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Presentation of a Structural Model of Preparedness for Disasters and Its Relationship with Personality Traits, the Mediating Role of Fatalism and the Behavioral Consequences of Citizens

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Original Article

Abstract

INTRODUCTION: Due to its geographical location, Iran has frequently faced natural disasters, especially earthquakes, which highlight the need to use the disaster management process. The aim of this study is to present a structural model of disasters preparedness and its relation to personality traits, mediation of fate and behavioral consequences of citizens.

METHODS: This descriptive research is one of the structural equation correlational one. All people aged 18 to 60 living in Tehran city were studied and finally 384 people were selected as a sample based on Morgan table by multi-stage cluster sampling using these questionnaires: a) NEO 5-Factor Inventory (Costa & McCrae, 1985); b) Fatalism (Shamsoddini & Maghsoodi, 2021); c) Behavioral consequences (researcher-made); and d) Household preparedness index for disasters (Nouri, 2016). Cronbach's alpha coefficient (0.79) was used to assess the reliability of the questionnaires and data were analyzed using SPSS-24, Amos and Lisrel 8.8.

FINDINGS: The results showed that personality traits ($p<0.01$) has a positive and significant effect on disaster preparedness. Also, the indirect effects of fatalism ($p<0.01$) have a negative effect and behavioral consequences ($p<0.01$) have a positive and significant effect on people's preparedness against disasters.

CONCLUSION: According to the research findings, the components of personality traits, fatalism and behavioral consequences have a great impact on people's tendency to prepare for natural disasters.

Keywords: Readiness; Personality traits; Fatalism; Behavioral consequences; Disasters.

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Introduction

Due to a wide range of risks and their multiple vulnerabilities, cities as the most complex man-made structures, face extensive risks (1). One of the most important risks is natural disasters that have always been a major threat to human lives, property, and infrastructure throughout human life (2). In fact, natural disasters are dynamic and uncertain processes that have the potential to turn into terrible disasters in the absence of risk reduction systems (3). Global data also shows the fact that natural disasters have occurred more frequently than in the past during the last two decades and have had more destructive effects (4).

In many developing countries, 75% of the damages are caused by only one natural disaster (earthquake) and it destroys one to two percent of their gross national product (5).

In general, crisis management is a dynamic process in form of appropriate activities that are carried out before, during and after disasters (6) and includes two stages: *pre-disaster phase* (prevention/ mitigation/ preparedness) and *post-disaster phase* (response/ rehabilitation/ reconstruction). Basically, the purpose of the pre-disaster phase is to develop the capacity and prepare to deal with the possible consequences of disasters in the early days of the occurrence, and unlike the post-disaster phase, it mainly focuses on the effectiveness after the disaster. Disaster

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management is important in development of the resilience capacity of societies, because it leads to preparedness to deal with a disaster (7).

"Preparedness" is one of the most important stages of the natural disasters management cycle that must be taken care of before it occurs. In other words, one of the ways to reduce the risks caused by natural disasters, including earthquakes, is to improve the level of preparedness among different sections of the society (8). In fact, preparation is an operation that is carried out after predicting and recognizing the possibility of a disaster and includes activities that are designed to minimize losses, damages and other adverse effects of disasters. Designing disaster response activities, especially providing timely rescue and emergency evacuation, is one of the most important parts of preparation (9). Disaster preparedness can reduce the risk of life losses, property damage and vulnerability before the occurrence (10) and is of great importance. But despite the importance of individual preparedness, reports indicate that there are few studies in this field even in disaster-prone areas (11) so that empirical studies are conducted on factors. Also, the determinants of disaster preparedness, especially in developing countries, are relatively low (12). Therefore, taking into consideration that the way of understanding the risk determines the type of human reaction to respond to it, so if the citizens do not understand the importance of the risk of disasters, they will not value the programs for prevention and reduction of the effects of the disaster (1).

Accurate assessment of people's perception of risk is also very important to determine their behavior when a real disaster occurs, as well as measure their awareness of prevention policies and the need to reduce the effect of disasters and use the recommendations and guidelines of responsible organizations. People should have as much of a correct understanding of the risk as possible so that they can be expected to cooperate in reducing these risks. Thus, one of the most important components in understanding risk-taking, reaction and preparedness against disasters is the personality characteristics of people. The study of the psychology of disasters shows that a wide range of personality traits are related to disaster-prone behaviors. Studies that have used discriminant correlation methods have positively examined the relationship between disaster management and personality traits along with other variables (13).

Theoretically, it is thought that personality traits affect people's perception and evaluation from the surrounding environment (14) and subsequently such evaluation affect their behavior. Another similar point that is included in social cognition models admits that personality traits indirectly influence human behavior through the influence of attitudinal variables and norms of behavior (15).

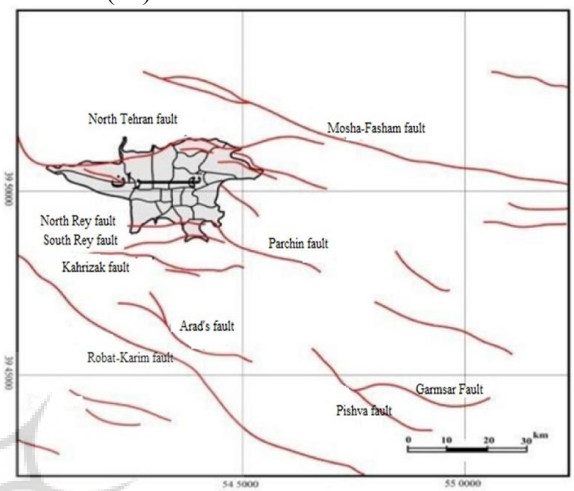

Figure 1. Faults in the area of Tehran city

Determinism is a cultural and group belief through which a deterministic person attributes all the affairs and phenomena of his social life to the operation of supernatural and metaphysical forces and factors and considers these forces to be the supervisors of his actions, deeds and actions in any situation (16). In fatalism, there is the belief that the results of human work are predetermined by forces that are beyond the power and control of the individual (17). Believing in fatalism removes the burden of responsibility from a person's shoulders, imposes a passive attitude on a person, and deprives a person of his ability to play a prominent and effective role (18).

The result of this type of attitude will be: lack of belief in planning and foresight, lack of motivation and participation, increase the spirit of passivity, lack of planning, and lack of necessary preparation to face the disaster (19).

Considering the importance of preparedness category in disaster management cycle, the main goal of this research is to model the structural equations of disaster preparedness in relation to personality traits and the mediation of fatalism and behavioral consequences of citizens. In other words, the city of Tehran, as one of the most important and vulnerable areas of Iran, requires special attention and planning for preventive

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measures and disaster management, and the establishment of an efficient, fast and responsive military show the importance of investigating this issue.

Methods

In this descriptive research, all people aged 18 to 60 living in Tehran city were studied. In order to determine the sample size, Morgan's table was used and taking into account the acceptable error of 0.05 and the confidence level of 95%.

The RCS staff of the mentioned branches, who have been collaborators of this thesis, referred to the mentioned family members for completing the questionnaire based on the criteria for entering the research. The questionnaires were collected by multi-stage cluster sampling method considering branches, bases and houses of Helal Red Crescent Society in different regions of Tehran province which have acceptable information about those areas. In the following, three different areas (10, 15 and 22) then 5 neighborhoods from each area were selected by lottery. According to the forecasted information, these branches are prepared against disasters, so eight households from different strata were selected from each neighborhood; the average of each household was considered to be four people, an average of 160 people (480 in total) were selected in each neighborhood. After the review, due to the various defects, 96 questionnaires were removed and finally 384 people were considered as the final sample.

Research tools

In order to check the required information, the following questionnaires were used:

A) NEO 5-Factor Inventory (NEO-FFI) (20)

This questionnaire (Costa & McCrae, 1985) contains 240 questions and two forms: form S (rating by the individual) and form R (rating by others). It measures five characteristics in each factor and provides a comprehensive assessment of a person's personality. This questionnaire, which is translated, standardized and implemented in Iran by Grossi, is suitable for people who are 17 years old or older (21). The 60-question form of this questionnaire, used in this research, is used if the general information about the personality is sufficient and the duration of the research is limited. The questions are arranged in a 5-point Likert scale and 12 items are assigned to each factor. Each questions has 5 options (completely agree, agree, no opinion, disagree & completely disagree), which are assigned a score of 0 to 4. Five separate scores are obtained by summing the scores of each of the questions related to each item. Cronbach's alpha coefficient result was 0.791, indicating the reliability and validity of the questionnaire items.

B) Fatalism

In the present research, the 24 questions of Shamsoddini & Maghsoodi questionnaire (2021) (22) was used to measure fatalism and includes various items, including belief in luck and fortune, pessimism and lack of trust in the future, belief in God's intervention in life and the direction of affairs, definiteness and certainty of fate, aversion to the world, lack of belief in population control, lack of belief in official insurances, belief in evil eye, and disbelief in human will and effort in life. This questionnaire is based on Likert scale (strongly disagree; disagree; no opinion; agree; strongly agree). The validity and reliability of this questionnaire for the determinism scale in Shamsoddini & Maghsoodi's research (22) was reported based on the Cronbach's Alpha of 0.78 and its face and content validity was 0.83. The internal consistency of the components of this scale in the present study was calculated based on Cronbach's alpha coefficient of 0.79 (Table 1).

C) Behavioral consequences

In this research, a 28-item researcher-made questionnaire was used to measure four factors, including citizen behavior, legality, self-care, and empathy in disasters. The initial questionnaire was presented to experts in terms of being understandable and compliance with all aspects of the behavioral consequences. The findings were analyzed in the two parts of descriptive and inferential. In the descriptive part, maximum, minimum, average and standard deviation were used. And in the inferential part, exploratory factor analysis was used to measure the validity of the Cronbach's alpha using SPSS-24 in order to determine the construct validity and the number of saturating factors. In addition, to check the confirmatory structure, confirmatory factor analysis was used using Lisrel-8.8 software. In order to standardize the raw scores, these scores were converted into standard T scores and percentage rank using JMetrik 4.1.1 software and presented as a normative table for the total scores of the questionnaire. This questionnaire is based on a Likert scale (completely true; true; average; false; completely false). The validity and reliability of the questionnaire was calculated

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based on Cronbach's alpha coefficient of 0.79. (Table 2)

D) Disasters Preparedness Index

In this research, the Nouri questionnaire (2015) was used to measure the household's preparedness against disasters. The concept of readiness at the level of an urban household includes four dimensions: mental-attitudinal, operational, communication (social capital) and physical platform. Each of these dimensions has different components and includes 13 subscales, which are rated using a 5-point Likert scale. The validity and reliability of the scale in Nouri's research (2015) using Cronbach's alpha coefficient was 0.70 and in the present study it was 0.78.Various methods of descriptive statistics (mean, standard deviation, skewness and kurtosis) and inferential statistics (path coefficient) were used to answer the research questions. In order to analyze data questionnaire SPSS-24 and Amos software were used.

Findings

The statistics analysis of the demographic variables was as follows: out of a total of 384 participants who were in the age group of 18 to 60 years; 54.69% were women and 45.31% were men; in terms of educational level, 27.5% diploma, 11.9% associate, 35.8% bachelor's, 20% master's and 4.8% had a PhD degree. By age group, 15.64% of people between 18 and 25; 24.9% between 26 and 36; 1/30% between 37 and 47; 1.15% between 48 and 58 and finally 14.17% were over 58 years old.

According to Table 1, variables of personality traits such as neuroticism, extroversion, openness, agreeable, and conscientiousness have an average of 89.05%; 74.27%; 88.69%; 90.09%; 89.57% respectively. Fatalism components such as belief in luck and fortune; pessimism and trust in the future; belief in God's intervention in life and the direction of affairs; definiteness and certainty of fate; aversion to the world, lack of belief in population control; lack of belief in official insurances; belief in evil eye and disbelief in human will and effort in life, the average are in order as follows: 17.51%, 10.89%, 12.57%, 15.43%, 17.83, 11.87%, 36.15%; 24.31% and 27.31% . Behavioral consequences in disasters such as citizen behavior, legality, self-care, and finally empathy have an average of 18.20%, 20.28%, 15.72% and 18.12% respectively. Disaster preparedness variables such as mental-attitudinal preparation, operational readiness, communication readiness and social capital, and preparation of the physical substrate have an average of 23.31%; 23.13%; 31.64% and 14.26% respectively.

Table 1. Descriptive index values of research variables

Variable	Components	M	SD	Skewness	Kurtosis
Personality traits	Neuroticism	38.2	8.9	0.68	0.46
	Extroversion	35.4	10.6	-0.088	-0.65
	Openness	36.8	7.4	0.06	-0.68
	Agreeable	40.2	8.1	-0.006	-0.63
	Conscientiousness	35.2	7.12	-0.008	-0.71
Fatalism	Belief in luck and fortune	17.51	4.37	0.54	0.32
	Pessimism and lack of trust in the future	10.89	3.29	0.62	0.27
	Belief in God's intervention in life and direction of affairs	12.57	3.63	0.07	-0.54
	Certainty of fate	15.43	3.80	0.12	-2.53
	Aversion to the world	17.83	7.11	-0.009	-1.59
	Lack of belief in population control	11.87	4.50	-0.06	-1.52
	Lack of belief in official insurances	36.15	5.06	0/57	0.28
	Belief in evil eye	31.24	5.31	0.08	-0.46
	Disbelief in human will and effort in life	31.27	4.69	-0.008	-0.74
Behavioral consequences (in disasters)	Citizen behavior	18.20	6.04	-0.098	0.74
	Legality	20.28	4.80	0.07	-0.80
	Self-care	15.72	3.26	0.49	0.17
	Empathy	18.12	5.84	0.63	0.52
Disaster preparedness	Mental-attitudinal preparation	23.31	7.44	-0.009	-1.32
	Operational readiness	23.13	6.87	0.09	-0.54
	Communication readiness and social capital	31.64	5.85	-0.04	-1.31
	Physical substrate preparation	14.26	4.58	0.54	0.19

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Table 2. Correlation coefficients between the components of personality traits, belief in fatalism, behavioral consequences and disaster preparedness p≤0.05

Variable		1	2	3	4	5	6	7	8
Neuroticism	The correlation coefficient	0.7							
	Sig	0.000							
Extroversion	The correlation coefficient	0.549	0.793						
	Sig	0.000	0.000						
Openness	The correlation coefficient	0.604	0.807	0.637					
	Sig	0.000	0.000	0.000					
Agreeable	The correlation coefficient	0.6	0.794	0.62	0.648				
	Sig	0.000	0.000	0.000	0.000				
Conscientiousness	The correlation coefficient	0.614	0.807	0.689	0.656	0.675			
	Sig	0.000	0.000	0.000	0.000	0.000			
Fatalism	The correlation coefficient	0.562	0.777	0.672	0.617	0.637	0.657		
	Sig	0.000	0.000	0.000	0.000	0.000	0.000		
Behavioral consequences	The correlation coefficient	0.68	0.51	0.385	0.412	0.398	0.449	0.374	
	Sig	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Disaster preparedness	The correlation coefficient	0.739	0.804	0.64	0.664	0.679	0.703	0.631	0.64
	Sig	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 3. Evaluation indicators of the generality of the structural equation model of personality traits, behavioral consequences and determinism on preparedness against disasters

Measure	Threshold	Value
CMIN/DF	5>	4.8
DF	-	73
CFI	0.9≤	0.8
PCFI	0.5≤	0.53
RMSEA	0.1≥	0.09
HOELTER	75<	103

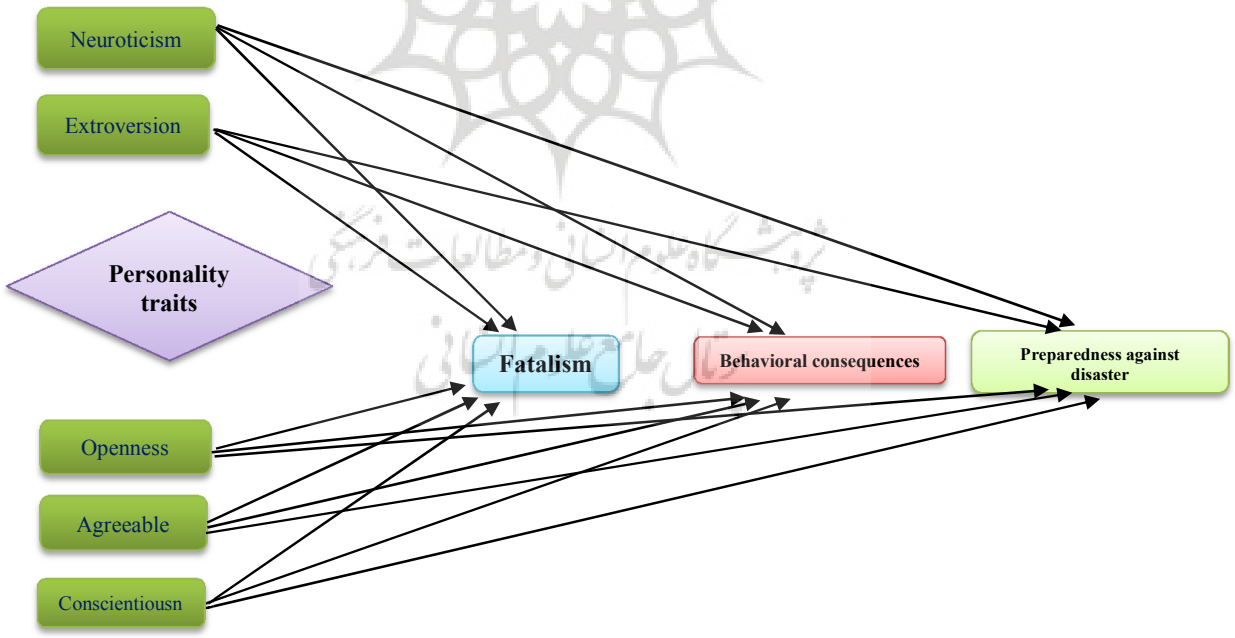

Figure 2. Structural equations model of research

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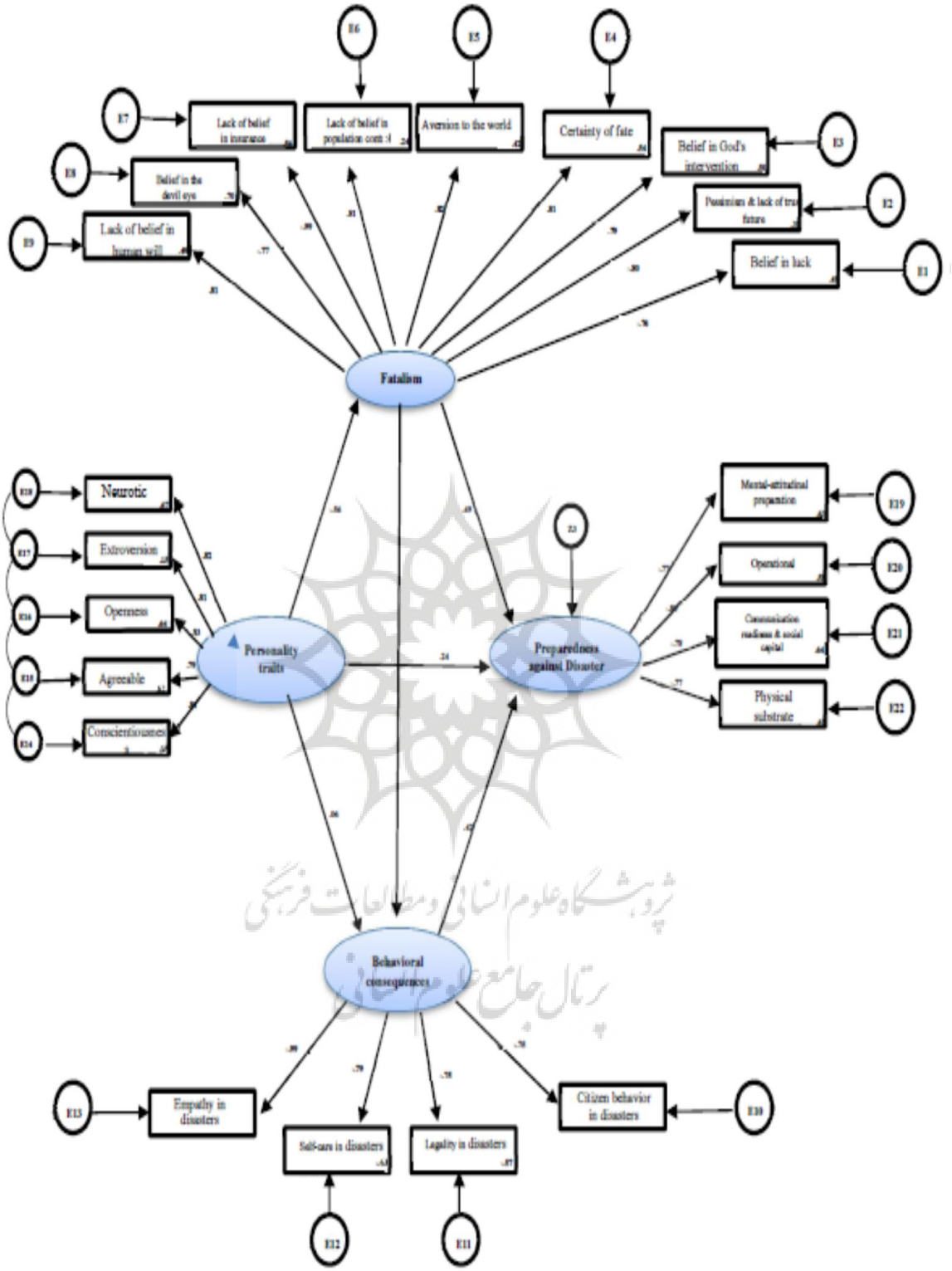

Figure 3. Model for explaining disaster preparedness based on research variables

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According to the model evaluation indicators, the research model is supported by the collected data, in other words, the fit of the data to the model is established. In general, if three indicators show a good fit, the researcher can be more confident about the appropriateness of the model (23). Chi-square is 4.8 and the comparative fit index is 0.8, which is not much different from the optimal limit of 0.9. The Parsimonious Fit Index (PFI) is 0.53, which is more than the cut point of 0.5 and is acceptable. The square root index is the mean square of the estimation error and is 0.09 and a value smaller than or equal to 0.1 indicates the acceptability of the model. Steiger (1989), the creator of the RMSEA index, considers a value less than 0.1 acceptable to fit the final research model; the Holter index is also 103 and above the cut point of 75, which is in the acceptable range.

Discussion and Conclusion

The aim of the present study was to model disaster preparedness in relation to personality traits and the mediation of fatalism and the behavioral consequences of citizens. The results of the findings are in line with the researches of (22, 24 & 25).

As observed, there is a significant relationship between disaster preparedness and other variables under investigation. The correlation coefficient showed that the disaster preparedness variable has a relationship with the variables of personality traits, fatalism and behavioral consequences. In addition, in the examination of the subscales, it was found that with the increase in the anxiety scores, the disasters preparedness scores decrease and with the increase of extroversion scores, the scores of disaster preparedness increase.

The same happened with the agreeable subscale, and as the scores of this component increased, the disaster preparedness scores also increased. This occurred for the accountability subscale as well, but not for flexibility. Therefore, these personality traits can play a decisive role in disaster preparedness. When the subscales of extroversion, agreeable, and responsibility/ accountability show a positive relationship with disaster preparedness, it means that by training and improving these features, you can see its positive effect on disaster preparedness. It is interesting that this relationship is negative in the neuroticism subscale. In fact, less is expected from a person with neurotic characteristics in order to be more prepared for disasters.

Since the way of feeling the danger determines the type of human reaction to respond; if the citizens do not understand the importance of the danger of the disaster, they will not pay any attention to the programs of prevention and reduction of the effect of disasters and crises.

Accurate assessment of people's perception of risk is also very important to determine their behavior when a real disaster occurs, as well as measure their awareness of prevention policies and the need to reduce the effect of disasters and use the recommendations and guidelines of responsible organizations.

People should have a correct understanding of the risk as much as possible so that they can be expected to cooperate in reducing these risks. Therefore, based on the research findings of Ghaed Rahmati and Soltani (2007), one of the most important components in understanding risk-taking, reaction and preparedness against disasters is the personality characteristics of people (26). Basically, the components of people's personality characteristics have an undeniable role in people's preparedness against disasters.

One of the strengths of this research is the change of views about disaster-proneness to preparedness. However, personality traits that are related to people's preparedness may cause more preparedness and prevent more damage when disasters occur. In line with the conducted investigations, different researches have confirmed the role of personality traits in people's dealings with disasters, which is in line with the results of this research.

According to the research of Clark and Robertson (2005) regarding the relationship between attitude and attitudinal-perceptual approaches with the occurrence of occupational disasters, adaptability and neuroticism are the influencing factors on occupational disasters. (27)

Based on the findings, it was confirmed that the different behavior of disaster preparedness in people is due to personality traits and the mediating variable of fatalism and that the personality characteristics with respect to the mediating variable of fatalism in women and men of the research sample are statistically significant and mainly related to gender.

According to the five dimensions of Neo's personality traits, we will see that the characteristics of introversion and extroversion, acceptability, etc. are mainly different between women and men. These differences are also

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evident in fatalism and are emphasized in the concepts of fatalism such as traditionalism, family structure and gender socialization as effective factors. Based on this, fatalistic people believe that the future and the social environment are not under their control and determine the destiny and future of everyone (28).

Carstiers (1985) also believes that the existence of the fatalistic spirit is caused by the spread of a feeling of insecurity, a feeling that one cannot rely on anyone or anything, even oneself (29). Hence, only fate is blamed or credited in misfortunes and successes. Therefore, this variable can be very effective in the behavior of disaster preparedness. It is important to mention that the effects of this fatalistic approach are different according to personality differences in people, for example, social laziness is the result of the laziness of people in society, and one of the important factors that causes the creation and growth of social laziness is fatalism, It means that many people are passive and hedonistic and it is also observed in the society. Low level of productivity, lack of interest in long-term and hard work and emerging phenomenon called inter-vacation are examples of this characteristic.

However, this research has investigated the relationship between personality traits and disaster preparedness through the mediation of fatalism and behavioral consequences and the findings indicate a negative relationship between fatalism and disaster preparedness. Based on this research, increasing preparedness against disasters is possible when people should believe in their own will to build their future and destiny and without relying on luck and with trust and belief in God's intervention in life and direction of affairs; they should do their best in line with their work and duties.

Realism requires that in doing all affairs with trust in the truth, deliberation, reflection and exploration with knowledgeable and people, so that everything is done in the best way and man accepts the responsibility of his shortcomings and don't blame fate. Therefore, fatalism is one of the variables that affect people's preparedness against disasters.

The results of the show that the indirect effect of personality traits on disaster preparedness is statistically significant, in the sense that the variable of behavioral outcomes related to personality traits can play a mediating role on disaster preparedness. In this research, that part of the behavioral consequences is considered which provides the context for the emergence of these behaviors through its existing social and work relations system in the form of helping, altruism, verbal and practical definition, support and presence beyond roles and responsibilities. And following that, creativity, cognitive and behavioral tendencies are aimed at creating innovative and innovative ideas, methods and solutions in work environments. According to the purpose of this study, which is to evaluate the fit of the model, the data analysis should be examined in the form of structural equation model.

The structural equation showed that the effect of personality traits and its indirect effect against disasters were statistically significant; similarly, the indirect effect of fatalism on disaster preparedness was significant. Preparedness against accidents is very important in a risky country like Iran, especially in its capital, which is threatened by various dangers. The findings of this research become important from the fact that by analyzing various variables, it helps to choose the process of educating a society ready against risks. Explaining the variables and personality traits as well as the variables of fatalism and behavioral consequences and their effect on disaster preparedness can guide those in charge towards more correct educational choices in order to build a resilient society. It should be noted that societies that fail to increase people's preparedness against disasters have to pay heavy costs.

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Conflict of Interests

The authors declare no conflict of interest.

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