Personal epistemology: Implications for stress in college students

Robyn M Johnson

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PERSONAL EPISTEMOLOGY: IMPLICATIONS
FOR STRESS IN COLLEGE STUDENTS

by

Robyn M. Johnson

Bachelor of Science
University of Nevada, Las Vegas
1996

A thesis submitted in partial fulfillment of the requirements for the

Master of Education
Department of Health and Physical Education
College of Education

Graduate College
University of Nevada, Las Vegas
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The Thesis prepared by

Robyn M. Johnson

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ABSTRACT

Personal Epistemology: Implications for Stress in College Students

by

Robyn M. Johnson

Dr. Charles Regin, Examination Committee Chair
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University of Nevada, Las Vegas

This research study investigated whether college students’ epistemological beliefs (i.e. certain knowledge, simple knowledge, fixed ability, quick learning, and omniscient authority) could predict negative stressors and/or reactions to stress in their college experience. Based on responses to two self-assessment inventories and a demographic survey; analysis of the data suggests that over and above contributions from demographics (i.e. gender, ethnicity, age, and education level), certain dimensions of epistemological beliefs contributed significantly to the prediction of negative stress in college students. This suggests that it is essential for educators to provide opportunities for students’ epistemological development; specifically, in the area of constructing knowledge. Students need opportunities to view themselves as sources of knowledge (i.e. knowledge is constructed internally), which leads to development of a higher level of cognitive processing.
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Thank you for providing the connection that helped me to discover the field of personal
epistemology. This is just the beginning!
CHAPTER 1

INTRODUCTION

This section provides a summary of the purpose of this research study. Additionally, a brief overview of prior research in the area of epistemology and stress is presented, which provided the foundation for the development of the two research questions addressed in this study. A more detailed overview of the literature and research in the areas of epistemology and stress, as they relate to this research, can be found in Chapter 2 of this paper. The significance of this study is discussed briefly in the closing of this section, and will be explained in more detail in Chapter five of this paper.

Purpose of the Study

A significant amount of research has been completed regarding the college experience and how the student develops through college (Perry, 1970; Astin, 1993; King & Kitchener, 1994; Kuh, 1995; Baxter-Magolda, 1992; Chickering & Riess. 1993; Heath, 1968). This research study explored the concept of how the beliefs (i.e. beliefs about the nature of knowledge and knowing) possessed by college students, in particular their epistemological beliefs in five identified dimensions, impacted their college experience and possibly their development through their college education. Specifically, this study explored to what extent an individual’s epistemological beliefs contributed to the individual’s negative stress during his or her college experience. Astin (1998), using the results accumulated from thirty years of annual freshmen surveys conducted by the
Cooperative Institutional Research Program (CIRP) concluded that stress in college students is on an increase. Astin also found that the percentage of college students reporting that they frequently feel depressed has been increasing, in contrast to a decrease in the number of students who rated themselves above average in emotional health. In addition, the number of entering freshmen seeking personal counseling has been on the rise. Carlson (1999) states “Stress is a natural and inevitable occurrence in college life...Exposure to new experiences, demands on one’s time, and a variety of new choices to make all combine to create stress for the college student, even one who is excited and ready to jump into college life with both feet.”

How one perceives and responds to these new collegiate events may be influenced by the individual’s personal epistemology, specifically, these new experiences are tempered through the lens of their epistemological beliefs. Stress has an impact on the sympathetic nervous system and can cause the body to respond in a variety of ways; physiological, emotional, and/or behavioral, all of which may have minor to severe implications for the college student’s academic performance, physical health, and/or emotional well-being (Girdano, Everly, & Dusek, 2001). For most individuals, going to college removes them from the secure family environment; an environment where their epistemological beliefs are not generally tested and readily accepted as the norm, and places them in an environment where their epistemological beliefs are constantly challenged and questioned. This questioning of beliefs forces the individual to confront their beliefs and either assimilate or accommodate to this cognitive disequilibrium (Perry, 1970). Bendixen (2002) in describing this process suggest that Epistemic Doubt plays a key role in belief change. As explained later in this paper this process may create a significant
amount of discomfort and stress for the individual. This study hypothesized that certain epistemological beliefs may contribute to the negative stress an individual encounters in college.

Research Questions

This study was an investigation into the area of a hypothesized relationship between stress in college students and epistemological beliefs. Two research questions were posed for the purpose of this study. They are:

1. Do the demographic variables of gender, age, ethnicity, and education level predict certain stressors and/or reactions to stress in college students?

2. Do the epistemological dimensions of fixed ability, certain knowledge, simple knowledge, quick learning, and omniscient authority predict certain stressors and/or reactions to stress in college students over and above the demographic variables of gender, age, ethnicity, and education level?

Significance of the Study

Because research on stress has suggested that it may be the cause of some physical, mental, and emotional illnesses; exploring what potentially contributes to stress is extremely important. If potential sources of certain types of stressors and/or certain types of reactions to stress can be identified then this may assist in the development of strategies to help reduce the negative side of stress in the college experience.
CHAPTER 2

LITERATURE REVIEW

The first section of this chapter explores the history and concept of stress; specifically, how stress became a topic of research in the field of psychology, how stress affects the body and mind, and how the use of self-assessment inventories came about in predicting stress. Furthermore, stress has numerous definitions and connotations; therefore, for the purpose of this research working definitions for stress, stressors, and stress reaction are identified as they relate to this research project. The second section of this chapter addresses personal epistemology. Both epistemological beliefs and epistemological development are explained, with a specific focus centering on the epistemology of college students.

Stress

As far as anyone can establish, the first use of the term stress in a non-technical sense was in the 14th century and referred to the term as hardship, straits, adversity, or affliction (Lumsden, 1981). In the 17th century, scientist Robert Hooke made a lasting contribution to the field of stress by formulating an engineering analysis of stress (Hinkle, 1973). This analysis of stress stated that bridges should be built to withstand carrying heavy loads, and combat against the elements without collapsing. Hooke's analysis led to three concepts: load, stress, and strain. Load referred to external forces, stress to the area of the structure over which the load is applied, and strain is the deformation of the structure
based on the interplay of load and stress. This influenced the 20th century research on
stress, which drew on the idea of load as an external force exerted on a social,
physiological, or psychological system (Lazarus, 1999). Load then became synonymous
with stress stimulus or stressor, and strain synonymous with its current day use stress
response/reaction. For the purpose of this research the term stressor(s) is defined as any
condition or event that causes a stress response; specifically, demanding adjustments
beyond the normal wear and tear of daily living (Girdano et al., 2001; Gadzella, 1994).

It was during the 1940s that stress research focused on the military and the effects of
war on the individual. Many of the young soldiers returned from combat with a
multitude of symptoms that doctors could not diagnose; commonly referred to today as
posttraumatic stress disorder. Interest in the concept of stress expanded from the military
for two reasons. First, war had spread from the battlefield; the advance of technology
and the creation of new weapons brought the fight into our homes. Second, the
realization that stress not only occurred during wartime, but could also develop in
peacetime. Specifically, stress could take place at work, at home, or in relationships,
basically anytime one was struggling to adapt to life stress could take place (Lazarus,
1999). Consequently, all concepts and terms reflecting adaptation problems with life
such as anxiety, conflict, frustration, trauma, alienation, and depression, previously used
by a plethora of social scientists, were brought under the umbrella of stress (Lazarus,
1999). As Cofer and Appley (1964) stated, "It is as though, when the word stress came
into vogue, each investigator, who had been working with a concept he felt was closely
related, substituted the word stress and continued in his same line of investigation" (p.
449).
Today, Hans Selye is considered the father of modern stress research (Lerman, & Glanz, 1997; Girdano et al., 2001). Selye (1976) simply defined stress as a response elicited by an external event. A more concrete definition of stress, and how it is referred to for the purpose of this research, describes stress as a generic term used to describe life situations, which cause changes, adaptations, and/or adjustments in a person's mental, emotional, or physical status (Regin, 2000). Stress can have both a positive and negative effect on our lives; some researchers and scientists would go so far as to say that we need stress. Girdano et al. (2001) state "stress is a natural defense mechanism that has allowed our species to survive" (p.1). Selye (1976) described two types of stress. Selye said that we have good stress, which he called eustress, and bad stress, which he labeled distress. Whether stress is good or bad, eustress or distress, both have an impact on our bodies and minds by affecting our sympathetic nervous system. One key is for our body and mind to work in harmony; this concept of the body and mind interactions is often referred to as psychosomatic (Girdano et al., 2001). This led to the term psychosomatic disease, which is described as a result of excess emotional arousal, maladaptive coping, and chronic distress (Girdano et al., 2001). To further explain this, some emotions such as anxiety, anger, fear, and frustration can increase the body's susceptibility to organic disease. Psychosomatic diseases established a link between emotions and how they could affect the body resulting in physical ailments (Girdano et al., 2001). According to the psychosomatic phenomenon distressing emotions inhibit the bodies ability to protect itself from disease.

Real or imagined, stress arouses our sympathetic nervous system, and should be counterbalanced by a stimulation of the parasympathetic nervous system. If this does not
happen, the nervous system can become fatigued and damaged to the point of malfunction or disease.

One of the foremost theories regarding stress and how it affects the body is Hans Selye’s General Adaptation Syndrome (GAS) also referred to as the biological stress syndrome (Lerman & Glanz, 1997; Girdano et al., 2001; Selye, 1976). Figure 1 depicts the various stages of Selye's GAS theory. Selye stated that everyone has a homeostatic level, where the body functions at a balanced state and to stay at this level one needs to balance the positive and negative stressors. When a person is confronted with a stress event, there will be a slight dip in the homeostatic level and then a rise above the homeostatic level to confront that event. This is the first phase of the GAS and it is called the alarm phase. The second phase is the resistance phase where the body confronts the stress event and this takes place above the homeostatic level. The final phase is divided into two categories, recovery phase or exhaustive phase. The recovery phase takes between 24 to 36 hours, and the more an individual can stimulate the parasympathetic nervous system, the closer the recovery can be to 24 hours. If there is a recovery phase then there is no exhaustive phase. However, if the individual does not go into the recovery phase or complete the recovery phase the individual will eventually find him or herself in the exhaustive phase, which increases his or her risk of disease. High blood pressure is an example of an individual who has not allowed his or her body to return to the homeostatic level.
Selye often referred to stress as the disease of adaptation (Girdano et al., 2001). His focus on the body and mind's ability to adapt, to work in a psychosomatic environment, led to a second theory on stress, which is referred to as the Adaptive Energy Theory (see Figure 2).
According to Selye, each of us is born with a finite amount of adaptive energy. When an individual runs out of their adaptive energy he or she dies. Selye believed that an individual cannot replenish their adaptive energy, but may affect the rate at which this energy is used up. Furthermore, Selye stated that there are certain life events that are so overwhelming that one cannot overcome them.

**Measuring Stress Reactions and Identifying Stressors**

During the 1960s and 1970s a major focus of stress research was on trying to identify and quantify potential stressors and stressful life events. Holmes and Rahe (1967) developed the Social Readjustment Rating Scale (SRRS) designed to measure both positive and negative life events considered stressful by the need to adapt or adjust to the event. Whether positive or negative, it is the change, the disruption of homeostasis that produces the stress (Girdano et al., 2001). The SRRS lists a series of life events and weights them in regards to the level one must adapt and/or adjust to the stress event (see table 1 for a list of items and weights on the SRRS scale). Interesting is the inclusion of both negative and positive events as stressful. For example, according to the SRRS a "vacation" earned more stress points than a "minor violation of the law" (e.g. a ticket for speeding). Research on this scale showed that individuals who responded with high scores had more illnesses. The original SRRS was designed for a specific population; however, since that time it has undergone several revisions, as many of the items are not specific to the current era. It is noteworthy to mention that while the scale had several limitations in its methodology (i.e. respondents were not asked whether events were desirable or undesirable); it generated much research in the area of identifying potential stressors (Dohrenwend, & Dohrenwend, 1981). Since the original SRRS, numerous
self-assessment stress inventories have been created and designed for specific populations, which focus on the stressors and reactions to stress of the target population.

Table 1


<table>
<thead>
<tr>
<th>Item</th>
<th>Point Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death of a spouse</td>
<td>100</td>
</tr>
<tr>
<td>Divorce</td>
<td>73</td>
</tr>
<tr>
<td>Marital Separation</td>
<td>65</td>
</tr>
<tr>
<td>Jail Term</td>
<td>63</td>
</tr>
<tr>
<td>Death of a close family member</td>
<td>63</td>
</tr>
<tr>
<td>Personal Injury or illness</td>
<td>53</td>
</tr>
<tr>
<td>Marriage</td>
<td>50</td>
</tr>
<tr>
<td>Fired from work</td>
<td>47</td>
</tr>
<tr>
<td>Marital reconciliation</td>
<td>45</td>
</tr>
<tr>
<td>Retirement</td>
<td>45</td>
</tr>
<tr>
<td>Change in family member's health</td>
<td>44</td>
</tr>
<tr>
<td>Pregnancy (Yours or significant other's)</td>
<td>40</td>
</tr>
<tr>
<td>Sex difficulties</td>
<td>39</td>
</tr>
<tr>
<td>Addition to family</td>
<td>39</td>
</tr>
<tr>
<td>Business Readjustment</td>
<td>39</td>
</tr>
<tr>
<td>Change in financial status</td>
<td>38</td>
</tr>
<tr>
<td>Death of a close friend</td>
<td>37</td>
</tr>
<tr>
<td>Change to a different line of work</td>
<td>36</td>
</tr>
<tr>
<td>Son or daughter leaving home</td>
<td>29</td>
</tr>
<tr>
<td>Trouble with in-laws</td>
<td>29</td>
</tr>
<tr>
<td>Outstanding personal achievement</td>
<td>28</td>
</tr>
<tr>
<td>Spouse begins or stops work</td>
<td>26</td>
</tr>
<tr>
<td>Starting or finishing school</td>
<td>26</td>
</tr>
<tr>
<td>Change in living conditions</td>
<td>25</td>
</tr>
<tr>
<td>Revision of personal habits</td>
<td>24</td>
</tr>
<tr>
<td>Trouble with the boss</td>
<td>23</td>
</tr>
<tr>
<td>Change in work hours, condition</td>
<td>20</td>
</tr>
<tr>
<td>Change in residence</td>
<td>20</td>
</tr>
<tr>
<td>Change in schools</td>
<td>20</td>
</tr>
<tr>
<td>Change in recreational habits</td>
<td>19</td>
</tr>
<tr>
<td>Change in church activities</td>
<td>19</td>
</tr>
<tr>
<td>Change in social activities</td>
<td>18</td>
</tr>
<tr>
<td>Mortgage or loan under $10,000</td>
<td>17</td>
</tr>
<tr>
<td>Change in sleeping habits</td>
<td>16</td>
</tr>
<tr>
<td>Change in number of family gatherings</td>
<td>15</td>
</tr>
<tr>
<td>Change in eating habits</td>
<td>15</td>
</tr>
<tr>
<td>Vacation</td>
<td>13</td>
</tr>
<tr>
<td>Christmas season</td>
<td>12</td>
</tr>
<tr>
<td>Minor violations of the law</td>
<td>11</td>
</tr>
</tbody>
</table>
One such self-assessment stress inventory (and the one used for data collection in this research study) focusing on the target population of college students is the Student Life Stress Inventory (SSI) developed by Bernadette Gadzella (Gadzella, 1991). The SSI is an instrument designed to measure on a continuous scale the stressors and reactions to stress specific to college students and their lives on and off campus (Gadzella, & Baloglu, 2001; Gadzella, Masten, & Stacks, 1998; Gadzella, 1998; Gadzella, 1994). Previous research using the SSI has examined its reliability and validity (Gadzella, & Baloglu, 2001; Gadzella, Fullwood, & Ginther, 1991; Gadzella & Gunthric, 1993). The SSI identifies five areas of stressors and four types of reactions to stress, based on responses to questions about the experiences of students in the college environment.

One question that arises from the inspection and use of these scales, especially the SRRS, is the notion that not all individuals respond to stress in the same way. Lerman and Glanz (1997) state, “stress does not affect all people equally, some individuals live through terribly threatening experiences yet manage to cope well and do not become susceptible to illness” (p. 113). Lazarus (1999) states, “It is the meaning constructed by a person about what is happening that is crucial to the arousal of the stress reaction” (p. 55). Furthermore, Lazarus believed that the stress one experiences is not in a situation or in the person, but in the transaction between the two depending upon the meaning the person gives to the situation (Goleman, 1979; Weiten, et al., 1990). Therefore, if constructing meaning is pivotal to the stress reaction then it would make sense that "how" the individual constructs meaning is of even more importance in helping to understand the individual’s responses to stressors. And if it is through our epistemological lenses...
that we construct meaning, one might consider the possibility that epistemology is a filter for how one reacts to stress and how strongly one reacts to certain stressors.

**Personal Epistemology**

Personal Epistemology encompasses the area of epistemology that concentrates on the psychology of beliefs about knowledge and knowing (Hofer & Pintrich, 2002). An important construct of personal epistemology is how the individual develops their beliefs about knowledge; this process is often referred to as epistemological development. Hofer (2002) states "from a psychological and educational perspective, the focus of concern among those studying personal epistemology or epistemic cognition is how the individual develops conceptions of knowledge and knowing and utilizes them in understanding the world" (p. 4).

One of the first individuals to conduct extensive research in the area of the epistemological development of college students was William Perry (Perry, 1970). Even though Perry's research has been criticized for his use of mostly male participants at a predominantly white, middle to upper class university, it still stands today as a landmark in epistemological development research. Hofer and Pintrich (1997) state "Perry's scheme has served as a heuristic for understanding how college students make meaning of their educational experiences and as a platform for multiple lines of research on epistemological beliefs" (p. 90).

Perry based his research on an assumption of the time that how students responded to the relativism of college was based primarily on their individual personality (Perry, 1970; Hofer & Pintrich, 1997). In his research Perry collected information that described students' experiences at college. To do this he used both a tool that he developed, an
instrument called the CLEV (Checklist for Educational Values), and interviews in which he would ask the participant “Would you like to say what stood out to you during the year?” It was through the analysis of these interviews that Perry concluded that it was not an individual’s personality that led to ways of construing meaning in their world, but a logically coherent, cognitive developmental process (Perry, 1970; Hofer & Pintrich, 1997).

Through his research Perry identified nine positions, referred to as positions rather than stages, of intellectual and epistemological development. Several researchers have grouped these nine positions into four categories (Moore, 1994; Kurfiss, 1988; Knefelkamp & Slepitza, 1978). Table 2 lists and describes the four categories and aligns them with Perry’s original nine positions.

In referring to a change from one position to another, Hofer & Pintrich, (1997) following a common theme of Piaget’s state “change is brought about through cognitive disequilibrium; individuals interact with the environment and respond to new experiences by either assimilating to existing cognitive frameworks or accommodating the framework itself” (p. 91).

Just as Gilligan (1982) criticized Kohlberg’s (1969) theory of moral development for using entirely male participants and generalizing to both genders, Belenky, Clinchy, Goldberger, & Tarule (1986) questioned Perry’s use of predominantly male participants (only 2 women were included in Perry’s research study results). Interested in whether there was a difference in the themes of knowing as they applied to women, Belenky et al. (1986) conducted 135 interviews with women, using Perry’s initial research as a
framework. From the interviews Belenky et al. (1986) concluded that women viewed reality and drew conclusions about truth, knowledge, and authority through five different perspectives, referred to as women's ways of knowing. The five perspectives Belenky et al. identified as women's ways of knowing are silence, received knowledge, subjective knowledge, procedural knowledge, and constructed knowledge (see Table 3). Belenky et al. (1986) concluded that women's ways of knowing were highly intertwined with self-concept (Hofer & Pintrich, 1997). While Perry focused on the nature of knowledge, Belenky et al. focused more on the source of knowledge and truth.

Table 2

Perry's Scheme of Intellectual and Ethical Development (1970) Identified by Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Position</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dualism</td>
<td>Positions 1 &amp; 2</td>
<td>Division of meaning into two realms; absolutist, right-and-wrong view of the world. Authorities know the truth.</td>
</tr>
<tr>
<td>Multiplicity</td>
<td>Positions 3 &amp; 4</td>
<td>Diversity of opinions and values are recognized as legitimate in areas where right answers are not known. Truth is still knowable. All views are equally valid, no judgment can be made among them, everyone has a right to their own opinion and none can be called wrong.</td>
</tr>
<tr>
<td>Relativism</td>
<td>Positions 5 &amp; 6</td>
<td>A shift from a dualistic viewpoint of the world to one that is relative, the individual now realizes that they are an active maker in constructing their own meaning. Knowledge is relative, dependent upon context. Here one begins to weigh their own commitments to knowledge.</td>
</tr>
<tr>
<td>Commitment with Relativism</td>
<td>Positions 7, 8, &amp; 9</td>
<td>Individuals make affirmations, choices, and decisions to values, careers, and relationships in the awareness of relativism. Note: These positions are not commonly found among college students.</td>
</tr>
</tbody>
</table>
Table 3

Belenky et al., Women's Ways of Knowing

<table>
<thead>
<tr>
<th>Way of Knowing</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silence</td>
<td>Compliance to external authority, passive, voiceless existence</td>
</tr>
<tr>
<td>Received Knowing</td>
<td>Ability to hear, but unable to speak in one's own voice, there is only one right answer</td>
</tr>
<tr>
<td>Subjective Knowing</td>
<td>Sense of self overcomes reliance on outside authority and replaces it with intuition; source of truth is within oneself.</td>
</tr>
<tr>
<td>Procedural Knowing</td>
<td>Reasoned reflection, applying objective, systematic procedures of analysis</td>
</tr>
<tr>
<td>Construed Knowing</td>
<td>Individual views self as participant in construction of knowledge; integration of subjective and objective strategies of for knowing</td>
</tr>
</tbody>
</table>

Baxter-Magolda, following both Perry and Belenky et al.'s research, focused on the gender-related implications of epistemological development. By conducting a longitudinal study, using both men and women college students, Baxter-Magolda examined epistemological development and how epistemological assumptions affect interpretation of educational experiences. Through analysis of her research Baxter-Magolda (1992) developed the Epistemological Reflection Model, which contains four qualitatively different ways of knowing; identified as absolute knowers, transitional knowers, independent knowers, and contextual knowers (see Table 4). Within three of the four identified ways of knowing, a gender related reasoning distinction was found.
Women who were identified as absolute knowers displayed a pattern of receiving more often than men, while men identified as absolute knowers displayed the pattern of mastering more often. The pattern of receiving suggests that women are more private and tend to listen and record more than men who tend to be more public, demonstrating, and challenging in their reasoning. Within the framework of transitional knowers, patterns for women tended to be more interpersonal, use discussion, and resolve uncertainty by personal judgment. On the other hand, patterns for men who were identified as transitional knowers were more impersonal, use debate, and resolve uncertainty by logic. Patterns for the independent knowers suggest that women are more inter-individual, while men tended to be individual. By focusing on the nature of learning, Baxter-Magolda added another dimension to the study of epistemological development.

Table 4

Baxter-Magolda’s Epistemological Reflection Model

<table>
<thead>
<tr>
<th>Domains</th>
<th>Absolute Knowing</th>
<th>Transitional Knowing</th>
<th>Independent Knowing</th>
<th>Contextual Knowing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature of Knowledge</td>
<td>Is certain or Absolute</td>
<td>Is partially certain and partially uncertain</td>
<td>Is certain, everyone has own beliefs</td>
<td>Is contextual; judge on basis of evidence in context</td>
</tr>
<tr>
<td>Role of Learner</td>
<td>Obtains knowledge from instructor</td>
<td>Understands knowledge</td>
<td>Thinks for self. Shares views with others, Creates own perspective</td>
<td>Exchanges and compares perspectives, Thinks through problems, Integrates and applies knowledge</td>
</tr>
</tbody>
</table>
Expanding on Perry's work in another direction, King and Kitchener focused on epistemic assumptions that underlie reasoning (King & Kitchener, 1994; King, Kitchener, Wood, & Davidson, 1989; Kitchener, 1983, 1986). King and Kitchener's research led to the development of a seven-stage model of epistemic cognition entitled the Reflective Judgment Model. According to King and Kitchener (1994) the model focuses on "the ways that people understand the process of knowing and the corresponding ways they justify their beliefs about ill-structured problems" (p. 13). A brief explanation of the seven stages of the model describe stage one through three as students not perceiving that knowledge is uncertain, there are no real problems that do not have certain answers. In stage four, students recognize that one cannot know with certainty. In stage five, students believe that what is known is limited by the perspective of the knower. In stage six, students understand that knowing is a process that requires action on the part of the knower. Finally, in stage seven, students believe that knowledge is in the outcome of the process of reasonable inquiry in which solutions to ill-structured problems are constructed.

**Epistemological Questioning**

While, Perry, Belenky et al., Baxter-Magolda, and King and Kitchener have focused on epistemological development, Chandler (1990, 1987, 1975) and Bendixen (2002) have explored the feelings individuals experience when faced with a change in their epistemological beliefs; what Perry, based on Piaget, refers to as cognitive disequilibrium. In his research Chandler (1975) refers to this cognitive disequilibrium as Epistemic Doubt and Epistemological Loneliness. While Chandler used the terms to relate to relativistic thinking only, Bendixen (2002) suggests that Epistemic Doubt is a
trigger to belief questioning and change across all developmental stages of epistemological beliefs.

Prior to college the individual has a sense that the world evolves around them, and the individual is used to being the focal point of the family unit (Chandler, 1975). For most middle class families who have children this usually holds true, their children are the focus or center of the family unit’s attention. However, in college the individual freshman comes to a realization that they are no longer the center of the universe, and that their beliefs are no longer “absolute”.

Chandler (1975) states:

There is a gradual dawning of awareness of what Sarte (1965) has called a ‘plurality of solitudes’ – that each person’s point of view relentlessly cancels out the viewpoint of another. This potentially ominous and isolative awareness, which Berger and Luckman (1966) have characterized as the ‘vertigo of relativity’, heralds in a growing sense of estrangement from others referred to as epistemological loneliness. (p. 172)

For the individual entering college, the realization that their epistemological beliefs are questionable leads to a complexity of emotions and doubts (Bendixen, 2002).

Chandler (1975) further states:

The initial recognition of this uncertainty principle is not, consequently, necessarily equivalent to its whole-hearted acceptance, nor is it all obvious how one is to cope with let alone take pleasure in, this ultimate relativity. The growing realization is instead typically accompanied by a sense of uneasiness that is hard to shake off. It is this double-edged feature of adolescent emerging social
decentering skills, which serve to dampen the enthusiasm with which they sometimes embrace their own newly acquired conceptual accomplishments, to discourage them in their attempts to consolidate their intellectual gains, and at times to entirely derail their subsequent development process. (p. 172)

Bendixen (2002) used a phenomenological approach to get to the meaning of what an individual experiences when their beliefs are in question. Bendixen conducted extensive interviews with college students, and from the results of these interviews developed a process model of epistemic belief change. There are four components to the model; the first component explores what triggers the epistemic doubt (questioning of belief). In this area Bendixen (2002) found that:

Exposure and independence were catalyst of epistemic doubt. Beliefs long held by participants were disintegrating because of the people and experiences around them. Exposure to beliefs unlike their own made participants see their beliefs in a new light. College was mentioned as a place where differing epistemological beliefs were encountered and these differences caused one to question the validity of the current beliefs held. (p. 196-197)

The second component of Bendixen's model explores the experience of epistemic doubt; "what it feels like." Here participants in the study cited feelings of uneasiness, unclear thoughts, and a feeling that they were not sure what was true. One student noted that the teacher never really told them the "true" or "right" answers, which left her feeling as though there was no certainty (Bendixen, 2002). The third component of the model explores the resolution of the epistemic doubt. In this component individuals either take control of their beliefs or surrender control of their beliefs. Individuals who took
control of the belief resolved their epistemic doubt through analysis and reflection. Individuals who chose to surrender the belief resolved their epistemic doubt by relinquishing control of their belief to a higher power. The final component to the model explores the results of the doubting process. In this component individuals either developed new “better” beliefs (those who took control) or reaffirmed and strengthened old beliefs (those who surrendered).

While this is not an exhaustive review of all epistemological development research, it is however a concise overview of the main themes and landmark research of epistemological developmental: from Perry who suggested the first developmental sequence, to Belenky et al. who explored gender related consequences in ways of knowing, to Baxter-Magolda whose longitudinal study contributed to the understanding of the nature of learning, to King and Kitchener’s explanation of epistemological awareness as a part of the thinking and reasoning process, to Chandler and Bendixen, who continue to explore the internal turmoil and process of questioning one’s epistemological beliefs. All have made significant contributions to the field of personal epistemology, and the understanding of the epistemological development of college students.

Measuring Epistemological Beliefs

Moving beyond the developmental stage approach of epistemology, Schommer (1989) believed that Perry and others following his research fell short in their viewpoint that epistemology was unidimensional and developed in a progression of stages. Schommer suggested that personal epistemology was a belief system that was composed of several independent dimensions. Based on this premise, Schommer (1989) set out to identify
independent epistemological dimensions, and to provide a quantitative method of measuring an individual's beliefs across a continuum. Through the use of an epistemological questionnaire, Schommer (1989) identified four areas of epistemological dimensions: innate ability, certain knowledge, simple knowledge, and quick learning. Each dimension is based on a continuum, and stated from a naïve point of view. Later, Schommer (1990) refined the four dimensions and hypothesized five epistemological dimensions (see Table 5): certain knowledge (i.e. absolute knowledge exists and will eventually be known), simple knowledge (i.e. knowledge consists of discrete facts), quick learning (i.e. learning occurs in a quick or not at all fashion), fixed ability (i.e. the ability to acquire knowledge is fixed), and source of knowledge (i.e. authorities have access to otherwise inaccessible knowledge). To test the five hypothesized epistemological dimensions Schommer developed a 63-item questionnaire, using a 5-point scale, designed to measure the beliefs of college students in these areas. Empirical work has typically yielded four out of the five dimensions (all but omniscient authority): certain knowledge, simple knowledge, fixed ability, and quick learning (Hofer, 2001).

Using Schommer’s epistemological questionnaire as a framework, Schraw, Bendixen, and Dunkel (2002) developed a 32-item instrument entitled the Epistemological Beliefs Inventory (EBI) that measured the same five dimensions proposed by Schommer (Bendixen, Schraw, & Dunkle, 1998; Bendixen, Dunkle, & Schraw, 1994). Schraw et al. stated, “Our goal was to develop an instrument that was shorter, measured all five hypothesized beliefs, and was more reliable than other instruments” (p. 263). For the purpose of this research study the EBI was chosen as the instrument for measuring the participants beliefs among the five dimensions, based on its reputed reliability, validity.

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and empirical work using all five dimensions. An explanation on the development and validation of the EBI can be found in Schraw, Bendixen, and Dunkle (2002).

Table 5
Schommer's (1990) Hypothesized Epistemological Dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Belief In</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source of Knowledge</td>
<td>Omniscient Authority</td>
<td>From knowledge is handed down by omniscient authority to knowledge is reasoned out through objective to subjective means.</td>
</tr>
<tr>
<td>Certainty of Knowledge</td>
<td>Certain Knowledge</td>
<td>From knowledge is absolute to knowledge is constantly evolving.</td>
</tr>
<tr>
<td>Organization of Knowledge</td>
<td>Simple Knowledge</td>
<td>From knowledge is compartmentalized to knowledge is highly integrated and interwoven.</td>
</tr>
<tr>
<td>Control of Learning</td>
<td>Fixed Ability (Labeled Innate Ability in 1989)</td>
<td>From ability to learn is genetically predetermined to ability to learn is acquired through experience.</td>
</tr>
<tr>
<td>Speed of Learning</td>
<td>Quick Learning</td>
<td>From learning is quick or not-at-all to learning is a gradual process.</td>
</tr>
</tbody>
</table>

Summary

The definition of stress has evolved through history, and through this evolution instruments have been developed to quantitatively measure stressors and how individuals react to certain types of stress. One such instrument specifically focuses on the stressors and reactions to stress of college students; this is the student life stress.
inventory (SSI). For this research, the SSI will be used to compare college students stress
to their epistemological beliefs.

Traditionally, epistemological beliefs have focused on developmental stages or
positions, Perry, Belenky et al., Baxter-Magolda, and King and Kitchener. The research
on epistemological developmental stages has included both qualitative and quantitative
components. Researchers Schommer, and Schraw, Bendixen, and Dunkel, have
developed quantitative methods to measure epistemological beliefs along five specific
dimensions, rather than the developmental stages or positions. It is through the use of the
Epistemological Belief Inventory (EBI) that this research will quantitatively identify
college students' beliefs along the dimensions of simple knowledge, certain knowledge,
omniscient authority, quick learning, and fixed ability.

Analysis of the results of the SSI and the EBI, along with demographic variables will
show if there are relationships between certain types of stressors and reactions to stress,
and epistemological beliefs in the five identified dimensions, unique to the population of
college students.
CHAPTER 3

METHODS

This chapter provides detailed information on the participants, the materials used for data collection, and the procedure used to collect data. Prior to collection of data, an application for approval to conduct research involving human subjects was made to the Office for the Protection of Research Subjects at the University of Nevada, Las Vegas. The Social and Behavioral Sciences Institutional Review Board granted approval from the Office for the Protection of Research Subjects on November 13, 2001. Furthermore, each participant signed an informed consent form stating voluntary participation in the research. Prior to involvement, participants were notified thru the informed consent form and verbally that they could refuse to participate at any time during the research study.

Participants

Participants included 125 college students (n = 125) from a major southwestern university. The total number of participants met a general principle for the total number of participants needed (N) based on $N \geq 50 + 8m$, where $m$ is the number of independent variables (Tabachnick & Fidell, 2001). A frequency distribution of the participants revealed that 84 participants were women and 41 participants were men. For data entry of the gender variable, males were coded as one’s and females were coded as two’s. University education levels of freshman, sophomore, junior, senior, and graduate were assigned as a dichotomous categorical variable with freshman and sophomore in on level
(coded 1's) and junior, senior, and graduate in a second level (coded 2's). Of the 125 participants, 62 identified as freshmen/sophomores and 63 identified as junior/senior/graduate. The variable of ethnicity was also assigned as a dichotomous categorical variable with levels represented by ethnic majority (coded 1's) and ethnic minority (coded 2's). Of the 125 participants, 98 identified as ethnic majority and 27 identified as ethnic minority. Further analysis of the 27 participants in the ethnic minority category revealed, one African-American, 3 Native American/Alaskan Native, 13 Asian American/Pacific Islanders, and 8 Hispanic/Latinos. Age was measured on a continuous scale with participants ranging in age from 17 to 36 with a mean age of 20.48 and a SD of 2.71.

Materials

The Student Life Stress Inventory (SSI) consists of 51 items designed to measure on a continuous scale nine areas of stress. These nine areas of stress are divided into two categories; reactions to stress and stressors. Participants ranked their answers for each of the questions using a Likert scale of one to five, with one representing strong disagreement with a statement and five representing strong agreement with a statement.

An exploratory factor analysis was run on the Student Life Stress Inventory and all nine factors were modified based on the results of the factor analysis. Tabachnick and Fidell (2001) state:

Factor analysis is a statistical technique applied to a single set of variables when the researcher is interested in discovering which variables in the set form coherent subsets that are relatively independent of one another. Variables that are correlated with one another but largely independent of other subsets of variables
are combined into factors. Factors are thought to represent underlying processes that have created correlations among variables...when scores on factors are estimated for each subject, they are often more reliable than scores on individual observed variables. (p. 582-583)

A varimax (i.e. uncorrelated, orthogonal) rotation approach was used for the factor analysis, which yielded eight factors with eigenvalues greater than one and explained 52% of the sample variation. A conservative approach of a .5 alpha coefficient was used for acceptance of a variable in interpretation of the factor and any cross listings of variables with a .35 alpha coefficient or above were removed. Tabachnick and Fidell (2001) state, “as a rule of thumb only variables with loadings of .32 and above are interpreted. The greater the loading, the more the variable is a pure measure of the factor.” (p. 625) Comrey and Lee (1992) suggest:

That loadings in excess of .71 (50% overlapping variance) are considered excellent, .63 (40% overlapping variance) very good, .55 (30% overlapping variance) good, .45 (20% overlapping variance) fair, and .32 (10% overlapping variance) poor. (p. 625)

From the original 51 items and nine dimensions, 35 items representing eight dimensions were retained based on the factor loadings. The resulting 35 items aligned to represent eight factors that represented distinct areas of stress or reactions to stress in a college student’s life. These eight factors extracted from the factor analysis led to a modification of the original Student Life Stress Inventory. The modified factors in order of variance explained were: anxiety (eigenvalue = 3.37, variance explained = 10%), aggressive behavior reacting to stress (2.61, 7%), stress from conflict (2.46, 7%), stress
affecting self-concept (2.30, 7%), self-inflicted/unhealthy reactions to stress (2.16, 6%),
stress from change (1.86, 5%), physiological reactions to stress (1.76, 5%), and

grief/depression (1.73, 5%). Table 6 reports the factor structure loadings and values of
the alpha coefficient for each item.

The Epistemological Belief Inventory consists of 32 items designed to measure on a
continuous scale five areas of epistemic beliefs in the acquirement of knowledge: Certain
Knowledge, Fixed Ability, Simple Knowledge, Quick Learning, and Omniscient
Authority. Answers to each question on the EBI are based on a Likert scale using a range
of one to five, with one representing strong disagreement with a question and five
representing strong agreement with a question. An exploratory factor analysis was also
run on the EBI, and of the original 32 items and five dimensions, 25 items representing
the original five dimensions were retained. A varimax rotation was used in the factor
analysis and a conservative approach of retaining only variables with alpha coefficients
of .5 and above; additionally, .35 alpha coefficient and above was used as the cutoff point
for removal of any cross listings of a variable. The five factors all reported eigenvalues
greater than one and accounted for 45% of the variance in the sample. Some adjustments
of the items designated to the original dimensions were made based on the results of the
factor analysis. Based on the factor loading the original dimensions were retained and
are listed in order of variance explained: fixed ability (eigenvalue = 2.67, variance
explained = 11%), simple knowledge (2.26, 9%), quick learning (2.08, 8%), certain
knowledge (1.90, 8%), and omniscient authority (1.60, 6%). Table 7 reports the factor
structure loadings and values of the alpha coefficient for each item.
Table 6

Factor Analysis for the Student Life Stress Inventory. Coefficient Alphas and Factor Loadings

<table>
<thead>
<tr>
<th>Item</th>
<th>Alpha Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1 - Anxiety</strong></td>
<td></td>
</tr>
<tr>
<td>During stressful situations I have experienced trembling (being</td>
<td>.722</td>
</tr>
<tr>
<td>nervous, biting fingernails, etc.).</td>
<td></td>
</tr>
<tr>
<td>As a person I worry and get anxious about taking tests.</td>
<td>.685</td>
</tr>
<tr>
<td>I have experienced pressures due to an overload (attempting too</td>
<td>.632</td>
</tr>
<tr>
<td>many things at one time).</td>
<td></td>
</tr>
<tr>
<td>When under stressful situations I have experienced fear, anxiety,</td>
<td>.623</td>
</tr>
<tr>
<td>and worry.</td>
<td></td>
</tr>
<tr>
<td>During stressful situations I have experienced weight gain (eat</td>
<td>.509</td>
</tr>
<tr>
<td>a lot).</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 2 - Aggressive Behavior Reacting to Stress</strong></td>
<td></td>
</tr>
<tr>
<td>When under stressful situations I have abused others (verbally</td>
<td>.749</td>
</tr>
<tr>
<td>and/or physically).</td>
<td></td>
</tr>
<tr>
<td>When under stressful situations I was irritable towards others.</td>
<td>.738</td>
</tr>
<tr>
<td>Under stressful situations I have experienced anger.</td>
<td>.665</td>
</tr>
<tr>
<td>Under stressful situations I have used defense mechanisms.</td>
<td>.588</td>
</tr>
<tr>
<td><strong>Factor 3 - Stress from Conflict</strong></td>
<td></td>
</tr>
<tr>
<td>I have experienced conflicts which were produced by two or more</td>
<td>.781</td>
</tr>
<tr>
<td>undesirable alternatives.</td>
<td></td>
</tr>
<tr>
<td>I have experienced conflicts which were produced when a goal had</td>
<td>.743</td>
</tr>
<tr>
<td>both positive and negative alternatives.</td>
<td></td>
</tr>
<tr>
<td>I have experienced change which disrupted my life and/or goals.</td>
<td>.599</td>
</tr>
<tr>
<td><strong>Factor 4 - Stress Affecting Self-Concept</strong></td>
<td></td>
</tr>
<tr>
<td>When under stressful situations I have separated myself from</td>
<td>.770</td>
</tr>
<tr>
<td>others.</td>
<td></td>
</tr>
<tr>
<td>When under stressful situations I have cried.</td>
<td>.738</td>
</tr>
<tr>
<td>As a person I like to be noticed and be loved by all.</td>
<td>.507</td>
</tr>
<tr>
<td><strong>Factor 5 - Self-Inflicted/Unhealthy Reactions to Stress</strong></td>
<td></td>
</tr>
<tr>
<td>When under stressful situations I have smoked excessively.</td>
<td>.728</td>
</tr>
<tr>
<td>When under stressful situations I have abused self (used drugs,</td>
<td>.704</td>
</tr>
<tr>
<td>etc.).</td>
<td></td>
</tr>
<tr>
<td>When under stressful situations I have attempted suicide.</td>
<td>.604</td>
</tr>
<tr>
<td><strong>Factor 6 - Stress from Change</strong></td>
<td></td>
</tr>
<tr>
<td>I have experienced too many changes occurring at the same time.</td>
<td>.674</td>
</tr>
<tr>
<td>I have experienced rapid unpleasant changes.</td>
<td>.653</td>
</tr>
<tr>
<td><strong>Factor 7 - Physiological Reactions to Stress</strong></td>
<td></td>
</tr>
<tr>
<td>During stressful situations I have experienced migraine headaches,</td>
<td>.655</td>
</tr>
<tr>
<td>hypertension, rapid heartbeat.</td>
<td></td>
</tr>
<tr>
<td>During stressful situations I have experienced sweating (sweaty</td>
<td>.605</td>
</tr>
<tr>
<td>palms, etc.).</td>
<td></td>
</tr>
<tr>
<td>During stressful situations I have experienced hives, skin</td>
<td>.603</td>
</tr>
<tr>
<td>itching, or allergies.</td>
<td></td>
</tr>
<tr>
<td><strong>Factor 8 - Grief/Depression</strong></td>
<td></td>
</tr>
<tr>
<td>As a student I have experienced failures in accomplishing the</td>
<td>.616</td>
</tr>
<tr>
<td>goals that I set.</td>
<td></td>
</tr>
<tr>
<td>When under stressful situations I have experienced grief,</td>
<td>.521</td>
</tr>
<tr>
<td>depression.</td>
<td></td>
</tr>
</tbody>
</table>

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**Table 7**

Factor Analysis for the Epistemological Belief Inventory, Coefficient Alphas and Factor Loadings

<table>
<thead>
<tr>
<th>Item</th>
<th>Alpha Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1 – Fixed Ability</strong></td>
<td></td>
</tr>
<tr>
<td>Really smart students don't have to work as hard to do well in school.</td>
<td>.780</td>
</tr>
<tr>
<td>Some people will never be smart no matter how hard they work.</td>
<td>.705</td>
</tr>
<tr>
<td>Smart people are born that way.</td>
<td>.638</td>
</tr>
<tr>
<td>Some people just have a knack for learning and others don't.</td>
<td>.552</td>
</tr>
<tr>
<td><strong>Factor 2 – Simple Knowledge</strong></td>
<td></td>
</tr>
<tr>
<td>Too many theories just complicate things.</td>
<td>.692</td>
</tr>
<tr>
<td>The best ideas are often the most simple.</td>
<td>.692</td>
</tr>
<tr>
<td>If a person tries to hard to understand a problem, they will most likely end up being confused.</td>
<td>.672</td>
</tr>
<tr>
<td>People can't do much about how smart they are.</td>
<td>.529</td>
</tr>
<tr>
<td><strong>Factor 3 – Quick Learning</strong></td>
<td></td>
</tr>
<tr>
<td>If you don't learn something quickly you'll never learn it.</td>
<td>.695</td>
</tr>
<tr>
<td>If you haven't understood a chapter the first time through, going back over it won't help.</td>
<td>.665</td>
</tr>
<tr>
<td>Working on a problem with no quick solution is a waste of time.</td>
<td>.597</td>
</tr>
<tr>
<td><strong>Factor 4 – Certain Knowledge</strong></td>
<td></td>
</tr>
<tr>
<td>It bothers me when instructors don't tell students the answers to complicated problems.</td>
<td>.768</td>
</tr>
<tr>
<td>Instructors should focus on facts instead of theories.</td>
<td>.682</td>
</tr>
<tr>
<td><strong>Factor 5 – Omniscient Authority</strong></td>
<td></td>
</tr>
<tr>
<td>People should always obey the law.</td>
<td>.768</td>
</tr>
<tr>
<td>Parents should teach their children all there is to know about life.</td>
<td>.606</td>
</tr>
</tbody>
</table>

**Procedure**

Participants completed two self-assessment surveys: the Student Life Stress Inventory (SSI) (Gadzella, 2001) and the Epistemological Belief Inventory (EBI) (Schraw, Bendixen, & Dunkle, 2002). The SSI was used to measure eight areas of stress in college.
students. The EBI was used to measure five areas of epistemological beliefs of the participants. A brief demographic survey was also used to measure general demographic data of each participant: specifically, gender, age, ethnicity, and education level of the participant. Data collection took place on campus in classrooms and completion of all three surveys took approximately fifteen to twenty minutes.
CHAPTER 4

RESULTS

The data were analyzed on three levels: descriptive statistics and frequency distributions, correlations, and a multiple regression analysis using a stepwise approach.

Descriptive Statistics and Frequency Distributions

First, descriptive statistics were generated for all the independent variables, demographics and epistemological dimensions, then, a frequency distribution was run for the demographic independent variables of gender, age, ethnicity, and education level.

These are reported in table 8 (descriptives) and table 9 (frequencies).

Table 8

Descriptive Statistics for Independent Variables – Demographic and Epistemological Dimensions

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>17</td>
<td>36</td>
<td>20.48</td>
<td>2.71</td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>2</td>
<td>1.67</td>
<td>.47</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>1</td>
<td>2</td>
<td>1.22</td>
<td>.41</td>
</tr>
<tr>
<td>Education Level</td>
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<td>1.50</td>
<td>.50</td>
</tr>
<tr>
<td>Epistemological Dimensions</td>
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<tr>
<td>Fixed Ability</td>
<td>4</td>
<td>20</td>
<td>10.87</td>
<td>3.52</td>
</tr>
<tr>
<td>Simple Knowledge</td>
<td>3</td>
<td>20</td>
<td>12.22</td>
<td>3.10</td>
</tr>
<tr>
<td>Quick Learning</td>
<td>3</td>
<td>13</td>
<td>5.09</td>
<td>1.71</td>
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<tr>
<td>Certain Knowledge</td>
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<td>10</td>
<td>7.07</td>
<td>1.79</td>
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<tr>
<td>Omniscient Authority</td>
<td>2</td>
<td>10</td>
<td>6.37</td>
<td>1.85</td>
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Table 9

Frequency Distribution for Demographic Independent Variables - Gender, Age, Ethnicity, and Education Level

<table>
<thead>
<tr>
<th>Age</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>1</td>
<td>.8</td>
</tr>
<tr>
<td>18</td>
<td>30</td>
<td>24.0</td>
</tr>
<tr>
<td>19</td>
<td>23</td>
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<td>20</td>
<td>16</td>
<td>12.8</td>
</tr>
<tr>
<td>21</td>
<td>21</td>
<td>16.8</td>
</tr>
<tr>
<td>22</td>
<td>17</td>
<td>13.6</td>
</tr>
<tr>
<td>23</td>
<td>8</td>
<td>6.4</td>
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<tr>
<td>24</td>
<td>2</td>
<td>1.6</td>
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<tr>
<td>25</td>
<td>2</td>
<td>1.6</td>
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<tr>
<td>26</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>27</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>29</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>31</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>36</td>
<td>1</td>
<td>0.8</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>41</td>
<td>32.8</td>
</tr>
<tr>
<td>Female</td>
<td>84</td>
<td>67.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnic Majority</td>
<td>98</td>
<td>78.4</td>
</tr>
<tr>
<td>Ethnic Minority</td>
<td>27</td>
<td>21.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education Level</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman/Sophomore</td>
<td>62</td>
<td>49.6</td>
</tr>
<tr>
<td>Junior/Senior/Graduate</td>
<td>63</td>
<td>50.4</td>
</tr>
</tbody>
</table>

Correlations

The second analysis performed was the Pearson product moment correlations. Correlations among all variables are displayed in table 10. The variable anxiety produced statistically significant correlations with gender (.31, p < .0001), ethnicity (.21, p < .01), and certain knowledge (.18, p < .03). These correlations suggest that females, ethnic...
minorities, and a higher belief in certain knowledge all show a positive relationship with 
anxiety in college students. Aggressive behavioral reactions to stress produced a 
statistically significant correlation with age (.18, p < .03), ethnicity (.19, p < .02), certain 
knowledge (.18, p < .03), and omniscient authority (-.16, p < .04). This suggests, 
according to the data within this study, that ethnic minorities have a positive relationship 
with aggressive behavior reactions to stress. Additionally, as age and belief in certain 
knowledge increases so does the association for an aggressive behavioral reaction to 
stress. Also, as one’s belief in omniscient authority increases the relationship for an 
aggressive behavioral reaction to stress decreases. Conflict stress correlated statistically 
significant with fixed ability (.15, p < .05), and certain knowledge (-.20, p < .02). Based 
on these results, it was suggested that as an individual’s belief in fixed ability increases so 
does the individual’s stress from conflict. Furthermore, the data suggest for this group 
that as one’s belief in certain knowledge increases, one’s stress from conflict decreases. 
The variable of stress affecting self-concept was also correlated and a statistical 
significant relationship was found with gender (.54, p < .0001). This correlation was also 
practically significant, producing a strong correlation (r = .54). This suggests that 
females, within this study, have a higher relationship with stress that negatively impacts 
their self-concept. Self-inflicted/unhealthy reactions to stress correlated statistically 
significant with omniscient authority (-.33, p < .0001). Interpretation of this suggests that 
as individuals’ beliefs in omniscient authority decrease their propensity for self-inflicted 
(unhealthy behaviors) reactions to stress increases. Stress from change did not produce 
any statistically significant correlations with any of the other variables. Physiological 
reactions to stress showed statistically significant correlations with gender (.23, p < .01).
ethnicity (.16, p < .04), and omniscient authority (.21, p < .01). Interpretation of this suggests that females and ethnic minorities in this study, along with an increasing belief in omniscient authority all have a positive relationship with physiological reactions to stress. Finally, the variable grief/depression showed a statistically significant relationship with age (-.15, p < .05), education level (-.22, p < .01), fixed ability (.23, p < .01), and quick learning (.25, p < .005). This suggests that in this study younger students, and students who are freshmen and sophomores have a higher propensity for grief and depression than older, upper division students (i.e. junior, senior, and graduate level). Furthermore, as an individual’s belief in fixed ability and quick learning increases so does their grief/depression stress.

Table 10

Correlations for all Variables

<table>
<thead>
<tr>
<th></th>
<th>G</th>
<th>Age</th>
<th>E</th>
<th>Ed</th>
<th>FA</th>
<th>SK</th>
<th>QL</th>
<th>CK</th>
<th>OA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>.31**</td>
<td>-.06</td>
<td>.21*</td>
<td>-.04</td>
<td>-.03</td>
<td>.07</td>
<td>-.04</td>
<td>.18*</td>
<td>.10</td>
</tr>
<tr>
<td>Aggression</td>
<td>.03</td>
<td>.18*</td>
<td>.19*</td>
<td>.11</td>
<td>.04</td>
<td>.06</td>
<td>.07</td>
<td>.18*</td>
<td>-.16*</td>
</tr>
<tr>
<td>Conflict</td>
<td>.00</td>
<td>-.11</td>
<td>.06</td>
<td>-.04</td>
<td>.15*</td>
<td>.07</td>
<td>-.04</td>
<td>-.20*</td>
<td>.00</td>
</tr>
<tr>
<td>Self-Concept</td>
<td>.54**</td>
<td>.00</td>
<td>.01</td>
<td>-.07</td>
<td>.07</td>
<td>-.03</td>
<td>-.01</td>
<td>.04</td>
<td>-.02</td>
</tr>
<tr>
<td>Self-Inflicted</td>
<td>-.14</td>
<td>.01</td>
<td>-.00</td>
<td>-.13</td>
<td>.08</td>
<td>.00</td>
<td>.09</td>
<td>.03</td>
<td>-.33**</td>
</tr>
<tr>
<td>Change</td>
<td>.04</td>
<td>.12</td>
<td>.06</td>
<td>.02</td>
<td>.04</td>
<td>.13</td>
<td>-.05</td>
<td>.08</td>
<td>.05</td>
</tr>
<tr>
<td>Physiological</td>
<td>.23**</td>
<td>.03</td>
<td>.16*</td>
<td>.04</td>
<td>-.10</td>
<td>.09</td>
<td>.03</td>
<td>-.01</td>
<td>.21*</td>
</tr>
<tr>
<td>Grief/Depression</td>
<td>.05</td>
<td>-.15*</td>
<td>.12</td>
<td>-.22*</td>
<td>.23**</td>
<td>.02</td>
<td>.25**</td>
<td>-.01</td>
<td>-.05</td>
</tr>
</tbody>
</table>

Note: G=gender, E=ethnicity, Ed=education, FA=fixed ability, SK=simple knowledge, QL=quick learning, CK=certain knowledge, OA=omniscient authority

* p < .05
** p < .005
Multiple Regression Analyses

Data were analyzed using multiple regression with a stepwise approach to investigate whether certain epistemological beliefs predict particular stressors and reactions to stress. Multiple regression is used in research as a means of predicting a score on one variable from a score on another (Tabachnick & Fidell, 2001). If multiple regression yields a statistically significant result then one can suggest, based on the data, a prediction of a dependent variable \( Y' \) using the statistically significant unstandardized B coefficients of the independent variables (Pedhazur, 1997). The prediction equation for multiple regression is \( Y' = a + b_1X_1 + b_2X_2 + \ldots + b_kX_k \), where \( Y' = \) predicted score, \( a = \) intercept (constant), \( b = \) regression coefficients (unstandardized B's) and \( X = \) raw score of the independent variable (Pedhazur, 1997).

In a stepwise approach to multiple regression, independent/predictor variables are entered one at a time and will be deleted if they do not contribute significantly to the regression when considered in combination with newly entered independent/predictor variables (Hinkle, Wiersma, & Jurs, 1998). For a variable to be entered in the multiple regression analysis, using the stepwise solution, the variable must meet the stepwise criteria of probability of F to enter < .05 and probability of F to remove > .100. As a result, only those variables that contribute significantly are considered in the analysis and will contribute to the predictive value of the dependent variable. In the stepwise solution assigning a variable to a specific block can control the order of independent/predictor variables entering the analysis. For example, if one had reason to believe (e.g. based on theory) that gender contributed the most variance to the dependent variable and wanted to account for this variance first, then assigning gender to the first block would be a way to
accomplish this. For example, if one wanted to account for predictor variables over and above demographics then the demographic variable would be assigned the blocks entering the analysis first. If the block includes more than one independent variable then the independent variable with the highest statistically significant correlation with the dependent variable will be considered first, followed by the next highest correlation, and so on.

A separate stepwise regression analysis was computed for each of the dependent variables: anxiety, aggressive behavior reacting to stress, stress from conflict, stress affecting self-concept, self-inflicted/unhealthy reactions to stress, stress from change, physiological reactions to stress, and grief/depression. All nine independent variables (gender, age, ethnicity, education level, fixed ability, simple knowledge, quick learning, certain knowledge, and omniscient authority) were entered into each of the stepwise regression analyses. For each individual regression analysis the independent/predictor variables were entered into the analysis in blocks. Demographic variables were entered in the first four blocks, so that any significant effect on the dependent variable for these items would be accounted for prior to epistemological beliefs. Therefore, if there were a statistically significant finding for epistemological beliefs it would be over and above any effect contributed by the demographic variables. The first block entered into the regression contained the variable gender, the second block contained the variable age, the third block contained the variable ethnicity, and the fourth block contained the variable education level. The final block in the stepwise approach included all five of the dimensions of epistemological beliefs as measured by the EBI: fixed ability, simple knowledge, quick learning, certain knowledge, and omniscient authority. Table 11

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represents a summary of the variables that loaded for each of the eight stepwise regression analyses, unstandardized B coefficients (used in a regression prediction equation). Standard Error of B, and Beta values.

Table 11

Summary of Stepwise Regression Analysis for Variables Predicting Stress in College Students

<table>
<thead>
<tr>
<th>Regression</th>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression 1 - Anxiety</td>
<td>Gender</td>
<td>2.983</td>
<td>.816</td>
<td>.309</td>
</tr>
<tr>
<td>Regression 1 - Anxiety</td>
<td>Certain Knowledge</td>
<td>.483</td>
<td>.215</td>
<td>.190</td>
</tr>
<tr>
<td>Regression 2 - Aggressive Behavior</td>
<td>Age</td>
<td>.255</td>
<td>.106</td>
<td>.207</td>
</tr>
<tr>
<td>Regression 2 - Aggressive Behavior</td>
<td>Ethnicity</td>
<td>1.731</td>
<td>.696</td>
<td>.214</td>
</tr>
<tr>
<td>Regression 2 - Aggressive Behavior</td>
<td>Omniscient Authority</td>
<td>-.343</td>
<td>.156</td>
<td>-.190</td>
</tr>
<tr>
<td>Regression 3 - Conflict</td>
<td>Certain Knowledge</td>
<td>-.268</td>
<td>.120</td>
<td>-.198</td>
</tr>
<tr>
<td>Regression 4 - Self-Concept</td>
<td>Gender</td>
<td>3.355</td>
<td>.472</td>
<td>.539</td>
</tr>
<tr>
<td>Regression 5 - Self-Inflicted</td>
<td>Omniscient Authority</td>
<td>-.384</td>
<td>.098</td>
<td>-.333</td>
</tr>
<tr>
<td>Regression 6 - Change</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Regression 7 - Physiological Reactions</td>
<td>Gender</td>
<td>1.191</td>
<td>.520</td>
<td>.202</td>
</tr>
<tr>
<td>Regression 7 - Physiological Reactions</td>
<td>Omniscient Authority</td>
<td>.263</td>
<td>.133</td>
<td>.175</td>
</tr>
<tr>
<td>Regression 8 - Grief/Depression</td>
<td>Education Level</td>
<td>-.795</td>
<td>.336</td>
<td>-.201</td>
</tr>
<tr>
<td>Regression 8 - Grief/Depression</td>
<td>Fixed Ability</td>
<td>.105</td>
<td>.049</td>
<td>.186</td>
</tr>
<tr>
<td>Regression 8 - Grief/Depression</td>
<td>Quick Learning</td>
<td>.207</td>
<td>.102</td>
<td>.179</td>
</tr>
</tbody>
</table>

Note: For regression 6 - change, none of the variables loaded in the regression analysis.
An overview of the eight dependent variables reveals that in four cases both demographic and epistemological beliefs contributed to the variance and prediction of the dependent variable, in two cases only epistemological beliefs contributed to the variance and prediction of the dependent variable, in one case only the demographic variable contributed to the variance and prediction of the dependent variable, and in one case neither demographics or epistemological beliefs were statistically significant. A more detailed explanation of the analysis for each of the eight dependent variables follows.

**Stepwise regression for anxiety.** The stepwise regression solution indicated that both gender and certain knowledge met the criteria for acceptance into the analysis and were statistically significant in the contribution to the prediction of anxiety (mean = 16.20, SD = 4.55) in college students, F(2, 122) = 9.053, p < .001. The predictors, gender (beta = .309, p < .001) and certain knowledge (beta = .190, p < .03), accounted for 12.9%, (R^2 = .129) of the variance in anxiety. The prediction/regression equation for anxiety is Y' = 7.798 + 2.983(gender) + .483(certain knowledge). The remaining independent variables did not load in the regression analysis, age (p = .605), ethnicity (p = .138), education level (p = .916), fixed ability (p = .528), simple knowledge (p = .645), quick learning (p = .983), and omniscient authority (p = .576).

**Stepwise regression for aggressive behavior reacting to stress.** The stepwise regression analysis for the dependent variable of aggressive behavioral reactions to stress (mean = 12.29, SD = 3.34) indicated that age (beta = .207, p < .02), ethnicity (beta = .214, p < .02), and omniscient authority (beta = -.190, p < .04) were all statistically significant in the contribution in predicating the dependent variable of aggressive behavioral reactions to stress in college students F(3, 121) = 4.946, p < .005.
Furthermore, age, ethnicity, and omniscient authority accounted for 11% ($R^2 = .109$) of the variance in aggressive behavioral reactions to stress in college students. The prediction/regression equation for aggressive behavioral reactions to stress is $Y' = 7.140 + .255(\text{age}) + 1.731(\text{ethnicity}) - .343(\text{omniscient authority})$. The remaining independent variables did not load in the stepwise regression approach, gender ($p = .835$), education level ($p = .872$), fixed ability ($p = .427$), simple knowledge ($p = .301$), quick learning ($p = .284$), and certain knowledge ($p = .064$).

**Stepwise regression for stress from conflicts.** The stepwise regression analysis solution for conflict stress (mean = 9.52, SD = 2.43) indicated that certain knowledge (beta = - .198, $p < .03$) was statistically significant in the contribution of the prediction of conflict stress $F(1, 123) = 4.997$, $p < .03$. Certain knowledge contributed to 4% ($R^2 = .039$) of the variance explained in stress from conflicts. The prediction/regression equation for stress from conflicts is $Y' = 11.416 - .268(\text{certain knowledge})$. The remaining independent variables did not load in the stepwise regression approach, gender ($p = .974$), age ($p = .216$), ethnicity ($p = .654$), education level ($p = .596$), fixed ability ($p = .054$), simple knowledge ($p = .150$), quick learning ($p = .905$).

**Stepwise regression for stress affecting self-concept.** Stepwise regression analysis for stress affecting self-concept (mean = 10.74, SD = 2.93) indicated that gender was a statistically significant contributor to the prediction of stress affecting self-concept in college students $F(1, 123) = 50.471$, $p < .001$. Additionally, gender accounted for 29% ($R^2 = .291$) of the variance in stress affecting self-concept. The regression/prediction for self-concept stress is $Y' = 5.133 + 3.355(\text{gender})$. The remaining independent variables did not load in the stepwise regression approach, age ($p = .713$), ethnicity ($p = .110$).
education level (p = .897) fixed ability (p = .145), simple knowledge (p = .963), quick learning (p = .231), certain knowledge (p = .471), and omniscient authority (p = .128).

**Stepwise regression for self-inflicted/unhealthy reactions to stress.** The stepwise regression solution indicated that omniscient authority (beta = -.333, p < .001) was the only independent variable that met the stepwise criteria for variables to enter. Omniscient authority was statistically significant in contributing to the prediction of self-inflicted/unhealthy reactions to stress (mean = 4.27, SD = 2.13) in college students F(1, 123) = 15.346, p < .001. Omniscient authority also contributed to 11% (R² = .111) of the variance in self-inflicted reactions to stress. The regression/prediction equation for self-inflicted stress is Y' = 6.718 - .384(omniscient authority). The remaining independent variables did not load in the stepwise regression approach, gender (p = .363), age (p = .653), ethnicity (p = .896), education level (p = .249), fixed ability (p = .237), simple knowledge (p = .429), quick learning (p = .163), certain knowledge (p = .847).

**Stepwise regression for stress from change.** The stepwise regression approach for the dependent variable stress from change (mean = 6.19, SD = 1.93) did not load any of the independent variables. Therefore, no statistically significant regression equation could be produced for this dependent variable.

**Stepwise regression for physiological reactions to stress.** The stepwise regression solution indicated that gender (beta = .202, p < .03) and omniscient authority (beta = .175, p < .05) were statistically significant in the contribution to the prediction of physiological reactions to stress (mean = 7.80, SD = 2.78) in college students F(2, 122) = 5.566, p < .005. Gender and omniscient authority accounted for 8% (R² = .084) of the variance explained in physiological reactions to stress in college students. The
regression/prediction equation for physiological reactions to stress in college students is

\[ Y^* = 4.132 + 1.191(\text{gender}) + .263(\text{omniscient authority}) \]. The remaining independent variables did not load in the stepwise regression solution, age (p = .741), ethnicity (p = .207), education level (p = .404), fixed ability (p = .598), simple knowledge (p = .412), quick learning (p = .536), certain knowledge (p = .992).

**Stepwise regression for grief/depression.** The stepwise regression solution for the dependent variable of grief/depression (mean = 5.90, SD = 1.98) indicated that education level (beta = -.203, p < .03), fixed ability (beta = .186, p < .04), and quick learning (beta = .179, p < .05) all contributed to the prediction of grief/depression in college students \( F(3, 121) = 6.137, p < .001 \). The independent variables of education level, fixed ability, and quick learning accounted for 13% \( (R^2 = .132) \) of the variance explained in the dependent variable of grief/depression in college students. The regression/prediction equation for the variable grief/depression is \[ Y^* = 4.906 - .795(\text{education level}) + .105(\text{fixed ability}) + .207(\text{quick learning}) \]. The remaining variables did not load in the stepwise approach, gender (p = .141), age (p = .955), ethnicity (p = .131), simple knowledge (p = .371), certain knowledge (p = .486), and omniscient authority (p = .494).
CHAPTER 5

DISCUSSION

The purpose of this study was two-fold, first to establish whether there was a relationship between specific demographic variables, epistemological beliefs along five identified dimensions, and negative stress affecting college students. Second, if a statistically significant relationship was found, could the independent variables predict the dependent variables identified as negative stressors or reactions to stress. The results indicated, through correlations, that there were statistically significant relationships between certain demographic variables, epistemological beliefs, and negative stress. The correlation results are explained, in detail, in chapter four of this paper. The following discussion will focus mainly on the findings of the regression analyses.

Anxiety

The findings of this study indicate that gender and certain knowledge were statistically significant predictors of anxiety. Specifically, women respondents had higher occurrences of anxiety than did men, and gender was a stronger predictor of anxiety than certain knowledge. Abouserie (1994) also found that female students were more prone to stress overall than male students. In addition to gender influences on anxiety, an individual's belief in certain knowledge also increased their anxiety. This suggests that female college students who feel strongly that knowledge is certain or absolute could
potentially have high levels of anxiety, while male college students who have a belief that knowledge is constantly evolving will most likely have the lowest levels of anxiety.

A potential interpretation of this is that some women do not see themselves as sources of knowledge, that knowledge comes from outside the individual, and that it is absolute. These women could be viewed as being in a stage of received knowers when they come to college. Belenky et al. (1986) defines received knowing as the ability of women to hear, but unable to speak in their own voice, and that there is only one right answer.

Besides mastering content knowledge, college allows for and encourages multiple points of view; simply stated there is more than one right answer. This experience could produce anxiety when faced with the reality that “facts” can produce multiple opinions. Acknowledging that some opinions/answers have more merit than others is a tenet of post-relativistic thinking; often an expressed goal of higher education (e.g. King & Kitchener, 1994). The ability to evaluate multiple points of view, and to recognize the point of view with the most merit represents a higher level of epistemological development. To an individual who is used to accepting only one “truth” this can produce an enormous amount of anxiety and subsequent personal growth (e.g. Bendixen, 2002).

A suggestion for health promotion professionals and educators in alleviating anxiety, attributed to strong beliefs in certain knowledge, is to help students, particularly female students, to understand that they can be a participant in constructing knowledge; that knowledge can be constructed from within rather than “received” entirely from external sources. Baxter-Magolda calls this the journey towards “self-authorship,” and has stated
that higher education needs to make “self” central to the education process; learners must be validated as “knowers”. Baxter-Magolda (1992) states:

Until students feel that what they think has some validity, it is impossible for them to view themselves as capable of constructing knowledge...Speaking in their own voice through class involvement, evaluation techniques, leadership opportunities, and peer interactions helped students come to see themselves as sources of knowledge. (p. 376)

Health promotion professionals and educators can promote the journey towards self-authorship by encouraging students to speak in their own voice in class interactions. Specifically, exercises that have students apply content knowledge by asking how they would put the knowledge into practice. This takes the student beyond the confines of passive learning and promotes a more active learning environment in which the student is engaged and helps to support the idea of students viewing themselves as sources of knowledge, which in turn represents a higher level of cognitive development.

Since it is important for college students to see themselves as constructors of knowledge it is even more important for female students, who have a stronger propensity to accept externally created knowledge; thinking it will bring internal self-knowledge. Gilligan (1982) recognized this and stated:

The difference between women and men which I describe center on a tendency for women and men to make different relational errors...for men to think that if they know themselves, following Socrates’ dictum, they will also know women, and for women to think that if only they know others, they will come to know themselves. (p. xx)
One might say that Gilligan is describing, in a sense, Belenky's connected knowing stage, in which women attempt to gain knowledge by connecting themselves to the concept: by examining it through the authors point of view and not their own, and then taking on this point of view as "knowing."

While results of this study suggest that women are at a higher risk for anxiety, Glidewell (1978) found that male students were less likely than female students to express anxiety for fear that this would be construed as unmasculine. Based on this finding, belief in certain knowledge may be a more accurate predictor of anxiety among college students, however further research is needed to explore this relationship.

Aggressive Behavior in Reacting to Stress

Results of this study also found that age, ethnicity, and belief in Omniscient Authority were all statistically significant predictors of aggressive behavior in reacting to stress. Age had a positive relationship with aggressive behavior, which suggests that as an individual’s age in this population increases so does their propensity to react aggressively to a stressful event. This is contrary to a generally held belief that as individuals’ age increases so does their ability to refrain from aggressive and violent behaviors. Further exploration and research should be done to understand age and its contribution to aggressive behavior in reacting to stress. One consolation is that age was the smallest of the three contributors (the other two being ethnicity and omniscient authority) indicating that it contributed the least to the prediction of aggressive behavior in reacting to stress. Ethnicity was positive and the largest contributor of the three independent variables. This indicates that ethnic minority students have a higher propensity to react with aggressive behavior to stress than ethnic majority students.
The final contributor to the prediction of aggressive behavior when reacting to stress is the epistemological dimension of Omniscient Authority. A review of what a strong belief in Omniscient Authority denotes would suggest that individuals ascribe to the belief that experts are the authorities, experts have the answers to knowledge that might otherwise be inaccessible, higher powers exist and they are all-knowing. Results indicate that as an individual's belief in Omniscient Authority increases, aggressive behavioral reactions to stress decrease. This may have something to do with giving control over to a higher power. As Bendixen (2000) reported, individuals resolved epistemic doubt in one of two ways, either by taking control of the belief or giving the control of the belief over to a higher power. Many self-help programs are based on this concept of giving the control of the stressor or unwanted behavior over to a higher power, and many of these programs have attributed their success to this process (Brown, 1994; Jarusiewicz, 2000; DiLrenzo, Johnson, & Bussey, 2001; Matthews, 1998). One potential explanation that ethnic minorities rated higher in their aggressive reactions to stress is a feeling of lack of control over their situations, in view of the fact that being a minority in any situation denotes less control than that of the majority group.

Suggestions for health promotion professionals and educators in reducing aggressive behavior among ethnic minority students might include providing opportunities to validate their feelings, to engage and interact with them, to demonstrate a commitment to them, and to help them understand that they too are contributors of knowledge: what they have to say is just as important as an ethnic majority student. Listening is a powerful tool in reducing aggressive behavior; by truly listening we validate the other individual's opinions (Hawkins, 1994; Feil, 1985). At the American College Personnel Convention
2002, in a workshop on race and privilege, one of the ethnic minority participants voiced
her opinion as to why she chose to spend more time with individuals of her own race.
Her response was that they listen and understand my stories, while “white” people want
to constantly tell you why they are “not like that.” my African-American friends “just”
listen and from that comes a common understanding. For ethnic majority students, this
may be a transforming realization: that the simple act of listening encourages more
acceptance by ethnic minority groups than numerous “that’s not me” stories of defense.

Listening involves engagement, but, college faculty are slowly becoming removed
from the ability to engage and commit to students’ personal growth and development.
Kluge (1993) states:

Faculty have been encouraged to remove themselves, to disengage somewhat
from a full, complete, intense commitment to students...We’re teaching less,
there’s less emphasis on faculty keeping office hours and attending meetings,
more celebration of publication and other accomplishments. Students are aware
of that, aware of it when you go from asking for four papers to asking for one,
aware of it when you go from ten office hours a week to two. That suggests
disengagement. (p.38)

Chickering and Gamson (1987) cite faculty-student interaction as the number one best
practice in undergraduate education. Kuh (1999) states:

This disengagement trend is mirrored in downward trends in personal
development and value gains, suggesting a diminishing influence of higher
education on personal development. Understanding self and others and being
knowledgeable about different cultures and ways of life are essential to functioning effectively in a diverse society. (p. 106)

Therefore, if health educators, in collaboration with student affairs professionals and faculty, can provide opportunities for creating connections among students of different cultures, aggressive behavior reactions to stress among ethnic minorities might decrease as their feelings of lack of control over the unknown lessen. One example is to create an environment that is comfortable; this could be accomplished through the use of intergroup dialogue in a class setting, in campus residential housing programs, or through new student orientation programs. Step one of this process would be for group members to listen without comment, as the group becomes more familiar and safe, then the opportunity to ask questions and provide reflections could be implemented. It is also important to find opportunities to increase interactions with university faculty, both in and out of the classroom. Suggestions for increasing interaction might include recreation events, study groups, and/or one-to-one goal setting sessions

Stress from Conflict

Findings indicate that the only predictor of stress from conflict in college students is their level of belief in the epistemological dimension of certain knowledge. What is unique in this finding is that no demographic variables (e.g. age, gender, ethnicity, and education level) were identified as predictors; therefore, the entire effect on conflict stress can be attributed to certain knowledge. The results indicate a negative relationship between these two variables. Interestingly, this suggests that as an individual's belief in certain knowledge increases their conflict stress decreases, and vice versa, as belief in certain knowledge decreases, conflict stress increases. Whereas, previously it was
suggested that a high belief in certain knowledge predicts high anxiety levels, the opposite is suggested here for conflict stress. One plausible explanation would be that if an individual believes in an absolute truth (i.e. high certain knowledge belief) he or she is not bothered by any other alternative explanations or points of view. The individual is entrenched firmly in his or her belief and will not listen to or accept other points of view: kind of like a blind faith which is often seen in some of the more strict religions and occult practices. This blind faith may produce an emotional buffer to conflict. Whereas, an individual who has a high belief in certain knowledge, but is questioning the validity and merit of multiple opinions, which in turn ignites doubt in his or her belief (i.e. epistemic doubt) might experience anxiety as they try to accommodate or assimilate the belief in question. (Bendixen. 2002)

One implication is that conflict stress is not necessarily a detriment if it is coupled with acknowledgement of multiple points of view, which is one step closer to post-relativistic thinking, and represents a higher order level of cognitive development. Therefore, it is important for health professionals and educators to encourage students, who have strong beliefs in omniscient authority, to find a balance between higher order thinking and their beliefs in omniscient authority.

Further research in this area could explore the relationship between beliefs in certain knowledge and levels of stress in anxiety and conflict. One possibility is that individuals with strong beliefs in certain knowledge and high levels of anxiety might be in the midst of processing epistemic doubt (e.g. Bendixen 2000); whereas, individuals who have a high belief in certain knowledge and a low level of conflict stress might not be experiencing any epistemic doubt. Doubt can encourage conflict; conflict occurs when
information is contrary to what the individual believes. Hofer (2001) states that “belief change may be similar to conceptual change, in that one needs to be dissatisfied with existing beliefs, understand the alternatives, and find them viable, and make connections between new and old beliefs” (p. 367). Based on Hofer’s statement, it appears to be a viable potential conclusion for the findings of this variable that participants who had a strong belief in certain knowledge were most likely very satisfied with their beliefs, and therefore no epistemic doubt or conflict was occurring.

Self-Concept

The findings for self-concept indicated that gender was the only predictor of stress affecting self-concept. Purkey (1988) defines self-concept as “the totality of a complex, organized, and dynamic system of learned beliefs, attitudes and opinions that each person holds to be true about his or her personal existence.” Epstein (1973) describes self-concept as a “theory” about one’s self that represents and organizes current self-knowledge and guides how new self-knowledge is perceived. One of the most important characteristics of self-concept is that it is learned, no one is born with a predetermined self-concept. Self-concept is learned through perceptions of experiences and in dealings with others. The stronger the belief about one’s self-concept the more difficult it is to change. The positive relationship between self-concept and gender indicates that females’ self-concept, in this study, is affected more negatively by stress than males.

This is a strong implication for health promotion professionals as Pipher (1995) found that a low or negative self-concept puts women at a risk for eating disorders, suicide attempts, dropping out of school, teen pregnancy, and violent behavior. Markus and Wurk (1987) state that self-concept provides an emotional buffer and a motivational
resource. Consequently, if a women’s self-concept is low and the emotional buffer has eroded, emotional burnout, breakdown, and/or some of the outcomes identified by Pipher may result (Renaud, & McConnell, 2002; Senekal, Steyn, Mashego, & Nel, 2001).

Furthermore, if a women’s motivational resource is diminished, this can lead to depression, as lack of motivation is a symptom and outcome of depression (Lecci & Karoly, 1994).

Based on Belenky et al. (1986), if a women’s predominate way of constructing knowledge is through received and connected knowing, rather than internally constructed, one might better understand a women’s construction of their own self-knowledge. If self-knowledge contributes to the construction of self-concept, and a woman does not internally create knowledge (i.e. in the stages of received and connected knowing), then what contributions does a woman make to her own self-concept? It would appear, based on Belenky et al.’s research that for most women, self-concept is defined externally. The irony of “self” is evident.

One feature of self-concept is that it can be changed. Franken (1994) states:

There is a growing body of research which indicates that it is possible to change the self-concept. Self-change is not something that people can will but rather it depends on the process of self-reflection. Through self-reflection, people often come to view themselves in a new, more powerful way, and it is through this new, more powerful way of viewing the self that people can develop possible selves. (p. 443)

Health promotion professionals and educators need to provide female college students opportunities to self-reflect and to understand that they too are constructors of
knowledge; that what they have to say is important, and this may go a long way in positively increasing their self-concept. Again, providing opportunities to attain self-authorship would help female college students in positively affecting their self-concept.

Self-Inflicted/Unhealthy Reactions to Stress

Findings for self-inflicted/unhealthy reactions to stress indicate that the only predictor of this behavior was belief in omniscient authority. Again, there were no statistically significant contributions from the demographic variables, which is an interesting finding in itself. Items identified in the SSI as self-inflicted/unhealthy reactions to stress included: “when under stress I smoke to excess,” or “I have abused myself (e.g. using drugs, etc.),” or “I have attempted suicide.” The fact that any of the participants answered in the high end on these items suggests an immense need for health education programs that teach college students how to positively manage their reactions to stress.

Omniscient authority related negatively to self-inflicted/unhealthy reactions to stress, which indicates that as individuals’ belief in omniscient authority increase their self-inflicted/unhealthy reactions to stress decrease. Again, this revisits an earlier statement that many of the self-help addiction programs include a element of focus on a higher power, in which the individual gives the stress and/or addictive/unhealthy behavior over to a higher power. Recently there has been an increase of spirituality focused programs on college campuses. Many of the programs at a recent American College Personnel Association Convention (ACPA 2002) included topics of spirituality on college campuses, and one of the keynote speakers was Terrence Deal author of Leading with Soul. A rise in spirituality is common in times of crisis. One might suggest that many college campuses are in fact in crisis with regards to unhealthy behaviors such as
increases in drug use, drinking, and sexually transmitted diseases (Baer, Kivlahan, Blume, McKnight, & Marlatt, 2001; Wechsler, 2000; Keeling, 2000). Based on the results of this study (i.e. belief in omniscient authority predicts a decrease in unhealthy reactions to stress), one might suggest that this resurgence of spirituality may have a positive effect in decreasing the unhealthy behaviors among college students.

Health educators have long since used spirituality to positively affects wellness in an individual. For example, spirituality is one component of the Wellness model, used by many health educators, in creating a balanced healthy lifestyle for clients. Other dimensions of the Wellness model include: physical, intellectual, emotional, and social.

Stress from Change

None of the variables predicted the dependent variable of stress from change. One possible answer is that the participants viewed change differently, thus no common ground was found on this item, which could lead to identifying predictive variables. Items on the SSI that identified this dependent variable did not define change, but rather used the word change as a way of identifying change (see table 6), and this in itself may have caused some inconsistencies with participants’ defining for themselves the concept of change. Whether this is one answer or not, it does provide an opportunity for future research in defining change from the perspective of the college student.

Physiological Reactions to Stress

Results for physiological reactions to stress indicate that both gender and omniscient authority are statistically significant predictors of physiological reactions to stress. Examples of specific physiological reactions cited in the SSI were migraine headaches, hives, hypertension, racing heart, and allergies, to name a few. The positive relationship
between gender and physiological reactions to stress indicates that females have higher incidences of physiological reactions to stress. Omniscient authority also related positively to physiological reactions to stress, this suggests that as individuals’ beliefs in omniscient authority increase their physiological reactions to stress increase. Therefore, the data suggest that female college students who have a high belief in omniscient authority will have the highest occurrences of physiological reactions to stress. The belief in omniscient authority is an interesting finding. Earlier in this section, a high belief in omniscient authority predicted a decrease in self-inflicted/unhealthy reactions to stress, yet in this regression a high belief in omniscient authority suggests an increase in physiological reactions to stress. A possible explanation is that individuals with high beliefs in omniscient authority might internalize their emotions. They outwardly accept the absolute letter of the law: the absolute “truth,” but internal epistemic doubt may be occurring, and because of omniscient belief internalized constraints the individual would never verbalize these questions; possibly fearing a “fall out of grace” with the omniscient authority. This inner emotional turmoil does not allow the individual to restore the body to a balanced state, which according to Selye (1976) and Girdano et al. (2001) can cause unhealthy physical reactions. An example of this is post-traumatic stress disorder, discussed earlier in Chapter 2.

Health professionals and educators need to help college students understand that it is acceptable to question, and provide safe opportunities to verbalize questions of doubt, which may help reduce the number of physiological reactions to stress for college students. Many of the doubts and fears that students have upon entering the college environment relate to dealing with the peer pressures of sex, drinking, and drugs. An
example of providing a safe environment to ask questions is to allow students the opportunity to ask questions anonymously without fear of recognition. It is far more important to have the question asked than it is to have the student succumb to the unhealthy behavior.

**Grief/Depression Reactions to Stress**

The findings for grief/depression reactions to stress indicate that education level, and beliefs in fixed ability and quick learning are predictors of grief/depression in college students. While education level was negatively related, both quick learning and fixed ability were positively related. This suggests that lower division students (freshmen/sophomores), with beliefs in quick learning (i.e. learning occurs in a quick or not at all fashion) and fixed ability (i.e. the ability to acquire knowledge is fixed) will predict the highest levels of grief/depression in college students.

One explanation for these results is that a vast majority of college freshmen and sophomores come from a learning environment (e.g. high school) that is particularly passive (i.e. students are expected to recite answers, and teachers are viewed as the expert holders of knowledge). Experience in a learning environment that is passive can make arriving on a college campus where multiple points of view are offered and accepted quite stressful (Bendixen, 2002; Chandler, 1975). If students entering college bring with them a strong belief that if they do not learn quickly or that their ability to learn has set limits, and then confronted with a more difficult curriculum without familiar support groups (e.g. family, high school teachers), it is certainly a possibility that those students will experience feelings of depression and grief over their perceived inability to succeed (Oswalt & Finkelberg, 1995).
Health educators, student affairs professionals, and faculty can help combat this grief/depression reaction of new students by providing opportunities to orient the new students to the university culture and climate both in and out of the classroom. Another suggestion would be to implement a mentorship program between older (upper division students) and younger (lower division students).

Conclusion

The overall significance of this research depicts how importance it is for health educators, university faculty, and student affair professionals to understand how students make meaning, to encourage students to think critically from a post-relativistic dimension, to encourage “self-authorship,” and to offer opportunities for students to view themselves as creators of knowledge. Baxter Magolda (2001) states:

To help students construct knowledge for themselves, student affair professionals must enhance their understanding of how students make meaning of their experience – the assumptions that they hold about the nature, limits, and certainty of knowledge; how they view themselves; and how they construct relations with others. (p.320)

Specifically, strong beliefs in the areas of certain knowledge, omniscient authority, fixed ability, and quick learning inhibited students in this study from viewing themselves as active participants in the creation knowledge. Students with beliefs in these areas view learning as more of a passive response than active participation. By actively participating in the learning process, students retain internal control and take on “ownership” of their learning. Hofer (2001) cites Simpson and Nist (2000) who recommend “that academic assistance programs help students become more aware of epistemological beliefs as a
means of fostering awareness...in particular they suggest students may be reluctant to adopt suggested strategy use until they relinquish simplistic views of knowledge that require little active involvement by the student” (p. 370). Many times by just becoming aware of a stressful situation, and how we make meaning of the situation leads to reducing the anxiety and the negative stress of the event itself. Understanding leads to developing a “sense of control” over what may be perceived as a stressful event.

Taking responsibility for one's learning is not free of stress, but it can help promote individual understanding and recognition of how one makes meaning, which in turn will help identify suitable methods to resolve issues that conflict with individual beliefs.

Abouserie (1994) suggests “that it is known that an individual’s ability to deal with stress can be improved, it is important that university students should be exposed to personal stress recognition and management techniques which will enhance their coping abilities” (p. 328). This research extends Abouserie's findings by suggesting that personal stress recognition should include identifying individual students’ epistemological beliefs, which leads to identifying how students make meaning. And, to reiterate a statement made earlier by Lazarus (1999) that how we make meaning is crucial to how we perceive stress. For example, it would be beneficial to know if a student who is experiencing anxiety has a strong belief in certain knowledge. A strong belief in this area as it relates to the student's education could affect the student's entire academic performance. Therefore, techniques and opportunities to encourage beliefs outside of the certain knowledge dimension could then be applied to help the student alleviate anxiety. Hofer (2001) provides specific suggestions:
Providing opportunities for students to discuss and analyze ill-structured problems both in and out of the classroom environment, teaching students the skills necessary to evaluate and analyze data, engaging students in discussion of controversial issues, and assisting them in examining their assumptions about knowledge and how it is gained. (p. 375)

Simply stated by Hofer (2001), it is important to not only ask "what we know," but "how we know what we know." Getting students to think critically, and viewing themselves as creators of knowledge, and how they create that knowledge may help in relieving certain types of negative stress affecting college students. One implication for further research is extending the concept of "source of knowledge" and identifying what sources individuals/students use to create and define what they view as knowledge.

*Health promotion professionals.* Specific applications for health promotion professionals and health educators would include focusing on four main themes that have been consistently addressed in helping to alleviate or reduce each of the negative stressors and reactions to stress identified in this research (see figure 3). Health educators and educators need to explore opportunities that help college students develop skills in the areas of self-authorship, listening, self-reflection, and spirituality.

![Figure 3. Themes for Reducing Stress in College Students](reproduced_with_permission_of_the_copyrigh_owner_.further_reproduction_prohibited_without_permission)
Future research. This research defined a broad scope of variables as they related to stress. Further research could be conducted by performing a more in-depth analysis of each of the dependent variables; anxiety, aggressive behavior reacting to stress, stress from conflict, stress affecting self-concept, self-inflicted/unhealthy reactions to stress, stress from change, physiological reactions to stress, and grief/depression. In-depth research on a specific stressor or reaction to stress would alleviate a limitation of this study with regards to possible correlations among the independent and dependent variables not accounted for conducting eight separate stepwise multiple regressions. Another suggestion for future research might investigate which stress prevention and/or management techniques work best for each of the dependent variables of this study based on the statistically significant predictor variables.
REFERENCES


Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 261-276). Mahwah, New Jersey: Lawrence Erlbaum Associates, Inc.


Hofer, B. K. (2001). Personal epistemology research: Implications for learning and


Hofer, B. K., & Pintrinch, P. R. (Eds.). (2002). *Personal epistemology: The psychology of beliefs about knowledge and knowing*. Mahwah, New Jersey: Lawrence Erlbaum Associates, Inc.


(Eds.), *Adult development: Comparisons and applications of developmental models* (pp. 57-78). New York: Praeger.


Pedhazur, E. J. (1997). *Multiple regression in behavioral research: Explanation and...*


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