the format of the present study items allowed graded response for both the "incremental" and "entity" pole; (c) item content tested the nature of beliefs about abilities in specific subject areas in addition to abilities in general rather than intelligence in general only.

The third difference was related to the purposes of the study, in particular, to the need to establish content of implicit beliefs items parallel to this of the items included in

the attribution measure. The scale for general beliefs showed limited reliability coefficient and the scales for specific beliefs showed adequate reliability coefficients.

The items preserved the format and wording of the general beliefs measure. Classifications based on specific beliefs measures yielded similar ratios of category groups within the studied sample. These findings suggested that the inclusion of specific beliefs items did not influence the validity of the general beliefs scale. Further, the results from the multiple regression analyses provided some evidence for the construct validity of the specific beliefs scales, as discussed above.

The inclusion of an "incremental theory" dimension in the items, according to Dweck (Dweck, Chiu, & Hong, 1995), may result in a "drift" towards the incremental pole of the statements. This "drift" was reflected in the higher proportion of incremental theorists in the sample than that found in Dweck's studies. This, however, did not seem to invalidate the results from the present study. First, the age of the children that participated in the study is older than the age of children in Dweck's studies. Eighth-graders are capable of mentally reconstructing the missing opposite of the entity statement in Dweck's items and one should expect that if presented with such items students will be distributed across the beliefs categories in a manner similar to the present study. Nevertheless, this is an argument that requires empirical verification in future studies. Second, the validity of the present study's classification is supported by the prevalence of adaptive patterns among incremental theorists and maladaptive attributional patterns among entity theorists.

Finally, the different scale format (4-point instead of 6-point scale) in the present study does not impose substantial constraints on the interpretation of the results as compared to those of Dweck. Support for this claim can be found in the frequency of the "undetermined" category, which should not be influenced by the inclusion of the "incremental" pole in the items. In the present study, 14.2 % of the sample fell in this category according to the general beliefs measure, 8.3 % for the beliefs related to math/science ability measure, and 6.4 % for the beliefs about language arts/social studies abilities measure. These are proportions that are close to those reported by Dweck, Chiu, and Hong (1995).

Areas of Interest for Future Research

Suggestions for Improvement of the Present Study

The study revealed that implicit beliefs about intelligence have obvious heuristic appeal. For example, implicit beliefs may help explain why feedback linking outcomes to one or more attributions has differential effects. As discussed in the review, attribution theory predicts that attributing failure to low effort can lead to persistence and better future performance. In contrast, attributing poor performance (failure) to ability may have debilitating effects. One could expect, however, that effort feedback will be maximally effective with students who hold an incremental theory because an entity view is related to the belief that greater effort cannot produce better performance when ability is limited. These

predictions, however, may not generalize across domains. Thus, this is an interesting area of research that can be readily related to the present study.

Further research topics, however, would be more effectively pursued if the psychometric properties of the measure of implicit theories are established. Therefore, future efforts should be directed toward improvements of the implicit theories measure, with a special focus on reliability and validity studies.

Suggestions for related future research topics

The results from the study suggested that the role of the students vis a vis the educational environment could lead to the simultaneous entertainment of incremental and entity theories. More achievement research is needed in the classrooms. It would be informative to assess students' beliefs about intelligence at the outset of a school year and then follow students over time as they are exposed to classroom conditions that reinforce either an entity or an incremental perspective. It could be argued that teachers who give tasks in which greater effort pays off with higher grades may foster an incremental view; those who emphasize competition where ability equates with performance may cultivate an entity perspective.

Longer term studies are needed to determine whether theories generalize across domains. The results from this study suggest that it is possible that students think more in terms of specific domains of performance.

Research on the role of implicit beliefs in the context of Dweck's model of achievement motivation is called for. The relation of domain specific implicit

theories to the specific goals students pursue in different school subjects may provide additional evidence for domain specificity of implicit beliefs.

Finally, Dweck and Leggett (1988) found that perceptions of ability could moderate the effects of implicit theories on behavior. Research of how students' perceptions of competence affect achievement outcomes will help clarify the "operation" of implicit theories in achievement situations.

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Appendix A

Students' understanding of school abilities and success

Dear Student:

The purpose of this study is to gather information about how students of different ages understand school abilities and success in school. To this purpose we are asking a large number of high school students to answer the questions in this booklet. The questions concern students' explanations about the causes for success and failure in school situations, about different views of abilities, and a few questions about your background.

By answering the questions in the booklet you will greatly contribute to the success of the project. Please read carefully the instructions about how to answer the questions in each section. Then go through the questions and respond to each of them according to your opinions. There are no right or wrong answers. The information you provide should reflect what you would actually or typically think, feel, and do. When completing the questions, please complete them as honestly as possible. It is important to complete each question in the order that is presented. Once you have completed a question, please do not refer back to it or make any changes. You may, however, re-read the statements and description of school situations as many times as you like.

Your answers to the questions will be used for scientific purposes only and no individual information will be provided to teachers, parents and other people. Your responses will remain confidential and numbers rather than names will be used after all necessary information is gathered in order to protect your privacy.

ID. # _____

Participants' background information

Date today: _____   Birth date: _____
                                                    day / month / year

Current grade: _____   School: _____

Gender: ☐ male   ☐ female

In what city and country were you born? _____

If you were not born in Canada, how
old were you when you came here? _____

Where were your parents born?   mother _____
                                 father _____
                                 guardian(s) _____

Is English your first (native) language?
☐ Yes   ☐ No

If "No" on the previous question,

     What other language(s) do you speak? _____
                                          _____

     When you are with your parents at home, you speak:
     (please, select only one of the options below)

     ☐ only in your first language.
     ☐ mostly in my first language but I use some English too.
     ☐ I use both English and my first language equally.
     ☐ mostly in English but I use my first language a little, too.
     ☐ only in English.

     If you have to talk to your parents about something important, in which
     language would you feel most comfortable? _____

What background (heritage) do you consider yourself to be? _____
     (for example, Asian, Hispanic, Caucasian, African, etc.)

Section 1

Everyone has different ideas about school and school subjects. I am interested in your ideas about some school subjects. The pairs of sentences that follow describe opposite ideas about one and the same school subject. For each pair, I want you to decide first whether you think more like the students on the left side or more like the students on the right side. Once you have decided, I want you to decide whether the sentence you have chosen is only "sort of" true or "really" true. If it is only "sort of" true, then put an X in the box under "Sort of true"; if it is really true, then put an X in the box under "Really true". Sometimes you will check on one side of the page, and other times you will check on the other side of the page, but you can only check <u>one</u> box for each pair of sentences.

Really true	Sort of true						Sort of true	Really true
☐	☐						☐	☐
		Some kids think that every student can be a math-whiz by working really hard	**but**	Other kids think that some students will never be smart in math, no matter how hard they try				

Really true	Sort of true						Sort of true	Really true
☐	☐						☐	☐
		Some kids think that students are born with a certain amount of smartness and can't do very much to change it	**but**	Other kids think that every student can become smarter by working hard				

Really true	Sort of true						Sort of true	Really true
☐	☐						☐	☐
		Some kids think that every student can do well in social studies if he or she worked hard	**but**	Other kids think that working hard in social studies does not pay off				

Section 2

Directions: In the following items, imagine that each thing happened to you. Fill in the circle that best fits why you think that might have happened. Fill in the circle next to the statement that best fits how you think you might feel. Please mark only one statement for each situation.

1. If you had moved into a higher math class, it would be because
- ○ I worked hard .
- ○ the work in the class was very easy.
- ○ the teacher just happened to see my work on good days.
- ○ I seem to find math easy for me.

2. You missed many questions on your vocabulary homework assignment. This might happen because
- ○ I just can't seem to do well on vocabulary.
- ○ the words were too hard for most people.
- ○ there were too many things happening that day.
- ○ I probably didn't work hard enough.

3. You are told that you should repeat a page of math problems because of all the mistakes. The reason this happened was
- ○ the problems were meant for more advanced students.
- ○ I went too fast and didn't check.
- ○ too many things happened that day to do the work carefully.
- ○ I am bad in math.

4. On a weekly spelling and vocabulary test, you got a very high score. That might be because
- ○ I got lucky on that test.
- ○ I have always been good at spelling.
- ○ I worked hard on the assignments.
- ○ it was an easy test.

5. On a science assignment, the teacher says your answers were good. This would be because
- ○ I am smart in science.
- ○ anyone could do well on that assignment.
- ○ I spent many hours on the work.
- ○ I just happened to put the right answers down.

6. You work on a new kind of problem in math. You find out that you cannot understand how to do it. This is because
- ○ the problem is too hard for our class.
- ○ I didn't listen when I should have.
- ○ it takes a long time for me to understand.
- ○ it is just one of those things.

7. If your history map was not accepted by the teacher like most others, the reason that might happen is that
- ○ I've always had trouble with history things.
- ○ the assignment was just plain too hard.
- ○ I didn't work hard enough on the map.
- ○ I must have done the wrong map.

8. If you did not get chosen for the job of science lab assistant, it might be because
- ○ it was just one of those things.
- ○ I didn't do all the class work.
- ○ the teacher demands a lot of difficult work.
- ○ I am not very good in science.

9. On weekly math test, you find that you only got one problem right. This happened because
- ○ I wasn't very lucky.
- ○ I am not very smart enough in math.
- ○ I did not try hard.
- ○ "What a test!"

10. On your writing assignment the teacher made many good comments. This happened because
- ○ I worked hard on that assignment.
- ○ the assignment was too easy.
- ○ the teacher didn't read it carefully.
- ○ I am a good writer.

11. On your homework assignment for vocabulary, you see that the teacher marked it very good. The likely reason this happened is that
- ○ it must have been my day.
- ○ vocabulary work is easy for me.
- ○ it was so easy, nobody had trouble.
- ○ I worked a long time on the assignment.

12. On the most important writing assignment, the teacher said your work was poor. This happened because
- ○ I chose the wrong thing to write about.
- ○ I didn't try to make myself clear.
- ○ I can't put my ideas down on paper.
- ○ the teacher asked for too much.

13. You were allowed to do more difficult work in social studies. Would that be because
- ○ I have never had trouble with social studies.
- ○ the assignments were easy.
- ○ I guess it was just my time.
- ○ I put in a lot of time on my assignments.

14. On the year-end science test you find that you received a very high pass. The passing grade was because
- ○ it wasn't very hard test.
- ○ science comes easy to me.
- ○ I studied a lot for that test.
- ○ I happened to have studied all the right things.

15. You were told to rewrite your story. That would be because
- ○ I got caught on a bad day.
- ○ I can't seem to write.
- ○ the teacher made the assignment too hard.
- ○ I didn't work hard enough on the story.

16. You get a perfect score on a math test. Why?
- ○ I am really good in math.
- ○ The test was simple.
- ○ I took the test on one of my super days.
- ○ I checked all the answers.

Section 3

I would like you to think again first whether you think more like the students on the left side or more like the students on the right side. Once you have decided, consider whether the sentence you have chosen is only "sort of" true or "really" true. If it is only "sort of" true, then put an X in the box under "Sort of true"; if it is really true, then put an X in the box under "Really true." Sometimes you will check on one side of the page, and other times you will check on the other side of the page, but you can only check <u>one</u> box for each pair of sentences.

Really true	Sort of true					Sort of true	Really true
☐	☐					☐	☐
		Some kids think that students are born with a certain ability for language arts and can't do much to change it	but	Other kids think that everyone can become smart in language arts by working really hard			

Really true	Sort of true					Sort of true	Really true
☐	☐					☐	☐
		Some kids think that everybody can do well in science if they worked hard	but	Other kids think that nobody can do well in science just by trying hard			

Really true	Sort of true					Sort of true	Really true
☐	☐					☐	☐
		Some kids think that students are born with a certain amount of smartness for social studies and can't do much to change it	but	Other kids think that everyone could become smart in social studies by working really hard			

17. Your parents get a letter from your math teacher. It says that your class work is poor. This would happen because

        ○ I usually have trouble in math.
        ○ I didn't finish all my work.
        ○ I missed an assignment and the teacher caught it.
        ○ there is too much to do.

18. The social studies teacher says that your answer to a question in class in very good. A possible reason for that is

        ○ I would work hard on that kind of question.
        ○ I'm usually very good in social studies.
        ○ the teacher asked the one question I studied.
        ○ the question was probably easy.

19. You got back your science work and saw many errors. Why would this be?
- ○ It was a bad time for me.
- ○ I put too little time into it.
- ○ I am dumb in science.
- ○ It was a very difficult assignment.

20. If you got a high grade on your report card in history, it would be because
- ○ I must have been lucky.
- ○ it was an easy class.
- ○ I am good in history.
- ○ I worked hard every day.

21. You were switched to a more basic math class. The reason might be that
- ○ I am not smart in math.
- ○ the teacher expected too much.
- ○ I "goofed off."
- ○ the teacher only saw my bad work.

22. You face a new math problem and "catch on" very quickly. This would happen because
- ○ the problem probably was not too difficult.
- ○ I listened carefully when the teacher talked about it.
- ○ it was a good day.
- ○ I am very good at math.

23. On your test you see that you got few right on the spelling and vocabulary part. The score might be because
- ○ I did not have any luck on the test.
- ○ the test was just too hard.
- ○ I did not do enough homework.
- ○ I can't spell very well.

24. The math teacher lets you do some extra credit things because of especially good work that day. This might happen because
- ○ I did the homework assignment.
- ○ I just happened to study the right things.
- ○ the math problems were very easy.
- ○ math is easy for me.

25. For your big writing assignment for the month the teacher said your ideas were very well developed. This happened because
- ○ I was lucky to get a friend to help.
- ○ all my ideas are well developed.
- ○ the teacher doesn't expect very much.
- ○ I rewrote the paper, to make sure I did well.

26. The science teacher picks lab assistants for each class, and you were picked. This might be because
- ○ my name must have been picked out of a hat.
- ○ I know a lot about science.
- ○ I work very hard in the science class.
- ○ the job isn't very hard to do.

27. In your social studies class, you are called on to answer a question. When you finish the teacher tells the class that your answer was very poor. This might have happened because
- ○ I just can't seem to learn social studies.

       O it could have been a bad day.

       O the question was too hard for anyone to answer.

       O I didn't do my homework.

28. You failed history. The reason that happened is that

       O there was too much work.

       O I was unlucky.

       O I didn't do my homework.

       O history is beyond me.

29. Suppose the teacher puts your history report on the bulletin board as a good example. This could happen because

       O history comes very easy to me.

       O I worked on the assignment for a long time.

       O it was the one report I finished.

       O the information was not difficult to find.

30. Suppose you failed an important science test. This happened because

       O no one could have passed that test.

       O I have a hard time remembering science information.

       O I can't always study the right things.

       O I did not study very long for that test.

31. The teacher told you that you needed extra help in history. That might occur because

       O I just can't seem to do well in history.

       O the teacher expected too much.

       O the teacher only looked at part of my work.

       O I didn't try hard enough.

32. The math teacher sends home a letter to your parents that says you have done outstanding work. This would happen because

       O I finished all the assignments.

       O math is a strong area for me.

       O the teacher must have liked me that day.

       O the work was all review.

Section 5

Once again I would like you to decide first whether you think more like the students on the left side or more like the students on the right side. Once you have decided, consider whether the sentence you have chosen is only "sort of" true or "really" true. If it is only "sort of" true, then put an X in the box under "Sort of true"; if it is really true, then put an X in the box under "Really true." Sometimes you will check on one side of the page, and other times you will check on the other side of the page, but you can only check <u>one</u> box for each pair of sentences.

Really true	Sort of true						Sort of true	Really true
☐	☐						☐	☐

Some kids think that anyone who works hard can be the smartest in the class **but** Other kids think that working hard does not pay off

Really true	Sort of true						Sort of true	Really true
☐	☐						☐	☐

Some kids think that nobody can do well in math just by trying hard **but** Other kids think that everybody can do well in math if they worked hard

Really true	Sort of true						Sort of true	Really true
☐	☐						☐	☐

Some kids think that working hard in language arts does not pay off **but** Other kids think that everybody can do well in language arts by working hard

Really true	Sort of true						Sort of true	Really true
☐	☐						☐	☐

Some kids think that everyone could become smart in science by working really hard **but** Other kids think that students are born with a certain smartness in science and can't do much to change it

Finally, we would like to ask you to tell us what grades did you get in your last report card in:
Mathematics:
Science:
English:
Social Studies

Thank you very much for your participation and cooperation.

Appendix B

Coding scheme used to determine level of acculturation

Notes:

1. This scheme was used only with the students in the East-Asian ethnic group.

2. This scheme was used only with students who were of single and multiple Asian (e.g.

Vietnamese/Chinese) ethnic origin. The type of origin was determined on the basis of the

answers provided to the question inquiring about parents' place(s) of birth.

Scoring guidelines:

Categories	Score
Years in Canada (Calculated on the basis of age at which immigration to Canada took place)	Under 1 = 1 1-2 = 2 3-4 = 3 5-6 = 4 Over 6 = 5* * Students born in Canada received score 5.
First language	Asian = 1 English = 2
Language at home	only first (mother tongue) language = 1 mostly first but some English too = 2 equally both languages = 3 mostly English but some first language too = 4 only English = 5
Power language	Asian = 1 English = 2

Maximum score (most acculturated) = 17
Minimum score (least acculturated) = 4

A scale from 1 to 14 was used. Scores from 1 to 7 were classified in the "least acculturated" category. Scores from 8 to 14 were classified in the "most acculturated" category.