

REASONS OF MATHEMATICS ANXIETIES FOR UNIVERSITY STUDENTS

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ABSTRACT

In this study, an attitude scale was developed to bring out the mathematics anxieties of university students in Turkey. While developing the scale, related literature was searched, students' opinions were asked by two open-ended questions and experts' ideas were benefited. The scale elements with respect to their meaning clearance, their expression in plain language, their conformity to the grammar rules and their length were reexamined. The developed attitude scale, consists of 100 questions was applied to total 400 students of Marmara University in the fall term of 2005-2006 academic years after pre-testing with 30 students. After extraction of unanswered or unfilled questionnaires, 320 questionnaires were analyzed and evaluated in three groups, Science Studies, Social Studies and total. In order to find common characteristics, factor analysis was applied to the obtained data. The results of factor analysis show that there were differences in priorities of mathematics anxieties. Cronbach alpha reliability coefficients of the scale were found as 0.8069 for science, 0.8505 for social science and 0.8303 for total.

Keywords: Mathematics anxiety, factor analysis, attitude scale.

INTRODUCTION

Math anxiety is an emotional reaction to mathematics based on a past unpleasant experience which harms future learning. A good experience learning mathematics can overcome these past feelings and success and future achievement in math can be attained (Curtain-Phillips, M., 1999). In different cultures, mathematics is a foundational literacy that is understood to be of great importance. "It comes as a surprise to many people to learn that this attitude is not shared by other societies. In Russian or German cultures, for example, mathematics is viewed as an essential part of literacy, and an educated person would be chagrined to confess ignorance of basic mathematics" (Smith, B. S., 2002). On the international front, it has been reported that U.S. students tend to attribute their math proficiency to ability, implying a genetic predisposition, versus Asian students that attribute their math performance to hard work and many hours of study (Tobias, 1993, p. 52). The American Mathematical Association of Two-Year Colleges (AMATYC) clearly delineated the current situation: Higher education is situated at the intersection of two major crossroads: A growing societal need exists for a well-educated citizenry and for a workforce adequately prepared in the areas of mathematics, science, engineering, and technology while, at the same time, increasing numbers of academically under prepared students are seeking entrance to postsecondary education (AMATYC, 1995, p.3, as cited in Zopp, 1999, p.19). This is an issue of economics and it is important due to the computerized advancements ahead in society (Johnson, S. B., 2003). It seems that math aversion is a socially and culturally accepted practice in the United States. By contrast, studies confirm that in Asian countries such as Japan, Taiwan, and Thailand, math anxiety exists at a much smaller scale than in the United States. Studies have been done where students were asked to speculate why some people were better at math than others. Asian students consistently attributed the skills to hard work, while American students cited innate ability (Tobias, 1993, p. 52; Engelhard Jr., 1990). In Turkey, people accept math as the basis of all sciences. Although math anxiety in Turkey exists at a much smaller scale than in the United States, it exists at a bigger scale than in the Asian countries.

There is a relationship between mathematics anxiety and a global learning style. A higher level of global learning was related to higher levels of mathematics anxiety. All types of learners are capable of learning mathematics, but some types do not learn as well when taught in the traditional manner that has been prevalent in mathematics (Tobias, 1993). The implicit messages embedded in society are that, if one is not good at math it is not ones fault, it's okay, and common. It seems somewhat socially acceptable to "not" be a good at math. This troublesome norm has found its way into the mainstream of education (Johnson, S. B., 2003). Mathematics anxiety often has been cited as a factor limiting educational and career choices of college students, particularly women (Betz, 1978). Students who are severely math anxious may opt for academic majors within the humanities, fine arts, or social sciences that require minimal coursework in mathematics (Chipman et al., 1992). Because of their math anxiety, the students prefer to study in social field in high schools. The obligation to solve the mathematics questions and as they require absolute knowledge causes a stress on the students. This process that continues also at the university creates a negative relation between our students and us. The mathematics anxiety we face, as a resistance in mathematics education is very important when the basic science mathematics is not learnt well in many science branches prevents development of that science branch. For this reason, to find and remove the basic factors that prevent the mathematics teaching will greatly increase the general success.

What is math anxiety? Anxiety is a phenomenon that has been acknowledged for centuries. "The word anxiety comes from the Latin word anxious, meaning a condition of agitation and distress. The term has been in use since the 1500s (Bourne, 1995, p. 2). Bourne (1995) distinguishes anxiety from fear, in that anxiety has a more holistic affect on one's being; while fear seems to be a more acute response focused on concrete or external situations. Over 19 million Americans suffer from some kind of anxiety problem (Repich, 2002). The term math anxiety itself emerged in the early 1970's. The origin of the term is unknown, but one of the first researchers to investigate this dynamic was Shelia Tobias. The story that sparked Tobias' attention, a researcher/activist, was an informal survey