

**The Relationship Among Protective Factors, Volition, and Academic
Resilience in Chronically-ill Adolescents**

Thomas V. Powers

**A dissertation submitted in partial fulfillment
of the requirements for the degree of**

Doctor of Philosophy

University of Washington

2003

Program Authorized to Offer Degree: College of Education

UMI Number: 3111121

INFORMATION TO USERS

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleed-through, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

UMI[®]

UMI Microform 3111121

Copyright 2004 by ProQuest Information and Learning Company.

All rights reserved. This microform edition is protected against unauthorized copying under Title 17, United States Code.

ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

In presenting this dissertation in partial fulfillment of the requirements for the Doctoral degree at the University of Washington, I agree that the Library shall make its copies freely available for inspection. I further agree that extensive copying of the dissertation is allowable only for scholarly purposes, consistent with "fair use" as prescribed in the U.S. Copyright Law. Requests for copying or reproduction of this dissertation may be referred to Proquest Information and Learning, 300 North Zeeb Road, Ann Arbor, MI 48106-1346, to whom the author has granted "the right to reproduce and sell (a) copies of the manuscript in microform and/or (b) printed copies of the manuscript made from microform."

Signature Thomas V. P...

Date 12/16/03

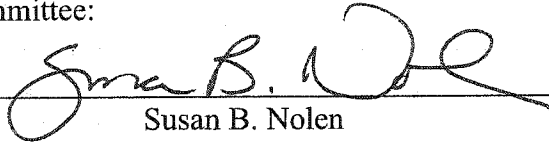
University of Washington
Graduate School

This is to certify that I have examined this copy of a doctoral dissertation by

Thomas V. Powers

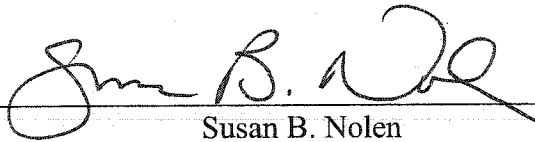
and found that it is complete and satisfactory in all respects,
and that any and all revisions required by the final
examining committee have been made.

Chair of Supervisory Committee:

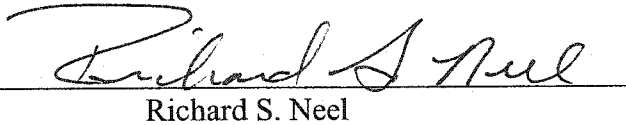


Susan B. Nolen

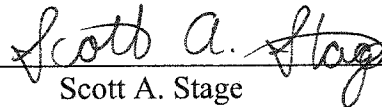
Reading Committee:



Susan B. Nolen

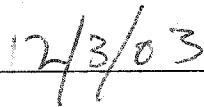


Richard S. Neel



Scott A. Stage

Date:



University of Washington

Abstract

The Relationship Among Protective Factors, Volition, and Academic Resilience in Chronically-ill Adolescents

Thomas V. Powers

Chair of the Supervisory Committee
Associate Professor Susan B. Nolen
College of Education

The purpose of this study was to examine the possibility that the construct of volition may function as a mediator between protective factors and academic resilience. The sample consisted of adolescents ($n = 57$) diagnosed with the chronic pain syndrome of reflex neurovascular dystrophy (RND) yet remaining enrolled in school and passing their classes. Protective factors were measured in the areas of parent relations, attitude toward teachers, and interpersonal relations by the Behavioral Assessment System for Children (Reynolds & Kamphaus, 1992). Volition was measured through the Action-Control Scale (Kuhl, 1994). Level of academic resilience was determined by GPA and attendance during the academic year that participants were diagnosed with RND. Protective factor measures were found to correlate with academic resilience and with volition measures. Volition, however, did not correlate significantly with academic resilience and, therefore, did not function as a mediator variable between protective factors and academic resilience. Potential explanations for this absence of correlation and suggestions for additional research are discussed.

Table of Contents

List of Figures	ii
List of Tables	iii
Chapter 1: Relevant Literature.....	1
Reflex Neurovascular Dystrophy as a Risk Factor.....	2
Models of Risk and Resilience	4
Academic Resilience.....	5
Volition as a Potential Explanatory Mechanism.....	8
Volition and Resilience	14
Research Question.....	16
Chapter 2: Method	17
Participants	17
Measures.....	18
Procedures	24
Analysis	25
Chapter 3: Results	30
Analysis of Volition Items.....	30
Correlations Among Indicators of Individual Constructs	31
Correlations Between Protective Factors and Academic Resilience	37
Volition as a Mediator.....	38
Multiple Regression of Protective Factors on GPA.....	38
Chapter 4: Discussion.....	40
Relevance of Significant Findings.....	40
Relevance of Findings Regarding Volition	41
Directions for Further Research.....	45
References	48

List of Figures

Figure Number	Page
1. The relationship between protective factors and academic resilience mediated by volition.....	26
2. The relationship between protective factors and academic resilience unmediated by volition.....	26

List of Tables

Table Number	Page
1. Factor loadings of individual items in Action-Control Scale subscales and principal components analysis.....	33
2. Correlations Among Composite and Individual Protective Factor, Resilience, and Volition Measures.....	36
3. Multiple Regression of Indicators that Correlated with GPA.....	39

Chapter 1: Relevant Literature

To say that students are academically resilient implies that they are overcoming some obstacles to academic achievement and progress that their peers do not face.

Various forms of chronic illness have been found to correlate with decreased academic performance and increased school absences. For example, academic decline in the areas of reading, spelling, and arithmetic has been documented among children treated for cancer (Brown et al., 1996; Brown, Sawyer, Anitiniou, Toogood, & Rice, 1999).

Charlton et al. (1991) documented significantly more absences among chronically-ill children compared to healthy peers. Fowler, Johnson, and Atkinson (1985) researched how children with different chronic illness (e.g., arthritis, diabetes, cystic fibrosis) compared to each other and to North Carolina state norms on measures of achievement and school absences. They found that as a group the children with chronic health conditions scored significantly lower than the state mean on standardized achievement tests. This group also had an absence rate over twice as high as the state mean (16 days per year compared with less than seven for state and 5.7 days nationally).

Because chronic illness has the potential to impede one's academic performance and progress it qualifies as a risk factor. Other documented risk factors to academic performance are "low expectations for success," "hopelessness," "friends as models of problem behavior" (Jessor, Turbin, and Costa, 1998), low level of "school connectedness," (Bonny, Britto, Klostermann, Hornung, & Slap, 2000), and alcohol and substance abuse (Vance, Fernandez, & Biber 1998). Questions remain about what really constitutes a risk factor, how powerful these risk factors are, and what mitigates their effects, thereby enabling some children with multiple risk factors to be academically

successful. Attempts to answer these questions have produced several models in which protective factors guard against or counteract the negative potential of risk factors, but little to no explanation of what makes an individual protective factor effective. The purpose of the proposed study is to examine the extent to which a single underlying mechanism may explain the effectiveness of identified protective factors.

Reflex Neurovascular Dystrophy as a Risk Factor

Though not a common disease, reflex neurovascular dystrophy (RND) can be extremely debilitating. Bernstein et al. (1978) describe RND as, "...a syndrome characterized by pain in an extremity and associated evidence of dysfunction of the autonomic nervous system" (p. 211). Bernstein et al. add further that the syndrome frequently results in impairment of the involved extremity and can lead to permanent disability. RND is a condition that involves the nervous system and the vascular system. Malfunctioning nerves produce pain signals that trigger constriction of veins, which in turn results in a self-perpetuating cycle of swelling and pain in the area of the body affected (Sherry, 2000). These symptoms can become amplified to the point where the parts of the body affected are functionally useless.

While the patients experience very real physical pain RND is thought to have a large psychological component to it as well. Therefore, treatment typically involves extensive physical and occupational therapy that is sometimes complemented with psychological services. These services range from information about how stress can produce physical symptoms to recommending and providing ongoing individual and family counseling.

While no data on the academic performance of children who suffer from RND is present in the literature, they are likely to be at risk for academic failure because they fall into the category of those afflicted with a chronic illness. Stein and Jessop (1982) developed a “noncategorical model” of viewing chronic illness. This model, “...considers psychological adjustment not as a function of specific chronic illnesses but as a function of common dimensions around which specific illnesses vary such as visibility, threat to life, and intrusiveness of care routines,” (Thompson, Gustafson, Gil, Godfrey, & Bennett-Murphy, 1998). That this view is a widely-accepted, major theoretical perspective in the medical community (Howe, Feinstein, Reiss, Molock, and Berger, 1993) suggests that it is not so much the name of the disease as it is the patient’s interpretation of and response to symptoms that place one at risk for academic failure.

Children diagnosed with RND typically present with pain symptoms and impaired limb function that are associated with other chronic conditions which have been shown to negatively affect school performance and participation. Sherry (2000) acknowledges similarities in symptoms between RND and arthritis and classifies both conditions as “amplified pain syndromes.” Fowler et al. (1985) found that in addition to scoring below their state mean on the California Achievement Test, children with arthritis also scored lower than 60% of the other chronic-illness groups with whom he compared them. Charlton et al. (1991) reported that symptoms and treatment of chronic and orthopedic conditions directly result in increased school absences. These findings may be applicable to children with RND because chronic pain and orthopedic impairment are the primary symptoms of RND. Research on other illnesses suggests that the symptomology and debilitating effects associated with RND can have negative school consequences.

Models of Risk and Resilience

In the field of resilience in general, it is agreed that the combination of risk and protective factors explain different levels of psychological adjustment; however, different theories exist on how the risk and protective factors combine. Garmezy, Masten, and Tellegen (1984) describe three different models for explaining this relationship. The first, the compensatory model, posits that risk factors can be directly countered by protective factors, that they combine additively so that one can cancel out the other. This also implies that one's adjustment improves in direct proportion to the number of protective factors present. The second model, the challenge model, posits that protective factors have variable effects on outcomes, depending on how much risk is present. In this model it is possible that low to moderate levels of risk can actually enhance adjustment by cueing or activating the protective mechanisms that would otherwise be dormant. The third model, the protective factor model (sometimes called the immunity model), hypothesizes that protective factors buffer or protect against the effects of risk factors. According to this model, a person who starts with multiple protective factors will continue to remain well-adjusted even as risk factors increase. The few studies that have deliberately explored the different models (e.g., Jackson & Frick, 1998; Pollard, Hawkins & Arthur, 1999) found support for all three, depending on the outcome variables and population studied.

While these models provide some insight into how resilience is conceptualized and researched, they also reveal a shortcoming in the field. Knowing whether the model at work is compensatory, challenge, or protective does not allow one to say any more

than, “these children persist because these protective factors are present.” This research does not address the question of how in particular the identified dispositional, family, social factors function to bring about school engagement and positive academic outcomes in the face of multiple risk factors. Rather than helping one to find new protective factors or new classes of protective factors, the current models describe the relationship between risk and protective factors once these factors have been identified.

Because the models describing how protective and risk factors relate provide no information on what makes a protective factor work and limited guidance in detecting new protective factors, the literature is fragmented into domain specific-protective factors. People have identified protective factors against taking a gun to school, protective factors for academic performance, and protective factors against feelings of discrimination mostly through direct experiment. They have ideas based on other people’s findings, but lack guiding principles. An unfortunate consequence of this a-theoretical approach is that findings of protective factors in one area do not inform searches in another area.

Academic Resilience

Though the body of research is smaller, the same organization of models found with resilience in general exists at the subdomain of academic resilience. There is evidence for the additive nature of protective factors or compensatory model (e.g., Bowen, Richman, Brewer & Bowen, 1998). It is also easy to find support for the interactive nature of risk and protective factors known as the challenge model (e.g., Jessor et al., 1998) and the idea of protective factors buffering against risk (e.g., Vance, et al., 1998), described as the protective or immunity model. Because academic resilience

is discussed in the same terms and researched with the same models as are used for resilience in general, this subset of research is subject to the same limitations as the larger field.

Without theoretical guidance underlying the operation of protective factors, the field of resilience research remains one in which the findings of one researcher do not necessarily inform or advance the work of other researchers. For example, Vance, et al. (1998) studied the academic progress of aggressive youths placed in state custody and found the social factors of “gets along with peers,” “gets along with adults,” “likeable,” and “sense of humor” predictive of positive school progress. Pollard et al. (1999) identified “high degree of social problem-solving skills” as a protective factor in school outcomes. Masten and Coatsworth (1998) identified IQ as “one of the most powerful predictors of academic success” (p.211). Weist, Freedman, Paskewitz, Proescher, and Flaherty (1995) examined “family cohesion” operationalized as emotional closeness, mutual supportiveness, and involvement in activities together and found that it correlated positively with school grades of boys. Based on this work, identifying new protective factors would be difficult because any number of elements (e.g., number of friends, length of family discussions, number outings with family) could fit these categories, but not necessarily result in resilience.

Individual protective factors can be generally grouped into Garmezy’s (1985) categories that he labeled 1) “dispositional attributes,” 2) “family cohesion and warmth,” and 3) “support figures available in the environment.” One’s ability to relate well with others emerges as a common dispositional factor (e.g., Vance et al., 1998; Pollard et al., 1999). Other studies of academic resilience (e.g., Weist et al., 1995; Smokowski,

Reynolds, & Bezruczko, 1999) implicated family ties and family support as protective factors correlated with academic performance in disadvantaged youth. Bowen et al. (1998) and Smokowski et al. (1999) both identified teachers and beliefs about teachers as a key element affecting the motivation of academically-resilient children. This research has produced a taxonomy of protective factors, but still no explanation of how they work.

This fragmented approach is further evidenced in a two-year longitudinal study (Hanson & Austin, 2003) on health risks, resilience, and academic performance commissioned by the California Department of Education. In this study the search for relevant protective factors involved identifying “external and internal resilience assets.” Questions designed to identify these assets were drawn from multiple measures administered to children throughout the state of California and grouped into thirteen different constructs based on results of exploratory and confirmatory factor analysis. Thus, the selection of items was arrived at empirically, without mention of a guiding theory. Though this approach may be effective for identifying elements that correlate with resilience, it appears inefficient and difficult to replicate. Furthermore, because each of the constructs was evaluated for how it related to academic outcomes, and no analysis was conducted to identify an underlying theme or operant mechanism in each of the constructs, this work still does not explain what makes the identified factors effective.

If one wants to foster academic resilience, a more useful approach than trying to experimentally determine thousands of individual protective factors would be to try to explain what it is about the identified protective factors that makes them effective. Identifying a common, underlying mechanism among identified protective factors would help in the search for additional protective factors and in the development of

interventions. For example, as part of his theory explaining goal pursuit despite adversity Kuhl (1985) describes “environmental control” as one such underlying mechanism. (Environmental control refers to the extent to which one deliberately alters one’s surroundings so that they are conducive to achieving a particular goal.) If level of environmental control explained the efficacy of different protective factors, then to find new protective factors one would search for instances where resilient children deliberately altered their surroundings so that they interacted with them differently than others did. One may find that something as simple as walking to school rather than taking the bus allowed students to avoid negative peer interactions. Without this theoretical guidance, however, it is unlikely that one would spend the time to evaluate whether or not “walks to school” was a protective factor. Similarly, in developing interventions, if one knew why “gets along with peers” (Vance et al., 1998) correlated with positive academic outcomes, then a range of interventions becomes available. For example, if positive peer relations were effective because they reduced anxiety, which enabled one to focus on academic tasks, then stress-management exercises might emerge as a valid intervention to improve academic performance. Explaining the theoretical underpinning of protective factors is relevant to developing interventions and providing guidance for research. Therefore, the purpose of this study is to explore the extent to which the effective components of individual protective factors may be organized under a single theory.

Volition as a Potential Explanatory Mechanism

While no theoretical explanation has emerged in the field of academic resilience to account for persistence and subsequent success despite risk factors, research in the area

of volition offers some potential theoretical guidance. Kuhl (1985) presents a theoretical framework to explain persistence in the face of challenges. Kuhl's theory of action posits that one develops characteristics and employs strategies that protect one's intentions and enable one to pursue a goal amidst distractions and competing desires. Kuhl identifies the following six factors as the elements of volition:

1. Active attention selectivity: This trait, "...facilitates the processing of information supporting the current intention and inhibits the processing of information supporting competing tendencies," (Kuhl, p. 104). In essence, it is one's ability to remain on-task amidst distractions.
2. Encoding control: This refers to one's ability to filter out information and to process information that is relevant only to one's intention.
3. Emotion control: The ability to inhibit emotional states that may undermine the pursuit of an intention.
4. Motivation control: Refers to a "feedback relation" that serves to renew one's intentions. It involves re-applying or reiterating the processes that caused one to arrive at the intention in the first place.
5. Environmental control: Involves manipulating the environment in a way that interacts with motivation control or emotion control so goal pursuit is facilitated. Kuhl provides the example of maintaining the intention to quit smoking by telling others about the intention. The positive social pressure from others reaffirms one's motivation to continue to pursue the goal.
6. Parsimony of information processing: This characteristic refers to one's ability to put "stop rules" in place so that one can act. It ensures that people

do not spend all of their time collecting more and more information and wallowing in the deliberation process to the point where they are unable to act.

These factors help one to develop what Kuhl refers to as an “action orientation,” which enables one to act and to continue to pursue goals when circumstances become challenging. Thus, a person high in volition is said to be “action oriented.” A person lacking in the factors listed above would be unlikely to pursue goals and, therefore, be considered “state-oriented” or low in volition.

In his taxonomy of the elements of volition Pintrich (1999) identifies four broad categories (each with multiple subcategories) that overlap with Kuhl’s (1985) elements of volition. Like Kuhl’s elements of volition, the taxonomy references strategies to regulate one’s behavior, emotional responses, and environment so that the pursuit of a goal is maintained. The names of the categories and Pintrich’s definitions are listed below.

1. Control of Motivation- involves strategies to monitor, regulate, and control various aspects of one’s own motivation including self-efficacy, goals, rewards, values, and interest.
2. Control of Emotions and Mood- involves strategies to monitor, regulate and control both positive and negative emotions and mood, generally attempting to increase positive affect and decrease negative affect.
3. Control of Behavior- involves strategies to monitor regulate and control actual behavior including choice, effort, persistence, and help-seeking.
4. Control of Environment- involves strategies to monitor, regulate and control various aspects of the environment.

In both Kuhl's and Pintrich's descriptions of volition there are references to internal processes resulting in specific strategies that affect how one interacts with the environment or approaches tasks so that desired goals can be achieved. Specific examples include stress-reduction exercises and positive self-talk. In addition, both descriptions include some element of modifying one's environment (e.g., removing distractions) so that goal pursuit is facilitated and maintained.

Citing the work of Kuhl (1984) and Corno (1993), Teo and Quah (1999) draw an explicit distinction between volition and motivation. They state that, "...volition or action control is associated with 'goal striving,' or the ability to control the enactment of intention, while motivation or motivational tendencies are related to 'goal setting' or the intention to do something" (p.26). Palfai, McNally, and Roy (2002) illustrate this distinction with the example, "...one can be highly motivated to lose weight; however, the ability to do so would be critically dependent on volitional skills such as the ability to plan specific weight-reduction strategies and implement these behaviors in relevant contexts" (p. 310). Thus, volition can be described as the processes and actions that enable one to maintain and enact intentions when faced with competing circumstances.

Garcia, McCann, Turner, and Roska (1998) provide an example of how the theoretical construct of volition is empirically researched. One aspect of volition research in education is looking at how the construct of volition correlates with different mechanisms people use to learn. Garcia et al. defined volitional control as "a set of self-regulatory strategies geared toward protecting the intention to learn by maintaining efforts to learn" (p. 408) and used a volitional control measure that evaluated one's tendency to apply different strategies such as rewarding oneself, or motivational self-talk.

They found this measure of volition correlated positively with academic study strategies such as self-testing and reviewing class material. Therefore, they concluded that one's level of volition predicts one's use of learning strategies.

Palfai, McNally, and Roy (2002) examined the role of volition as assessed through Kuhl's (1985) measure of action-orientation, and how it related to alcohol consumption among college student drinkers. They found a significant positive correlation between one's desire to change drinking behavior and alcohol-related problems, but one's "readiness to change" score was not predictive of any actual decrease in alcohol-related problems. One's degree of action orientation, however, was predictive of changes in alcohol-related problems. From these results Palfai et al. concluded that, "For a behavior that participants wish to change...individual differences in action orientation makes it easier for participants to carry out or enact intentions" (p. 315).

Orbell and Sheeran (2000) demonstrate how a more specific component of volition, implementation intentions (a strategy linked to motivation control), facilitates goal attainment. They tested the proposition that motivational factors being equal, people who developed a plan for implementing their intentions were more likely to follow through than those who did not. They studied how soon after hip or knee surgery patients returned to regular, daily activities. In a notebook patients were asked to record their goals for the week and their plans for implementing them. Orbell and Sheeran found that the variable of developing implementation intentions predicted the "speed of action initiation" in multiple functional daily activities. From their data Orbell and Sheeran concluded that, "...implementation intentions account for the translation of goal intentions into action" (p. 793).

In addition to observable behaviors and strategies, the construct of volition is thought to include what Corno (1993) refers to as “volition styles, or dispositional tendencies that affect goal implementation” (p. 17). Corno describes this category as including stable individual differences that affect striving. She offers “cognitive-intellectual aptitude” as one example. Ackerman and Woltz (1994) included “self-focus” as an integral component of volition and induced it, “...by requiring people to complete a long series of self-report measures that concern personality and aspects of typical intellectual engagement”(p. 489). This heightened attention to or awareness of oneself is thought to help one maintain intentions and goal pursuit. Carver and Scheier (1986) explain that self-focus contributes to action by helping one to amass information about one’s relationship to surroundings and then compare incongruities. In Kuhl’s (1985) theory this dissonance leads to action. Kuhl (1987) also refers to a “motivational memory system” as part of volition. This component involves the ability to develop and to recall a plan of action for pursuing a goal. Unlike the volitional strategies mentioned earlier, these examples of “dispositional tendencies” (cognitive-intellectual aptitude, self-focus, and motivational memory) characterize volition to include internal traits in addition to external behaviors.

This body of research demonstrates that the construct of volition encompasses much more than the term implies. Though willful action is still a component of volition, much of the research addresses the mechanisms that bring about continued action or goal pursuit in the presence of challenges. These mechanisms range from what are thought to be innate characteristics, to learned strategies, to environmental modification.

Volition and Resilience

The fields of volition and resilience share similar goals and assumptions. According to Corno (1993), “theories of volition do not assume that volition is necessary when goals are perceived as easy to enact. Volitional control mediates goal-setting and action when the need for it arises” (p. 16). Volition, then, comes into play when perseverance is necessary and adversity or distracting conditions are present. Wolters (1999) underscores this point by proposing that there are certain groups of students (e.g., the academically gifted) who have no need for volitional strategies because the work does not challenge them. Volition is a construct that specifically addresses how and why people persist under difficult conditions. People researching resilience are trying to address the same question. Work in resilience asks questions about the mechanisms that are in place to help people cope. The protective factors identified are often dispositional factors (e.g., sense of humor, ability to relate well to others) or external factors that influence behaviors (e.g., peer support, teacher encouragement). The construct of volition acknowledges the central role of dispositional traits in pursuing goals. It also recognizes that people use specific behavior or coping strategies such as modifying their environment and reiterating their original motivation to keep making progress toward their goals. Both fields also assume that persistence is explained by a variety of mechanisms from internal resources, to motivational components, to specific behaviors.

The similarities between the constructs of resilience and volition raise the possibility of a link between the two fields. The element of volition may be present in multiple protective factors and could explain the varying degrees of efficacy in different protective factors. For example, IQ has been identified as a protective factor predictive

of academic success (Masten and Coatsworth, 1998), but there are children with high IQs who do not complete school. Perhaps IQ contributes to academic resilience only in cases where it is accompanied by volition's "active attention selectivity" which enables children to remain on task academically. As such, identifying "active attention selectivity" as the operant mechanism would explain why IQ does not always predict academic outcomes. Similarly, relationship with parents might be a powerful protective factor because parents help to foster various components of volition such as emotion control and environmental control. Relationship with teachers may be a less-powerful protective factor than relationship with parents because teachers have a narrow role with children and, therefore, do not help to develop as many components of volition as parents do. In these speculative examples, volition and resilience are linked because volition functions as the element present in protective factors that leads to academic resilience.

Baron and Kenny (1986) discuss how mediators can represent internal psychological properties that transform the predictor variables (protective factors, in this case) in a way that potentially affects the outcome variables (measures of academic resilience). The mediator is what makes the predictor variable effective. If the mediator is separated from the predictor variable then a previously-significant correlation between the predictor variable and the outcome variable will disappear. The proposed relationship among protective factors, academic resilience, and volition is one in which volition mediates the relationship between protective factors and academic resilience. The presence of a mediation effect would support the position that volition is necessary if protective factors are to result in academic resilience. If these conditions are confirmed

then volition may function as an underlying mechanism explaining the effects of protective factors.

Research Question

Research in the area of academic resilience tends to identify specific conditions or traits that are present in someone who does well academically despite adversity and not on explanatory mechanisms. Examining the nature of the relationship between these specific protective factors and the construct of volition can help to develop the theory of volition and to assess its adequacy as an explanatory mechanism for the phenomenon of academic resilience. To address the possibility that volition may function as an underlying mechanism explaining the effect of protective factors, the question, "To what extent does the construct of volition mediate the relationship between protective factors and academic resilience in teens identified with academic risk factors?" is posed in this study.

Chapter 2: Method

Participants

The initial potential-participant pool was comprised of patients ages 12 and above who had been and diagnosed with symptoms associated with the chronic illness of reflex neurovascular dystrophy (RND) and treated at Children's Hospital in Seattle, Washington within the last three years. Of the 271 potential participants, 98 were excluded after their medical records were reviewed and it was determined that their symptoms co-occurred with other illnesses (e.g., cancer, major depression), were not enrolled in school, or had been home-schooled. Recruitment and follow-up letters were mailed to the remaining 173 potential participants. Sixty-six former patients responded that they would like to participate in the study. Of the 66, nine were excluded because they were either not enrolled in school during the time of their illness, school records could not be obtained, or the person did not return all of the assessment instruments. An additional two were excluded because they had grade-point averaged of less than 1.0 (i.e., were failing most of their classes) and, therefore, did not qualify as academically-resilient. The final sample consisted of 55 participants ranging from 13 to 19 years old (mean age = 14.4). Ninety-one percent of the sample (n = 50) were girls. The majority of the sample was Caucasian (n = 49); five participants did not indicate ethnicity, and one was Hispanic.

Rationale for Sample Selection

Because RND develops primarily in Caucasian females (Sherry, 2000) the obtained sample lacked ethnic diversity and gender balance. Despite these drawbacks that would affect the generalizability of the findings, the compromise was necessary to obtain a sample that had a uniformity of symptoms and common treatment protocol. In

many other chronic pain conditions (e.g., migraine headaches, sickle-cell disease) the intensity, frequency, and duration of painful symptoms and treatments vary tremendously. This variability presents a problem because the differing levels of risk could affect academic outcomes. For example, someone who gets migraines daily would be considered far more at-risk academically than someone who gets them only under the stress of final exams. The patients selected for this study had all been diagnosed and treated by the RND team at Children's Hospital. Because the patients were selected from a limited pool, it was possible to ensure that their common risk factor was similar in experience and not just label.

Measures

Assessment of Academic Resilience

Academic resilience is typically conceptualized as academic persistence and success despite adverse circumstances. Persistence is operationalized through a variety of measures from time spent on homework (Miller and MacIntosh, 1998) to absence of grade retention (Reynolds, 1998). Persistence alone, however, cannot define resilience. A student who devotes much time and effort to his studies, but fails repeatedly is not thought of as academically-resilient. As such, the element of academic success is necessary. Typically, some measure of academic performance such as GPA (e.g., Weist et al., 1995) or standardized test scores (e.g., Masten, Morison, Pellegrini, & Tellegen, 1990) is used as a dependent variable to measure academic success. In this study, participants' school attendance for the school year when diagnosed was used as an indicator of persistence and cumulative GPAs during the same time period was used to

measure academic success. These data were collected from participant transcripts and attendance records.

Grade-point average.

Although standardized test scores offer advantages such as consistency of items and norm-referenced scores, the conditions of this study make GPA a better indicator of academic resilience because the time at which the student took the standardized test may not have corresponded to a time when the student experienced chronic pain. Because RND can develop suddenly subsequent to psychological stress and minor trauma (Sherry, Wallace, Kelley, Kidder, & Sapp, 1999) it is possible that patients with RND were completely symptom free at the time of standardized testing. Without the additional hurdle of the chronic pain, the standardized-test score would represent academic achievement, but not necessarily academic achievement in the presence of a risk factor. By using a student's GPA it is possible to ensure that the achievement measure overlaps with the risk factor necessary to define academic resilience. To meet these conditions, the patients' GPA from the school year in which she or he was diagnosed with RND was selected as an indicator of academic resilience.

Grades were typically given as letters. To obtain ratio data for analysis, these letter-grades were converted to a four-point scale according to the formula used by Washington-State high schools. Each letter represented one of five whole numbers, with an "A" at the top of the scale at 4.0 and an "F" at the bottom as 0.0. Each "plus" or "minus" corresponded to a three-tenths addition to or subtraction from the whole number associated with the letter grade (e.g., "B+" equates to 3.3).

Attendance.

Though GPA may capture the component of academic success despite adversity, it does not necessarily reflect persistence despite adversity because of the potential confound with intellectual ability. A student who typically achieves “A’s” and makes “C’s” when confronted with risk factors is theoretically less resilient than a “C” student who maintains a “C” average in the presence of risk factors because the latter is likely more persistent than the former. Because persistence is a central component of resilience but is difficult to isolate from other elements contributing to GPA, another measure is needed to capture persistence.

Researchers (e.g., Vance et al., 1998) use several measures from “educational progress” (on a continuum from not enrolled or dropped out to on track for graduation) to “time spent on homework” (e.g., Miller and MacIntosh, 1999) as a means of assessing this central component of academic resilience. This idea of persisting at school is also assessed through the measure of absences or attendance in the presence of risk factors (e.g., Weist et al., 1995). Unlike “educational progress” or the amount of time one spends on homework, however, attendance is not a function of one’s academic ability. Because it appears to capture the concept of persistence more accurately than other measures in the literature, the percentage of days present at school during the school year when one was treated for RND was used as an indicator of one’s academic persistence.

Assessment of Protective Factors

The presence and degree of protective factors in Garmezy’s (1985) three areas (dispositional attributes, family cohesion and warmth, and support figures available in the environment) was measured with three scales from the Behavioral Assessment System

for Children (BASC). Though other measures fit Garmezy's organization of protective factors, the BASC scales of Attitude to Teachers, Relations with Parents, and Interpersonal Relations were selected because the scales and individual items are consistent with empirically-validated protective factors that correlate with academic resilience. For example, in the area of "dispositional attributes" Vance et al. (1998) found one's ability to get along with others significantly predictive of academic progress in at-risk youth. Some of these interpersonal skills were defined as "gets along with peers," and "likeability." The BASC Interpersonal Relations scale appears to capture similar constructs. The items are listed below.

Interpersonal Relations

1. I am good at making new friends (1)
2. I need help to get along with others (32)
3. People think I am fun to be with (63)
4. I feel close to others (94)
5. People like me because I am easy to talk to (125)
6. My friends are usually kind to me (156)
7. I am a likeable person (16)
8. Others have respect for me (47)
9. I enjoy making new friends (78)
10. I am liked by others (109)
11. I enjoy meeting others (140)

Masten et al. (1990) identified "family cohesion," and "family sociability" as significant predictors of academic resilience. The BASC scale of "Relations with

Parents” contains items that appear to address these constructs. Some examples are, “I like to be close to my parents,” “I help make decisions at home,” and “My mother and father like my friends.” Teachers fall into the category of “support figures available in the environment.” Bowen et al. (1998) used “school connectedness” as a dependent measure indicative of academic resilience. In their study “Teacher Support” was identified as a significant protective factor predictive of school connectedness. Their measure of teacher support included the items “My teachers really care about me,” “I get along well with my teachers,” “My teachers care whether or not I come to school.” The BASC scale of Attitude to Teachers contains similar items. It includes items such as “Teachers are neat people,” “My teacher cares about me,” and “my teacher understands me.” Therefore, it appears to parallel items in Bowen et al.’s study that were used to assess a construct found to correlate with academic resilience. Because the constructs named by the BASC scales and the scales’ individual items appear similar to other measures that correlated with academic resilience, they were selected to assess academic protective factors in this study.

On all of the BASC scales respondents indicated “true” or “false” after each statement. The “true” responses are summed and converted to T-scores by comparing a respondent’s score to the appropriate norm tables provided in the BASC manual. The resulting T-scores for the three individual scales were used as indicators of three specific domains of protective factors. In addition, an average of each participant’s three scales was calculated to obtain an overall protective-factor score.

Assessment of Volition

Kuhl’s (1994) Action-Control Scale was chosen as the instrument to measure

volition. The scale consists of 36 items that comprise three subscales labeled “Preoccupation,” “Hesitation,” and “Volatility.” These subscales purportedly represent traits and behaviors that are thought to interfere with one’s goal pursuit or volition. Each item describes a particular situation with two possible responses. One response is indicative of a state orientation while the other signifies an action orientation. A value of one is assigned to action-oriented responses, and a value of zero is assigned to state-oriented responses. The one-point responses within each subscale were summed and divided by the number of completed items to obtain “Preoccupation,” “Hesitation,” and “Volatility” scores. An average of each participant’s three scales was calculated to obtain an overall volition score. Examples of items from each scale are provided below.

Preoccupation-scale item:

When I have lost something that is very valuable and I can’t find it anywhere:

- a. I have a hard time concentrating on something else.
- b. I put it out of my mind for a little while.

Hesitation-scale item:

When I know I must finish something soon:

- a. I have to push myself to get started.
- b. I find it easy to get it done and over with.

Volatility-scale item:

When I have learned a new and interesting game:

- a. I quickly get tired of it and do something else.
- b. I can really get into it for a long time.

Blunt and Pychyl (1998) provided support for the construct validity of the Action-Control Scale when they found proneness to boredom and different forms of procrastination correlated with one’s “state orientation” score on the Action-Control

Scale. Diefendorff, Hall, Lord, and Streat (2000) found that one's overall score on this measure correlated with the likelihood of receiving high performance evaluations from supervisors. Similarly, Murphy-Southwick (1996) found one's Action Control Scale score to correlate with the probability of following through on tasks for which one had volunteered. Kuhl (1994) provides data on the internal consistency of the individual scales; he reports a Cronbach's alpha of .7 or higher on all three subscales. Diefendorff, et al. conducted a factor analysis of the Action-Control Scale and found that certain items had poor factor loadings given Kuhl's purported factor structure. Even with these items, however, they found that Kuhl's scales had strong internal consistency and good construct validity. Because of its prevalence in the field of research on volition and the empirical data available on the reliability and validity of the instrument, one's scores on the Action-Control Scale were selected to measure the construct of volition in this study.

Procedures

Initial screening of medical records resulted in 173 patients who could be recruited to participate in this study. The parents of these patients, or the patients themselves if they were age 18 or over, were mailed a packet that included the following.

- a. Recruitment letter explaining the study. This letter was signed by the Principal Investigator and the physician who had treated the patient.
- b. Consent form for parents
- c. Assent form for patients
- d. Release-of-information form to obtain school grades and attendance records
- e. BASC Self-Report
- f. Action-Control Scale

- g. Two-dollar bill
- h. Return envelope

Approximately five weeks after the initial packet had been sent, a follow-up letter was mailed to those who had not yet responded. Those who returned the signed forms and completed surveys were selected as the initial pool of subjects. The returned release-of-information forms were faxed to the potential participants' schools along with a letter requesting grades and transcripts. When records were received they were evaluated for the following exclusion criteria:

- a. Not enrolled in school during treatment.
- b. Not enrolled in core academic classes (i.e., math and English) during treatment.
- c. Not in grades seven through 12 during treatment.

Though initially included, those with a GPA of less than 1.0 (D average) were excluded because participants failing classes could not be considered academically resilient. From the remaining participants' records, the variables of "math GPA," "English GPA," "total GPA" and "percentage of days attended" were calculated for the semester during which the patient had been treated at Children's Hospital. These data along with the participants' BASC scores and Action-Control Scale scores were entered into SPSS for analysis.

Analysis

Models Guiding Analysis

Two potential models established the framework for analysis. Figure 1 and Figure 2 represent these models. Figure 1 depicts the relationship between the latent

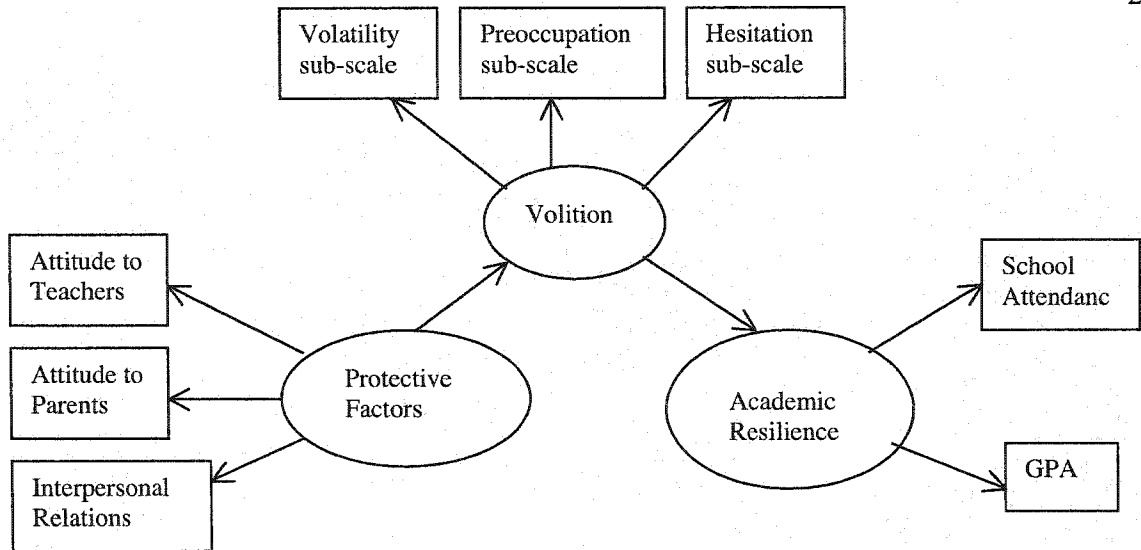


Figure 1: The relationship between protective factors and academic resilience mediated by volition.

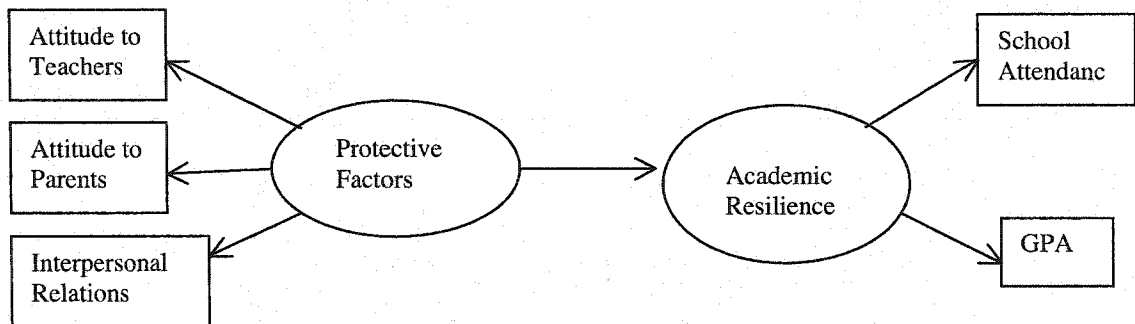


Figure 2. The relationship between protective factors and academic resilience unmediated by volition.

variable of protective factors and the endogenous variable of academic resilience (represented by the indicators of GPA and percentage of days attended) as mediated by the theoretical construct of volition. Figure 2 shows a direct path between the independent variable of protective factors and the dependent variable of resilience.

Using these two models, the adequacy of volition as a mediator between protective factors and academic resilience was to be evaluated in accordance with Baron and Kenny's (1986) procedures of mediation analysis as follows. First the non-mediated

model (Figure 2) would need to be tested to establish the relationship between protective factors and resilience. Assuming a significant relationship, the second step would be to test the fully mediated model (Figure 1). Significant correlations between protective factors and volition and between volition and academic resilience would raise the possibility that the fully-mediated model was valid for interpretation. If these correlations were found, then the hypothesized model would need to be tested further by controlling the paths between volition and the exogenous and endogenous variables. If under these conditions the previously-established correlation between protective factors and academic resilience was no longer present, then the fully-mediated model would be considered valid

Another possibility, however, is that the correlation remains significant but is lower than the correlation found in the unmediated model. Given this outcome, volition would be thought to partially mediate the relationship between protective factors and academic resilience. This conclusion would be reached because the attenuated correlation would indicate that a significant amount of the variance in academic resilience was still explained by protective factors independent of volition.

Evaluation of Models

Due to the small sample size of this study the most appropriate analysis tool, a structural equation modeling program, could not be used to perform the intended mediation analysis. Instead, path analysis using the partial correlation function in SPSS was selected. A shortcoming of this approach, however, is that a limited amount of data is provided to describe the proposed model. Path analysis reveals the correlation among

latent variables (i.e., protective factors, volition, and academic resilience), but unlike structural equation modeling, does not determine how much variance in a latent variable is accounted for by an indicator. It is possible, therefore, that a selected indicator variable may bear no relationship whatsoever to the construct it is thought to represent without being detected in path analysis. Specific to this study, if a strong correlation emerged between the total protective-factor score (which is the sum of the three protective factor variables) and the academic-resilience score, no information would be available on which of the three protective factors contributed most to that correlation. Conversely, a potential correlation between one protective factor (e.g., parents) and academic resilience could be masked because the variable of parents is summed with other variables that may not correlate with academic resilience.

Attempts were made to address these shortcomings by first evaluating the bivariate correlations among the indicator variables associated with each construct. Because the indicators were thought to represent a common construct, it was expected that they would correlate with each other. Once these correlations were established, the indicators could be summed with more confidence in the belief that they represented a construct to be evaluated through path analysis.

Summing the indicator variables, however, still presented the risk of correlations being masked because of potentially significant variables being aggregated with potentially non-significant variables. To ensure that this phenomenon did not occur, it was necessary to examine correlations among all the indicators of protective factors, and academic resilience. All correlations were examined through the bivariate correlation

function of SPSS. Those that emerged as significant became candidates for mediation analysis, with the indicators of volition as the potential mediators.

The results of the analyses conducted to address the question of volition as mediator variable led to the decision to evaluate one of the potential models more thoroughly. This analysis was a multiple regression that included all the predictors that correlated significantly with an indicator of academic resilience. It is described in detail in the Results section.

Chapter 3: Results

Analysis of Volition Items

To verify the construct validity of the Action-Control Scale, a principal components analysis was performed prior to other analyses using the data from all potential participants who had completed this instrument ($n = 66$). The steps taken in this principal components analysis followed those reported by Kuhl (1994) in the development of the instrument. Because the scales were designed to assess distinct components of volition, a varimax rotation was performed in which factor loadings of less than .20 were suppressed. Consistent with Kuhl's analysis three components with eigenvalues greater than 2 emerged. For a number of individual items, however, there was communality of variance among multiple factors. Because several items loaded on multiple scales, the validity of the scales was questionable. Therefore, these items were removed one at a time, starting with the items that loaded on the most factors (e.g., items loading on three factors were removed before items loading on two factors). Items that loaded similarly on two factors were removed before those that had a greater weighting on one factor than another. Each time an item was removed the analysis was repeated until all the items that loaded similarly on multiple factors were removed. After 14 items had been removed this process continued, but the analysis was constrained to three components to prevent the excessive loss of items from the three components that initially had eigenvalues greater than two.

Though the resulting scales had fewer items after all the items with communality of variance between factors were removed, they were similar to original ACS subscales (Kuhl, 1994) in actual items, factor loadings, and internal consistency. Items that formed

a common factor in Kuhl's study of the ACS also did so in this analysis. Only one item "switched scales." All items retained had factor loadings of .51 and above. All scales had a Cronbach's alpha of .71 or above. This information is presented in detail and compared to Kuhl's results in Table 1. That the retained items continued to intercorrelate in a manner previously described by Kuhl (1994) suggests that Kuhl's conceptualization of volition may generalize to the sample obtained for this study.

Correlations Among Indicators of Individual Constructs

Protective Factors

With an alpha level of .05 all the BASC subscales, which were conceptualized as indicators the main types of protective factors in Garnezy's (1985) categorization, were found to correlate significantly with each other and with the total protective factor score comprised of the three subscales (see Table 2). These correlations were expected based on the theoretical work in protective factors and the empirical research done to validate the BASC. That they were found, implies that research on the categories of protective factors applies to this sample and that the BASC may be a valid measure for assessing protective factors.

Volition

None of the scales obtained in this analysis correlated significantly with each other. Factor 1 correlated .22 with Factor 2 ($p > .10$) and .21 with Factor 3 ($p > .10$). Factor 2 correlated .19 with Factor 3 ($p > .10$). These results differ from Kuhl's (1994) in which he found a .43 correlation between the Hesitation and Preoccupation subscales. This difference raises the possibility that though the identified factor structure was similar

to Kuhl's, the new scales may have been assessing different components of volition than Kuhl's scale did or that this sample differed significantly from Kuhl's.

Another possible explanation for these results relates to the number of items on the scales. The Action-Control Scale has 36 items. In this study, only 17 of those items were retained after the principal components analysis. This reduction in items removed potential sources of variability that may have explained the correlations among the scales Kuhl (1994) obtained. For example, in Kuhl's version of the Volatility Scale all 12 of the items intercorrelated and, therefore, were purported to assess the construct that they were designed to evaluate, (volatility or lack of perseverance). The retained items in this analysis also intercorrelated and came from Kuhl's original Volatility Scale. As such, the new scale is thought to measure the same construct as Kuhl's original scale. If the eliminated items were the ones that accounted for the correlations among Kuhl's scales, then the scales in this study could still be assessing similar aspects of volition as Kuhl's scales, but not necessarily intercorrelate.

Table 1
Factor loadings of individual items in Action-Control Scale subscales and principal components analysis.

<i>Item</i>	Item statistics for Hesitation subscale of Action-Control Scale (Kuhl, 1994)			Item statistics for Factor One of this study		
	<i>Factor loading</i>	<i>Mean score within scale</i>	<i>r of item to scale</i>	<i>Factor loading</i>	<i>Mean score within scale</i>	<i>r of item to scale</i>
<i>Cronbach's alpha</i>	.78			.75		
2. When I know I must finish something soon...	.68	.38	.60			
5. When I don't have anything particular to do and I am getting bored...	.29	.63	.47			
8. When I am getting ready to tackle a difficult problem...	.46	.61	.51	.60	.76	.45
11. When I have to solve a difficult problem...	.65	.44	.56			
14. When I have to make up my mind about what I am going to do when I get some unexpected free time...	.22	.66	.45			
17. When I have to do work at home...	.60	.35	.58			
20. When I have a lot of important things to do and they all must get done soon...	.58	.62	.62	.56	.47	.39
23. When there are two things I really want to do, but can't do both of them...	.22	.41	.44			
26. When I have to take care of something important, but which is also unpleasant...	.68	.34	.62	.58	.44	.41
29. When I am facing a big project that has to be done...	.64	.37	.65	.75	.44	.66
32. When I have a boring assignment...	.32	.44	.44	.61	.23	.44
35. When I have to do something that is boring and uninteresting...	.57	.43	.61	.79	.29	.59

Note: Where no factor loading is reported the item had been removed due to cross loading or a factor loading of less than .30

Table 1 (cont.)

<i>Item</i>	Item statistics for Volatility subscale of Action-Control Scale (Kuhl, 1994)			Item statistics for Factor Two of this study		
	<i>Factor loading</i>	<i>Mean score within scale</i>	<i>r of item to scale</i>	<i>Factor loading</i>	<i>Mean score within scale</i>	<i>r of item to scale</i>
<i>Cronbach's alpha</i>	.74			.73		
3. When I have learned a new and interesting game...	.46	.64	.49	.55	.84	.33
6. When I am working on something that is important to me...	.59	.71	.59			
9. When I am watching a really good movie...	.42	.86	.43			
12. When I have been busy for a long time doing something interesting...	.48	.75	.49			
15. When I read an article in the newspaper that interests me...	.51	.75	.52	.73	.64	.51
18. When I am on vacation and I'm having a good time...	.48	.59	.50			
21. When someone I know brings up an interesting topic for discussion...	.50	.82	.48			
24. When I am busy working on an interesting project...	.65	.77	.63			
27. When I am having an interesting conversation with someone at a party...	.44	.78	.46	.77	.71	.56
30. When it turns out that I am much better at a game than the other players...	.32	.71	.39			
33. When I read something I find interesting...	.60	.77	.57	.66	.56	.46
36. When I am trying to learn something new that want to learn...	.58	.74	.56	.72	.69	.57

Note: Where no factor loading is reported the item had been removed due to cross loading or a factor loading of less than .30

Table 1 (cont.)

<i>Item</i>	Item statistics for Preoccupation subscale of Action-Control Scale (Kuhl, 1994)			Item statistics for Factor Three of this study		
	<i>Factor loading</i>	<i>Mean score within scale</i>	<i>r of item to scale</i>	<i>Factor loading</i>	<i>Mean score within scale</i>	<i>r of item to scale</i>
<i>Cronbach's alpha</i>	.70			.71		
1. When I have lost something that is very valuable to me...	.51	.37	.47	.66	.37	.42
4. If I've worked for two weeks on one project and then everything goes completely wrong...	.49	.30	.52			
7. When I am in competition and have lost every time...	.40	.45	.43			
10. If I had just bought a new piece of equipment and it was accidentally damaged beyond repair...	.53	.55	.49			
13. If I have to talk to someone about something important and can't find him or her at home...	.29	.46	.40			
16. When I have bought a lot of stuff at a store and realize that I paid too much for it and can't get my money back...	.41	.74	.44	.55	.67	.39
19. When I am told that my work has been completely unsatisfactory...	.51	.30	.53	.70	.26	.54
22. If I am stuck in traffic and miss an important appointment...	.44	.52	.47	.51	.39	.37
23.* When there are two things that I really like to do, but I can't do both of them...				.64	.43	.46
25. When something is very important to me, but I can't seem to get it right...	.50	.42	.54			
28. When something really gets me down...	.36	.26	.43	.63	.44	.47
31. When several things go wrong on the same day...	.47	.26	.50			
34. When I have put all my effort into doing a really good job on something and it doesn't work out...	.58	.45	.60			

Note: Where no factor loading is reported the item had been removed due to cross loading or a factor loading of less than .30

*In this analysis Item 23 did not load with other items in the Hesitation scale, instead it correlated with Preoccupation items.

Table 2
Correlations Among Composite and Individual Protective Factor,
Resilience, and Volition Measures.

	GPA	Attendance	GPA + Attendance (z-scores combined)	BASC Teachers	BASC Parents	BASC Relations	BASC Total	ACS Hesitation	ACS Preoccupation	ACS Volatility	ACS Total
Mean =	3.1	78.61	-.04	62.05	57.61	47.60	55.75	.45	.43	.69	.52
SD =	.76	17.93	.91	30.53	26.57	29.16	22.32	.31	.31	.31	.21
GPA											
Attendance	.45**										
GPA + Attendance	.85**	.84**									
BASC Teachers	.27*	.18	.26								
BASC Parents	.49**	.27	.40**	.34*							
BASC Relations	.30*	.15	.28	.42**	.45**						
BASC Total	.45**	.25	.40**	.77**	.75**	.81**					
ACS Hesitation	.16	-.12	.07	.24	.34**	.19	.33*				
ACS Preoccupation	-.18	-.11	-.25	.26*	.00	.11	.17	.21			
ACS Volatility	.25	.06	.13	.18	.18	.13	.21	.22	.19		
ACS Total	.13	-.09	-.02	.35*	.25	.21	.34**	.69**	.68**	.69**	

**p<.01, *p<.05

Academic Resilience

The two measures chosen to represent the construct of academic resilience, one's total grade-point average (GPA) and one's percentage of days present at school during the school year when one was diagnosed with RND correlated significantly with each other at an alpha level of .01 ($r = .451$). See Table 2. This moderate correlation between the two variables supports their use as indicators of a common construct of academic resilience.

Correlations Between Protective Factors and Academic Resilience

The total BASC scores, considered to represent participants' levels of protective factors, correlated significantly with the academic resilience score ($r = .40$, $p < .01$). More revealing, however, were the correlations among individual indicators. All of the BASC scales correlated significantly with GPA but not with attendance. Of the three BASC scales the Relations with Parents score was the best predictor of GPA ($r = .487$, $p < .01$).

This absence of a significant correlation between any of the BASC scales and attendance raised questions about the attendance variable. It could mean that the identified protective factors have little relationship to this component of resilience, or that the measure may not reflect resilience as accurately it could. Because attendance records for all participants could not be obtained and this variable did not correlate significantly with protective factor measures, further analysis focused primarily on GPA.

Volition as a Mediator

Once significant correlations were identified between protective factor measures and resilience measures, the next step was to evaluate the possibility of volition mediating the relationship between protective factors and resilience. Because no correlation was found between any of the BASC scales and attendance, and because attendance records could be obtained for only some participants ($n = 43$), GPA alone was selected as an indicator of academic outcome in the mediation analysis. Though it does not address the persistence component of resilience as directly as attendance, the measure is still relevant because it captures achievement well and still implies a certain element of persistence (one could not have a GPA without attending school, completing assignments and taking tests).

Two scales of the volition measures were found to correlate with individual protective factor measures. The Hesitation scale of the ACS correlated significantly with the Relations with Parents scale of the BASC ($r = .34, p < .01$) and the Preoccupation scale of the ACS correlated ($r = .26, p < .05$) with the Attitude to Teachers scale of the BASC. Because no significant relationships were found between either the Hesitation or Preoccupation scales and GPA, the preconditions for volition to function as a potential mediator were not satisfied. Therefore, the results of these analyses did not support volition as a mediator between protective factors and GPA.

Multiple Regression of Protective Factors on GPA

The correlations between the BASC scales and GPA found in this analysis favor the unmediated model described in the Analysis section over the mediated one. To

determine which individual protective factors, or combination thereof, best predicted one's GPA, a multiple regression analysis in which parents, teachers and peers were designated as independent variables predicting GPA was performed. The model predicted GPA in that the multiple-R for the regression equation was significantly different from zero, $F(3, 51) = 5.697, p < .01$. Within this model, however, two of the three BASC scales (Attitude to Teachers and Interpersonal Relations) did not contribute significantly to the equation (see Table 3). As such, the BASC scale of Relations with Parents was the only independent variable that contributed significantly to the regression equation, $t(51) = 3.00, p < .01$.

Table 3: Multiple Regression of Indicators that Correlated with GPA (n = 55)

Model	R^2	Adjusted R^2	F	p
Regression equation	.250	.206	5.679	.002
Independent Measures	Standardized coefficient, β	t		p
BASC Parents	.422	3.000		.004
BASC Peers	.068	.475		.637
BASC Teachers	.089	.647		.520

Chapter 4: Discussion

The aim of this study was to explore the relationship among protective factors, volition, and academic resilience to provide additional theoretical guidance to work done in academic resilience, thus informing a more parsimonious approach to intervention. If volition were found to mediate the relationship between protective factors and academic resilience, it raised the possibility that volition is necessary for protective factors to be effective. In that case, creating conditions to develop volition rather than replicating multiple protective factors would be a more efficient approach to fostering academic resilience.

Relevance of Significant Findings

Though some significant results obtained through this study were somewhat intuitive and previously documented, the overall findings can be interpreted in a manner that may provide additional direction to the field of academic resilience. Attendance and GPA were found to correlate. Individual protective factors correlated with each other and with elements of volition. Protective factors correlated with academic outcomes. More interesting perhaps is that one's relationship with parents was a better predictor of GPA than one's attitude toward teachers. These findings may have some value in that they address questions that have been posed by other educational researchers, such as how relationship with teachers influence academic achievement (Roeser, Eccles, & Sameroff, 1998) and how peer-relations contribute to academic competence (Clark, 1991). Specific to the field of academic resilience, they are potentially valuable because they lend

credence to the idea that there may be a unifying construct to explain academic resilience present in multiple protective factors.

The significant correlations among the protective-factor measures indicate that there is some shared variance among these scales. In addition, each of the individual BASC scales correlated significantly with an indicator of academic resilience, GPA. So some component within each of the protective factors predicted GPA. When the three BASC scales were entered into the multiple-regression analysis, however, each scale did not account for a unique amount of variance in GPA. Specifically, the Attitude to Teachers and Interpersonal Relations scales did not significantly improve the prediction ability of the Relations with Parents scale alone. If each of the BASC scales had contributed significantly to the regression equation, then it would be logical to conclude that inherent in each scale was a unique component that related to GPA. Because this is not the case, it is possible to conclude that the element within each of the protective factor scales that has a relationship to GPA may be shared among all three scales.

Relevance of Findings Regarding Volition

Because no mediation effect was found for volition in this study, however, no evidence can be offered in favor of volition as the explanatory mechanism in protective factors. This absence of a significant mediation effect leaves the door open to endless speculation about why no result was obtained. While it is possible that volition has no relationship to academic resilience, this study was not exhaustive enough to arrive at that conclusion in the absence of a significant mediation effect. Two of the more obvious

potential explanations for the absence of a significant correlation relate to the sample obtained and the measurement of constructs.

Homogeneity of Sample

Because the chronic condition of RND emerges disproportionately in Caucasian females (Sherry, 2000), the sample lacked equal gender and ethnic representation. This overrepresentation of Caucasians and females may have introduced confounds inherent in ethnicity (e.g., socio-economic status) and in gender differences (e.g., dropout rate). As such the selected sample could be a unique subset for whom the role of volition was negligible compared to other factors that were not identified.

Dewitt and Lens (1999) argue that there are specific subsets of students who do not need volitional strategies to be academically successful. Students who are more “task-oriented” than “performance-oriented” will tend to view academic tasks as engaging and therefore have no need to apply volitional strategies. Dewitt and Lens also describe gifted students and students with overlearned study habits as groups that would seldom have a need to apply volitional strategies because their natural talent or extensive training prevents them from seeing academic settings as challenging.

In designing this study, emphasis was placed on obtaining a sample with a common risk factor (i.e., chronic pain) that had been documented to compromise academic performance in different populations. Unfortunately, the condition selected (RND) which would ensure a homogeneity of symptoms did not encompass a demographically diverse population. In addition, to qualify the participants as academically-resilient it was necessary to ensure that they were passing their classes

when coping with the risk factor of chronic pain. Requiring certain common traits in the sample may have inadvertently resulted in a homogenous subgroup for whom volition was not relevant to academic outcomes.

Some support for this explanation is found in the descriptive statistics of the GPA scores and the available standardized tests scores. The mean GPA for this sample was 3.1 on a four-point scale. The standard deviation from the mean was .76. These statistics indicate that 50 percent of sample obtained a "B" average or higher and that approximately 84 percent of the sample had a "C+" average or higher during the year in which they were treated for RND. Of the students for whom SAT scores were obtained ($n = 10$) the average verbal score was 555 ($SD = 90.6$) and the average math score was 523 ($SD = 89.0$). Though the sample is too small to make any claims regarding statistical significance, the average scores in this sample were higher and the distribution was more tightly centered around the mean than the 2002 norms for Washington State. The average SAT math score for girls in Washington state was 500 ($SD = 97$), and the average verbal score was 502 ($SD = 99$) (College-Bound Seniors, 2002) Thus, there is some evidence that the sample selected may be more academically-homogenous than the average Washington student.

Measurement of Resilience

The central assumption that higher attendance and GPA represented a greater degree of resilience may have been erroneous because it does not take into account one's actual opportunity or capacity to meet the criteria of academically resilient. Some children may be working as hard as possible and coming to school as often as they can

but only achieve a “C” average and miss 20% of the school year because of legitimate illness or obligations. These children should be identified as extremely resilient because they are functioning as best as they can given their constraints. In this study, however, someone who had been an “A” student with perfect attendance and then became a “B” student and missed 15% of the school year when chronic pain occurred would score as more resilient than the first group. Equating higher scores with more resilience missed the intangible element of doing the best that one can under the circumstances.

Using attendance as an indication of volition was intended to address this issue because it measured perseverance independent of academic ability. Due to the nature of the data, however, it was not possible to determine whether or not a child’s actual attendance represented his or her best possible effort.

Measurement of Volition

Though the factor analysis of the Action-Control Scale performed in this study identified three distinct scales with sound psychometric properties, the absence of significant correlations among the scales is concerning. Because the three scales are purported to assess a similar construct, one would expect them to intercorrelate. In Kuhl’s (1994) research, the Preoccupation and Hesitation scales correlated positively, but the Volatility scale did not correlate significantly with either of the other two. Kuhl explained these results by describing the Hesitation and Preoccupation as addressing more specific aspects of his theory than the Volatility scale did. An implication of this explanation is that action-control (often described as volition) is such a multi-faceted construct that it is difficult to capture in a small number of scales. It is, therefore,

possible that though the scales obtained through the factor analysis done in this study did each measure a unique factor, they did not adequately capture the construct of volition.

Other researchers recognize the difficulty involved in trying to define and assess the construct of volition. In an article presenting his “Provisional Taxonomy for Volitional Control Constructs” Pintrich (1999) explains the need for consistent terminology and refers to Kuhl’s (1984) taxonomy as potentially, “...too global and general to help in the developing of a consistent terminology” (p. 338). Rather than attempting to measure volition as an entire construct Wolters (1999) identified the component of environmental control and assessed how it related to academic strategies. Similarly, McCann and Garcia (1999) narrowed the focus for their research and developed the “Academic Volitional Strategy Inventory” to assess how one manages emotion and motivation when engaged in academic tasks. Though one’s score on factors of the Action-Control Scale has been shown to correlate with specific performance outcomes (Diefendorff et al., 2000), the measure may have been too general to show any correlation with academic resilience in this study.

Directions for Further Research

Though this study did not find volition to theoretically link protective factors to each other and to academic resilience, this result does not diminish the value of having a unifying theory to help foster academic resilience, nor does it determine conclusively that the link does not exist. The correlations among protective factor scales and their correlation with GPA leave open the possibility that this unifying construct exists and is

yet to be clearly identified. Therefore, research that attempts to find a common thread among protective factors that correlate with academic resilience is still warranted.

Initially, however, the field of academic resilience may benefit from additional research that addresses one's capacity for academic success. Regularly including some element of "doing the best one can under the circumstances" in the measurement of resilience would help to separate those who are truly resilient (i.e., resistant to the effect of risk factors) from those who still score well on resilience measures but would have scored better if they had not been faced with risk factors. It is also possible that this distinction is irrelevant, in that those with the highest capacity for success may also be the most resilient. Being able to make this distinction (or determining that it is not necessary) might lead to a better explanation for resilience because people would be clearer about what was and was not included in the measurement of resilience.

After addressing this concern, one potential direction for researchers to explore would be to evaluate the correlations among specific items within the BASC scales and other measures of protective factors that have been shown to correlate with academic resilience. Examination of these inter-item correlations across various scales may result in a common factor or theoretical mechanism that accounts for various levels of academic resilience.

Further research relating volition to academic resilience should address whether or not the small to moderate correlations found in this study are replicable and reliable in a larger sample. If so, then further work should be conducted to isolate the elements within the general construct of volition that may account for the significant correlations.

The approach would be similar to the one suggested to isolate a common mechanism among BASC items. Within each volition scale certain items had higher correlations with resilience measures than other items. Because these items that correlated well with resilience measures did not form a common factor, however, additional thematically-similar items would need to be added or created. If a psychometrically-sound volition scale that correlated well with academic resilience could be developed, then its relationship to protective factors should be re-examined.

References

- Ackerman, P. L., & Woltz, D. J. (1994). Determinants of learning and performance in an associative memory/substitution task: Task constraints, individual differences, volition, and motivation. *Journal of Educational Psychology, 86*, 487-515.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.
- Bernstein, B.H., Singen, B.H., Kent, J.T., Kornreich, H., King, K., Hicks, R., & Hanson, V. (1978). Reflex neurovascular dystrophy in childhood. *The Journal of Pediatrics, 93*, 211-215.
- Blunt, A., & Pychyl, T. A. (1998). Volitional action and inaction in the lives of undergraduate students: State orientation, procrastination and proneness to boredom. *Personality and Individual Differences, 24*, 837-846.
- Bonny, A.E., Britto, M.T., Klostermann, B.K., Hornung, R.W., and Slap, B.S. (2000). School disconnectedness: identifying adolescents at risk, *Pediatrics, 106*, 1017-1021.
- Bowen, G. L., Richman, J. M., Brewster, A., & Bowen, N. (1998). Sense of school coherence, perceptions of danger at school, and teacher support among youth at risk of school failure. *Child and Adolescent Social Work Journal, 15*(4) 273-286.
- Brown, R. T., Sawyer, M. B., Antoniou, G., Toogood, I., Rice, M., Thompson, N., & Madan-Swain, A. (1996). A 3-year follow-up of the intellectual and academic functioning of children receiving central nervous system prophylactic chemotherapy for leukemia. *Journal of Developmental and Behavioral Pediatrics, 17*, 392-398.
- Brown, R. T., Sawyer, M. G., Antoniou, G., Toogood, I., & Rice, M. (1999). Longitudinal follow-up of the intellectual and academic functioning of children receiving central nervous system-prophylactic chemotherapy for leukemia: A four-year final report. *Journal of Developmental and Behavioral Pediatrics, 20*, 373-377.
- Carver, S. C. & Scheier, M.F. (1986). Principles of self-regulation and emotion. In E. T. Higgins & R.M. Serpentine (Eds.), *Handbook of Motivation and Volition*, (pp. 3-52). New York: The Guilford Press.

- Charlton, A., Larcombe, I.J., Meller, S.T., Morris-Jones, P.H., Mott, M.G., & Potton, M.W. (1991). Absence from school related to cancer and other chronic conditions. *Archives of Disease in Childhood*, *66*, 1217-1222.
- Chua, T. T., & Quah, M.L. (1999). The knowledge, volition and action programme in singapore: The effects of an experimental intervention programme on high ability achievement. *High Ability Studies*, *10*, 23-35.
- Clark, M.L. (1991). Social identity, peer relations, and academic competence of african-american adolescents. *Education and Urban Society*, *24*, 41-52.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155- 159.
- Corno, L. (1993). The best-laid plans: modern conceptions of volition and educational research. *Educational Researcher*, *22*(2), 14-22.
- Dewitte, S.& Lens, W. (1999). Volition: Use with measure. *Learning and individual differences*, *11*, 321-333.
- Diefendorff, J. M., Hall, R. J., Lord, R. G., & Strean, M. L. (2000). Action-state orientation: Construct validity of a revised measure and its relationship to work-related variables. *Journal of Applied Psychology*, *85*, 250-263.
- Fowler, M.G., Johnson, M.P., & Atkinson, S.S. (1985). School achievement and absence in children with chronic health conditions. *The Journal of Pediatrics*, *106*, 683-687.
- Garcia, T., McCann, E. J., Turner, J. E., & Roska, L. (1998). Modeling the mediating role of volition in the learning process. *Contemporary Educational Psychology*, *23*, 392-418.
- Garnezy, N. (1985). Stress-resistant children: the search for protective factors. In *Recent research in developmental psychopathology*, 213-231, New York: Pergamon.
- Garnezy, N., Masten, A. S., & Tellegen, A. (1984). The study of stress and competence in children: A building block for developmental psychopathology. *Child Development*, *55*, 97-111.
- Hanson, T. L., & Austin, G. (2003). *Student health risks, resilience, and academic performance in california: Year 2 report, longitudinal analyses*. Los Alamitos, CA: WestEd.

- Howe, G.W., Feinstein, C., Reiss, D., Molock, S., & Berger, K. (1993). Adolescent adjustment to chronic physical disorders: Comparing neurological and non-neurological conditions. *Journal of Child Psychology & Psychiatry & Allied Disciplines*, 34, 1153-1171.
- Jackson, Y., & Frick, P. J. (1998). Negative life events and the adjustment of school-age children: Testing protective models. *Journal of Clinical Child Psychology*, 27, 370-380.
- Jessor, R., Turbin, M. S., & Costa, F. M. (1998). Risk and protection in successful outcomes among disadvantaged adolescents. *Applied Developmental Science*, 2(4), 194-208.
- Kuhl, J. (1984). Volitional aspects of achievement, motivation, and learned helplessness: Toward a comprehensive theory of action control. In B.A. Maher & W.B. Maher (Eds.), *Handbook of Motivation and cognition: Foundations of Social Behavior*. New York: The Guilford Press.
- Kuhl, J. (1985). Volitional mediators of cognition-behavior consistency: self-regulatory processes and action versus state orientation. In J. Kuhl & J. Beckman (Eds.), *Action control* (pp. 101-128). New York: Springer-Verlag.
- Kuhl, J. (1987). Action Control: The maintenance of motivational states. In F. Halisch & J. Kuhl (Eds.), *Motivation, volition, and intention*, (pp.279-292). New York: Springer-Verlag.
- Kuhl, J. (1994). Action versus state orientation: Psychometric properties of the action control scale (ACS-90). In J. Kuhl & J. Beckmann (Eds.), *Volition and personality: action versus state orientation* (pp. 47-59). Seattle, WA: Hogrefe & Huber.
- Masten, A. S., & Coatsworth, J. D. (1998). The development of competence in favorable and unfavorable environments: Lessons from research on successful children. *American Psychologist*, 53, 205-220.
- Masten, A. S., Morison, P., Pellegrini, D., & Tellegen, A. (1990). Competence under stress: risk and protective factors. In J. E. Rolf & A. S. Masten (Eds.), *Risk and Protective Factors in the Development of Psychopathology* (pp. 236-256). New York, NY: Cambridge University Press.
- McCann, E.J. & Garcia, T. (1999). Maintaining motivation and regulating emotion: Measuring individual differences in academic volitional strategies. *Learning and individual differences*, 11, 259-279.

- Miller, D. B., & MacIntosh, R. (1999). Promoting resilience in urban African American adolescents: Racial socialization and identity as protective factors. *Social Work Research, 23*(3), 159-169.
- Murphy Southwick, C. (1996). Immunological responses to stress: The effects of action and state orientation., *Dissertation Abstracts International, 56*(10-B), 5280.
- Orbell, S., & Sheeran, P. (2000). Motivational and volitional processes in action initiation: A field study of the role of implementation intentions. *Journal of Applied Social Psychology, 30*, 780-797.
- Palfai, T.P., McNally, A.M., & Roy, M. (2002). Volition and alcohol risk reduction: The role of action orientation in the reduction of alcohol-related harm among college student drinkers. *Addictive Behaviors, 27*, 309-317.
- Pintrich, P.R. (1999). Taking control of research on volitional control: Challenges for future theory and research. *Learning and individual differences, 11*, 335-354.
- Pollard, J. A., Hawkins, J. D., & Arthur, M. W. (1999). Risk and protection: Are both necessary to understand diverse behavioral outcomes in adolescence? *Social Work Research, 23*(3), 145-158.
- Reynolds, A. J. (1998). Resilience among Black urban youth: Prevalence, intervention effects, and mechanisms of influence. *American Journal of Orthopsychiatry, 68*, 84-100.
- Reynolds, C.R. & Kamphaus, R.W. (1992). *Behavioral assessment system for children manual*. Circle Pines, MN: American Guidance Service, Inc.
- Roeser, R.W., Eccles, J.S., & Sameroff, A.J. (1998). Academic and emotional functioning in early adolescence: Longitudinal relations, patterns, and prediction by experience in middle school. *Development and Psychopathology, 10*, 321-352.
- Sherry, D. (2000). An overview of amplified musculoskeletal pain syndromes. *The Journal of Rheumatology, 27*, 44-48.
- Sherry, D.D., Wallace, C. A., Kelley, C., Kidder, M., & Sapp, L. (1999). Short- and long-term outcomes of children with complex regional pain syndrome type I treated with exercise therapy. *The Clinical Journal of Pain, 15*, 218-223.
- Smokowski, P. R., Reynolds, A. J., & Bezruczko, N. (1999). Resilience and protective factors in adolescence: An autobiographical perspective from disadvantaged youth. *Journal of School Psychology, 37*, 425-448.

- Stein, R. & Jessop, D. (1982). A non-categorical approach to chronic childhood illness. *Public Health Reports*, 97, 354-362.
- The College Board. (2002). *2002 College-bound seniors: A profile of SAT program test takers*. San Jose, CA: Educational Testing Service.
- Thompson, R. J., Gustafson, K. E., Gil, K M., Godfrey, J., & Bennett- Murphy, L.M. (1998). Illness specific patterns of psychological adjustment and cognitive adaptational processes in children with cystic fibrosis and sickle cell disease. *Journal of Clinical Psychology*, 54, 121-128.
- Vance, J. E., Fernandez, G., & Biber, M. (1998). Educational progress in a population of youth with aggression and emotional disturbance: The role of risk and protective factors. *Journal of Emotional and Behavioral Disorders*, 6(4), 214-221.
- Weist, M. D., Freedman, A. H., Paskewitz, D. A., Proescher, E. J., & Flaherty (1995). Urban youth under stress: Empirical identification of protective factors. *Journal of Youth and Adolescence*, 24, 705-721.
- Wolters, C.A. (1999). The relation between high school students' motivational regulation and their use of learning strategies, effort, and classroom performance. *Learning and individual differences*, 11, (281-299).