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ABSTRACT

Over the years, researchers in the field of psychology have been interested in the factors associated with anxiety. As a result of this interest, several theories have attempted to explain the construct and interventions developed to treat it. Even though there is no agreement on the nature of anxiety, there is a wide agreement that general anxiety can be classified as having two distinct components: trait anxiety and state anxiety. While trait anxiety refers to relatively stable individual differences in anxiety proneness, state anxiety is a transitory emotional condition. Among different state anxieties, mathematics anxiety is distinguished from general anxiety as situation-specific. It manifests itself in mathematically related environments. Considerable research has been conducted to explain mathematics anxiety as the importance of mathematics applications have grown in our society. More recently, it was suggested that statistics anxiety is a related but separate construct from general anxiety and mathematics anxiety; however, there is a lack of empirical literature distinguishing between these two types. In this paper, mathematics anxiety and statistics anxiety are discussed in relation to general anxiety research. Differences and similarities between the two anxieties are the main focus, and comparisons are made in terms of five main points: definitions, nature, antecedents, effects, and treatments of these anxieties. (Contains 126 references.) (MKA)

A COMPARISON OF MATHEMATICS ANXIETY AND STATISTICS ANXIETY IN RELATION TO GENERAL ANXIETY

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Anxiety is one of the most intensively researched constructs in the field of psychology. Mathematics anxiety is conceptualized as a separate, situation-specific anxiety. Statistics anxiety is recently suggested as a distinct construct from mathematics anxiety but received less attention. Researchers disagree regarding whether statistics anxiety and mathematics anxiety are the same constructs. Many assert that they are different. This paper compared and contrasted general anxiety, mathematics anxiety, and statistics anxiety in terms of their definitions, natures, antecedents, effects, and treatments.

Introduction

Anxiety is one of the most investigated constructs in the field of psychology. Over the years, researchers have been interested in the factors associated with anxiety. As a result of this interest, several theories have attempted to explain the construct and interventions developed to treat it. Even though there is no agreement on the nature of anxiety, there is a wide agreement that general anxiety can be classified as having two distinct components: Trait anxiety and state anxiety. While trait anxiety refers to relatively stable individual differences in anxiety proneness, state anxiety is a transitory emotional condition. Among different state anxieties, mathematics anxiety is distinguished from general anxiety as situation-specific. It manifests itself in mathematically related environments. Considerable research has been conducted to explain mathematics anxiety as the importance of mathematics applications have grown in our society. More recently, it was suggested that statistics anxiety is a related but a separate construct from general anxiety and mathematics anxiety (Benson, 1989; Benson & Bandalos, 1989; Onwuegbuzie, 1993; Zeidner, 1991). However, there is a lack of empirical literature distinguishing between these two types of anxieties. In this paper, mathematics anxiety and statistics anxiety will be discussed in relation to general anxiety research. Differences and similarities between mathematics anxiety and statistics anxiety will be the main focus, while comparisons will be made in terms of five main points: definitions, nature, antecedents, effects and treatments of these anxieties.

Definitions

There is not "a" single agreed upon definition of anxiety. Several widely accepted definitions will be cited. The constructs of general anxiety, statistics anxiety, and mathematics anxiety are situation-specific and, usually, negative and debilitating. However, occasionally, anxiety might function as a motivator (Meyers & Martin, 1974). For the purpose of this paper, the terms "general anxiety", "mathematics anxiety", and "statistics anxiety" will be conceptualized as debilitating anxiety.

General anxiety refers to an unpleasant emotional reaction that results from perception or appraisal of a particular situation as threatening (Schwarzer, Van der Ploeg, & Spielberger, 1982). If an individual perceives environmental demands as potentially dangerous, or exceeding his/her competence, then the environment will be regarded as stressful. In such cases, a person typically responds with anxiety (Schwarzer, Van der Ploeg, & Spielberger, 1982). Similarly, Lazarus and Averill (1972) defined anxiety as "an emotion based on the appraisal of threat". It is also defined as "an unpleasant emotional reaction to real or imagined dangers that is accompanied by autonomic discharge and subjectively experienced as "tension", "fright", or "nervousness" (Beck, 1972). This definition is close to Freud's distinction of two types of anxieties. Freud described objective anxiety that is caused by outside sources, and neurotic anxiety, anxiety from internal impulses (Strawderman, 1985). May (1950) gave an existential meaning to anxiety as "a state that is associated with feelings of uncertainty, helplessness and threat to the core or essence of personality".

Similar to general anxiety research, one of the greatest difficulties of mathematics anxiety research is that mathematics anxiety is being a difficult construct to define (Round & Hendel, 1980; Wood, 1988). Many definitions of mathematics anxiety are given (Dreger & Aiken, 1957; Fennema & Sherman, 1976; Gough, 1954; Kogelman & Warren, 1979; Lazarus,1974; Richardson & Suinn, 1972; Tobias & Weissbrod, 1980; Wagner, 1980); however, up to date, there is no agreed definition (Kazelskis, 1998). One of the first definitions of mathematics anxiety was "the presence of a syndrome of emotional reactions to arithmetic and mathematics" (Dreger & Aiken,1957, p.344). Later, Lazarus described it as " a irrational and impeditive dread of mathematics" (1974). The most widely used definition of mathematics anxiety is "the feelings of tension and anxiety that interfere with the manipulation of numbers and solving of mathematical problems in a wide variety of ordinary life and academic situations" (Richardson & Suinn, 1972, p. 551).

Although there are several definitions of statistics anxiety, Cruise and Cash (1985) and Zeidner (1991) are the most cited definitions. Cruise and Cash (1985, p.319) defined statistics anxiety as "the feelings of anxiety encountered when taking a statistics course or doing statistical analyses; that is, gathering, processing, and interpretation." Zeidner (1991) gave a more elaborative definition. This definition is very similar to that of mathematics anxiety. It states that statistics anxiety is

"... extensive worry, intrusive thoughts, mental disorganization, tension, and physiological arousal when exposed to statistics content, problems, instructional situations, or evaluative contexts, and it is commonly claimed to debilitate performance in a wide variety of academic situations by interfering with the manipulation of statistics data and solution of statistics problems (p. 319)."

It is clear that there has been a great difficulty in defining the construct of these anxieties. In order to investigate any concept, it needs to be defined. Definition was (and still is) one of the main difficulties in anxiety research in general and mathematics anxiety and statistics anxiety in particular.

Nature

Even though there is no agreement on the definition of general anxiety, there is a wide agreement that general anxiety can be classified as having two distinct components. Olson (1985) described these as cognitive and affective. Others labeled them as state and trait (Cattell & Scheier, 1961; Cattell 1966; Spielberger, 1966). A cognitive or worry component and an affective or emotional component are widely accepted (Olson, 1985). Wine (1980) described a three-factor construct. He purposed that anxiety is composed of cognitive, behavioral, and emotional components. Cattell and Scheiner (1961) conceptually distinguished anxiety as containing an overt- conscious state, and a covert-unconscious state. Later, Aiken (1962) used terms "general" versus "situational" to refer to state and trait anxiety, respectively. Over the years, the distinction between state and trait anxiety has been operationalized (Spielberger, 1966, 1972a, 1972b). According to Spielberger (1966, 1972a, 1972b), trait anxiety refers to relatively stable individual differences in anxiety proneness. On the other hand, state anxiety is a transitory emotional condition of the human organism that is characterized by subjective, consciously perceived feelings of tension, apprehension, nervousness, and worry. The most well-known type of state anxiety is test anxiety (Farbey, 1982). Test anxiety is defined as "a special case of general anxiety" that is associated with person's experience of evaluation (Sarason, 1980). Another type can be described as content-oriented anxiety, anxiety of a particular activity. Number anxiety (Dreger & Aiken, 1957), mathemaphobia (Lazarus, 1974), mathematics anxiety (Richardson & Suinn, 1972), and statistics anxiety (Cruise & Cash, 1985) are all content-oriented anxieties.

Researchers have consistently found that these anxieties are distinct from trait anxiety (Benson, 1989; Benson & Bandalos, 1989; Zeidner, 1991). However, there is a disagreement regarding the nature of mathematics anxiety. While Brush (1981) indicated that mathematics anxiety is nothing more than a situation-specific test anxiety, others described it as an attitude (Aiken, 1976) or fear (Hendel, 1977; Lazarus, 1974; Mook & Legg, 1980). While some regarded mathematics anxiety as a situation-specific (state) anxiety (Richardson & Suinn, 1972; Miller, 1981; Docking & Thornton, 1979), others regarded it as a trait anxiety (Byrd, 1982; Betz, 1978).

Similar to general anxiety, mathematics anxiety was initially conceptualized as a one-factor construct (Frary & Ling,1983; Richardson & Suinn, 1972). Later on, other factor analytic studies suggested multiple parts. Two-factor solutions were found by Alexander and Cobb (1984), Brush (1976; 1978; 1981), and Plake and Parker (1982). Three-factor solutions were obtained by Alexander and Martray (1989), Ferguson (1986; 1989), and Resnick, Viehe, and Segal (1982). Four-factor solutions were also suggested by Satake and Amato (1995). Most recently, Kazelskis (1998) supported a six-factor solution. One of the earlier studies, (Brush, 1976), found that mathematics anxiety had two distinct factors: namely, Problem Solving Anxiety and Evaluation Anxiety.

Similarly, Rounds and Hendel (1980) reported two factors: Mathematics Test Anxiety and Number Anxiety. Kagan (1987) found no distinction between Numeric Anxiety and general test anxiety or mathematics test anxiety. He concluded that "contrary to the theory of Rounds and Hendel (1980), anxiety over numeric manipulations appeared to be simply another variety of test anxiety" (p.306). Yet, still later, Ferguson (1986) confirmed Rounds and Hendel's (1980) two-factor solution and in addition, he found that Abstraction Anxiety was a third factor in mathematics anxiety. Kazelskis (1998) investigated the factor structure of the three most widely used mathematics anxiety scales: a revised form of MARS (RMARS), the Mathematics Anxiety Questionnaire (MAQ), and the Mathematics Anxiety Scale (MAS). He found that factor analysis suggested a six-factor solution; thus, he supported multi-dimesionality of mathematics anxiety with six constructs. The six dimensions were Mathematics Test Anxiety, Numerical Anxiety, Mathematics Course Anxiety, Worry, Positive Affect Toward Mathematics, and Negative Affect Toward Mathematics. He also pointed out that "Numerical Anxiety appears to be distinct from the other dimensions…it could be argued that anxiety as a result of the manipulation of numbers is the sine qua non of mathematics anxiety" (Kazelskis, 1998, p. 631).

Unlike mathematics anxiety, but similar to general anxiety, statistics anxiety is conceptualized as bidimensional (Zeidner,1991); or multidimensional (Cruise, Cash, & Bolton, 1985; Cruise & Wilkins, 1980; Qnwuegbuzie, 1997; Qnwuegbuzie, 1993; Qnwuegbuzie, Da Ros, & Ryan, 1997). Zeidner (1991) conceptualized statistics anxiety as a bidimensional construct, namely content-related anxiety and assessment-related anxiety. This was very similar to Brush (1976) and Round and Hendel (1980)'s two-factor conceptualization of mathematics anxiety. To test this two-factor hypothesis, Zeidner (1991) developed the Statistics Anxiety Inventory. Factor analysis revealed that two factors (statistics test anxiety = 24% and statistics course anxiety = 21%) accounted for 45 % of the total variance. Cruise, Cash, and Bolton (1985) proposed six factors of statistics anxiety. These were: (1) worth of statistics, (2) Interpretation anxiety, (3) test and class anxiety, (4) computational self- concept, (5) fear of asking for help, and (6) fear of statistics teachers. A recent phenomenological investigation of the construct of statistics anxiety revealed several components of statistics anxiety (Qnwuegbuzie, Da Ros, & Ryan, 1997). By using common qualitative research methods (such as observation, triangulation, and units of information), they found statistics anxiety to be a multidimensional construct. It was consisted of four main components; instrument anxiety (computational self-concept and statistical computing anxiety), content anxiety (fear of statistical language, fear of application of statistics, perceived usefulness of statistics, recall), interpersonal anxiety (fear of asking for help and fear of statistics teachers), and failure anxiety (study-related anxiety, test anxiety, and grade anxiety).

Antecedents

Epstein (1972) described three different types of antecedents: primary overstimulation, cognitive incongruity, and response unavailability. When stimulation exceeds what the forbearance level of the organism is, the organism said to be overstimulated. Cognitive incongruity is disagreement between an individual's expectation and the reality of the situation. Response unavailability refers to situations where the response could not be given until a waiting period is completed. Antecedents of general anxiety are also described as situational, dispositional, and environmental

(Lazarus & Averill, 1972). Situational factors are surroundings, dispositional factors are personality characteristics, and environmental factors include events that occurred in the past.

Several researchers have identified three antecedents of general anxiety as it related to mathematics anxiety. Dispositional antecedents include mathematics confidence (Byrd, 1982), self-esteem (Tobias, 1978; Mook & Legg, 1980), disapproval of significant others (Byrd, 1982; Tobias, 1978), lack of confidence (Fennema & Sherman, 1976; Hendel, 1977; Sherman, 1980), attitude toward math (Byrd, 1982), perceived usefulness (Lazarus, 1974; Sandman, 1979), math as a male domain (Boswell & Katz, 1980; Burton, 1978), and learning styles (Hodges, 1983). Situational antecedents are more related to mathematics instruction methods (Byrd, 1982; Burton, 1984; Tobias, 1978; Williams, 1988), including teacher-related factors (Byrd, 1982; Tobias, 1978), the rigidity of mathematics (Kogelman & Warren, 1978; Lazarus, 1974), mathematical notation and terminology (Byrd, 1982; Skiba, 1990; Tobias, 1978), emphasis on "a" single correct answer without considering the process and time-limited examination style (Byrd, 1982; Tobias, 1978; Mook & Legg, 1978), and rote learning (Bulman & Young, 1982; Greenwood, 1984; Kogelman & Warren, 1978). Environmental antecedents consist of SES (Byrd, 1982) and parental factors (Aiken, 1970; Aiken & Dreger, 1961; Burton, 1979; Byrd, 1982; Cooper & Robinson, 1991; Mcleod, 1992).

Situational, dispositional (personality related), and environmental antecedents of statistics anxiety were similar to those of general anxiety and mathematics anxiety. Situational factors include gender, socio-economic status, ethnicity (Qnwuegbuzie; 1999Zeidner,1991); or past mathematics related experiences such as the number of prior mathematics courses, mathematics skills, attitude toward calculators, statistics related factors such as prior statistical knowledge, prior statistics course grade(s), and satisfaction with prior statistics course(s) (Qnwuegbuzie, 1999; Zeidner, 1991). Dispositional factors consist of mathematics self-concept, self-esteem, perceived scholastic competence, perceived intellectual ability, perceived creativity, and perfectionism (Qnwuegbuzie, 1999). Examples of environmental factors are gender, age, racial differences, learning styles, classroom design, structure of the class, authority orientation, auditory-orientation, food intake preference, time of day preference, and mobility preference (Qnwuegbuzie, 1999).

Effects

Anxiety, in general, and mathematics and statistics anxieties, in particular, are negative emotions. Rarely do they function as motivators (Meyers & Martin, 1974). The negative effects of general anxiety are often physiological (i.e., blood pressure, respiration, sweat, and heart rate increase, dry mouth,) (Faust, 1990; Krantz & Manuck, 1984; Richardson & Suinn, 1972; Wine 1980), psychological (i.e., trepidation, fear, disappointment, uneasiness, rage, discontentment), and behavioral (i.e., stuttering, biting nails, pacing the floor, voice tremors) (Mandler; 1972; McReynolds, 1976).

There are two main theories that explain the relationship between anxiety and performance. Cognitive interference theories (i.e., Wine, 1980) hypothesized that high anxiety causes decrease in outcome performance. On the other hand, deficit theories (i.e., Tobias, 1986) claim that because of poor performance, anxiety increases. Regardless, there is strong evidence that anxiety is negatively related to academic achievement

(Spielberger, 1966; Tobias, 1980), external locus of control (Brett & Kernaleguen, 1975), and self- concept (Lipsett, 1958; Mitchell, 1959; Rosenberg. 1962).

The effects of mathematics anxiety are investigated under two broad terms: immediate and long-term. Lower achievement can be considered as one of the immediate effects (Aiken, 1970; 1976; Alexander & Cobb, 1984; Betz, 1977; 1978; Gaudry & Spielberger, 1971; Hendel, 1980; Richardson & Suinn, 1972; Richardson & Woolfork, 1980; Suinn, 1972; Suinn & Edwards, 1982; Tobias & Weissbrod, 1980). Avoidance (Aiken, 1976; Fennema & Sherman, 1976; Hendel, 1980), low self-esteem, learned helplessness, cautiousness, and compulsive behaviors (Meconi & Steiner, 1981) can be considered as some of the long-term effects of mathematics anxiety. Dew, Galassi, and Galassi (1984) also found physiological arousal to be related with math anxiety.

Qnwuegbuzie, Da Ros, and Ryan (1997) suggest that while medium levels of statistics anxiety cause discomfort, high levels of it can disastrous. In fact, they found that statistics anxiety shows itself in physiological and behavioral forms. Some of the effects of statistics anxiety are:

> depression, frustration, anger, apprehension, nervousness, worry, panic, stress, emotionality. Physiological signs were perspiration, palmar sweating, dry mouth, headaches, feeling sick, muscle contractions, tension, bodily pain, tightness in the throat, increase in heart and perspiration rate, and reduced sex drive. Behavioral signs were biting one's nails, voice tremors, plaintive voice, use of improper language, fits of anger, irritability, a tight brow, and tears. Related emotion included frustration, learned-helplessness, fear, uncertainty, reduction in self self-esteem and independence, lack of concentration, blanking

out, feelings of anticipation and disappointment, hostility, restlessness, and paranoia (p. 16).

Many studies reported negative relationships between statistics anxiety and statistics course performance (Benson, 1989; Elmore, Lewis, & Bay, 1993; Llonde & Gardner, 1993; Feniberg & Halperin, 1978; Fitzgerald, Jurs, & Hudson, 1996; Onwuegbuzie, 1993; Onwuegbuzie & Daley, 1996; Onwuegbuzie & Seaman, 1995; Zeidner, 1991).

Treatment

Spielberger (1972) listed repression, denial, and projection as ways individuals deal with anxiety. Lazarus (1966) classified these methods under two general strategies: combating anxiety strategies and defending against anxiety strategies. Combating strategies may include attacking and avoiding, while defensive mechanisms are similar to those suggested by Spielberger (1972).

Even though students deem that math anxiety cannot be treated, many studies have been shown to be effective in treating mathematics anxiety (Tobias, 1991). Some studies focused on teaching students in areas of mathematics deficiency (Frye, 1983), others employed relaxation techniques (Bander, Russell, & Zamostny, 1982; Fitzgerald, 1984) and desensizitation techniques (Goodall, 1980). Mathison (1977) indicated that behavioral treatments are most useful with students who have low mathematics anxiety and are lacking some mathematical skills. In general, research studies indicate that anxiety reduction and stress management techniques are not as effective as cognitive restructuring techniques (Deitch, 1981; Kagan, 1987). Oaks (1989) suggested that interventions solely focused on reducing anxiety would not be successful in long run, unless cognitive restructuring takes place. Similarly, Clute (1984) found that low mathematics anxious students were more successful when discovery methods were employed, while, high mathematics anxious students benefited more from expository methods.

Several strategies have been developed to specifically deal with statistics anxiety (Schacht & Stewart, 1990; Brems, 1999; Johnson, 1999; Zerbolio, 1999). Some focused on improving statistics textbooks (Johnson, 1977; Rowntree, 1981). Others suggested changing the style of statistics examinations from timed to un-timed examinations (Morris, 1981; Onwegbuize,1993). Farbey (1982) found that calculator usage reduced students' anxiety while working statistical problems. Ellman (1991) reduced mathematics anxiety and computer anxiety in a statistics course using elaboration theory approaches (Reigeluth, 1983; 1987), even though achievement was not effected by these approaches. Strategies that help students make meaningful connections between mathematical data and statistical concepts are suggested to reduce anxiety in statistics courses (Ellman, 1991). Similarly, Seaver and Belli (1989) suggested that students needed to have more realistic applications and supplemental textbooks.

<u>Relationships Among Three Anxieties</u>

Biernbaum and Eylath (1994) studied the relationships between statistics anxiety and mathematics anxiety. This study produced interesting and important results. Statistics anxiety was significantly related to mathematics anxiety ($r=.54$, $p<.001$) and computer anxiety ($r=.33$, $p<.001$). Inductive reasoning ability was the only variable that was significantly related to statistics anxiety ($r=-.26$, $p<.01$), but not related to mathematics anxiety ($-.10$, $p>.05$). Parallel to this, statistics course grades were related to only high school mathematics grades ($r=.18$, $p<.05$) and inductive reasoning ability ($r=.20$, $p<.05$) but not related to statistics anxiety ($r=-.11$). This is a direct confirmation of what Eysenck (1982) suggested; anxiety is not related to the end-product but more related to process. Willingness to study statistics, on the other hand, was negatively related to statistics anxiety ($r=-.56$, $p<.001$), mathematics anxiety ($r=-.57$, $p<.001$), computer anxiety ($r=-.30$, $p<.001$), attitudes toward statistics ($r=.56$, $p<.001$), attitudes toward mathematics ($r=.45$, $p<.001$), attitudes toward computers ($r=.25$, $p<.001$), high school mathematics grades ($r=.25$, $p<.01$), and numerical ability ($r=.19$, $p<.05$). Interestingly, experience in statistics courses and statistics course grades did not correlate with either statistics anxiety or willingness to study statistics.

Slight (Hadfield & Maddux, 1988) and moderate (Betz, 1978) relations between mathematics anxiety and general anxiety have been reported. Moderate relations between mathematics anxiety and trait anxiety have also been found (Bander & Betz, 1981; Betz, 1977, 1978; Dew, Galassi, & Galassi, 1983, 1984; Plake & Parker, 1982), even though it was suggested that math anxiety may not be related to general anxiety (Morris, 1981). Only one study (Thronton 1979) found no association between math anxiety and trait anxiety. Finally, Maysick (1984) reported positive relations between statistics anxiety and trait anxiety, number anxiety and mathematics test anxiety.

Demaria-Mitton (1987) asserted that "since statistics, like mathematics, is a number and symbol system requiring thinking on an abstract level…" it is justified to consider them to be identical. Such conclusions are found to be faulty by later researchers (Birenbaum and Eylath, 1994; Buck, 1987; Cruise and Cash, 1985; Cruise, Cash, and Bolton; 1985; Onwuegbuzie, 1999a, 1993). Buck (1987) explains that even though basic mathematical concepts are used in statistics, statistics is more closely related to verbal reasoning than it is to mathematical reasoning. Thus, he infers that mathematics and statistics are different from each other. Birenbaum and Eylath (1994) tie this wide-spread misconception with the lack of research on statistics anxiety. Morris (1976) also found that the fear (anxiety) of mathematics was higher among psychology students than math students, even though there is little relationship between a student's math background and success in psychological statistics courses (Giambra, 1976). Cruise, Cash, and Bolton (1985) and Onwuegbuzie (1999a) suggested that statistics anxiety is related to, but different from mathematics anxiety.

Even though statistics can be considered as a sub-area of mathematics and statistics anxiety is positively correlated with mathematics anxiety (Maysick, 1984), researchers explain that statistics is more than just manipulation of mathematical symbols in that statistics involves different mental procedures (Cruise and Cash, 1985). In fact, to solve statistical problems, one uses more logic than math skills (Zerbolio, 1999). A relatively recent study found no relationship between numerical ability and statistics course grade (Birenbaum and Eylath, 1994). In this sense, as opposed to Widmer and Chavez's claim that "statistics anxiety is a specific form of math anxiety" (1986, p. 70), the concept of statistical anxiety may be broader than that of mathematics anxiety. These confirm Onwuegbuzie's (1993) assumption that cognitive processes involved with statistics anxiety is different from other anxieties such as general anxiety or mathematics anxiety. Birenabum and Eylath (1994) found that, unlike mathematics anxiety, statistics anxiety was significantly correlated with inductive reasoning ability. Statistics anxiety is also found to be different from general anxiety (Benson, 1989), test anxiety (Benson, 1989;

Benson and Bandalos,1989; Zeidner, 1991), math self-concept, and math self-efficacy (Benson, 1989; Benson and Bandalos,1989; Zeidner, 1991) just as in the same way that mathematics anxiety is a distinct construct from general anxiety (Richardson and Woolfolk, 1980). Therefore, "statistics anxiety is a better predictor than any other anxiety of the cognitive processes involved in statistical contexts" (Onwuegbuzie, 1993, pp.8-9).

Conclusions

General anxiety is one of the most intensively investigated constructs in the field of psychology. Mathematics anxiety is conceptualized as a situation specific anxiety that manifests itself in mathematics-related environments. Plenty of research studies have demonstrated mathematics anxiety to be different from general anxiety. Statistics anxiety is recently suggested and less investigated than mathematics anxiety. Researchers disagree regarding whether statistics anxiety and mathematics anxiety are the same constructs. Many assert that they are different (Benson, 1989; Benson & Bandalos, 1989; Cruise & Cash, 1985; Onwuegbuzie, 1999a; 1993), even though a few claim that statistics anxiety is a specific form of mathematics anxiety (Widmer & Chavez, 1986). Thus, mathematics anxiety and statistics anxiety share many similarities in terms of their nature, antecedents, effects, and treatments. Nevertheless, there are distinctions between the two. Further research is needed to investigate relationships between mathematics anxiety and statistics anxiety.

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