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MENTAL HEALTH AND COPING STYLES OF RURAL RESIDENTS AFFECTED BY DRINKING WATER SHORTAGE IN FARS PROVINCE

An Ecopsychological Perspective**

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The purpose of this study was to examine, in an Iranian sample, the effect of drinking water shortage on the rural residents' mental health and their coping styles, and to investigate the influences of gender, location of residence, marital status, job and the level of education on these constructs. Participants included 1198 rural residents around the Iranian cities of Darab and Eghlid. A demographic questionnaire, *the General Health Questionnaire 28* (GHQ-28), and *the Coping Styles with Drinking Water Crisis Scale* (CSDWS) were used in this study. The CSDWS is a multidimensional construct with four factors including: (1) optimising water consumption methods, (2) water-free technologies and social changes in life, (3) usage of high-quality technologies in water saving, and (4) emotion-focused avoidant coping styles. Rural residents who had suffered no drinking water shortage had a significantly higher performance of rational coping styles and had a lower psychopathology indicator and a lower performance of emotion focused avoidant coping styles than rural residents who had experienced drinking water shortage. The effect of location of residence, marital status, level of education and occupation on coping styles and mental health was affirmed in this sample.

Keywords: drinking water shortage, coping styles, mental health, demographics

Mentalhygiene und Bewältigungsstrategien bei von Trinkwassermangel betroffener Landbevölkerung in der Provinz Fars: Die Ökopsychologische Perspektive: Die Rolle der lokalen Ressourcenwirtschaft: Eines der Ziele der Untersuchung bestand darin, an einer Stichprobe aus dem Iran die Auswirkungen von Trinkwassermangel auf die Mentalhygiene der ländlichen Bevölkerung und auf ihre Bewältigungsstrategien zu untersuchen und im Weiteren zu klären,

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inwieweit diese von Geschlecht, Wohnort, Familienstand, Arbeitsplatz und Bildungsstand beeinflusst werden. In der Untersuchung wurden 1198 Bewohner der ländlichen Umgebung der Städte Darab und Eghlid im Iran erfasst. Hierfür wurden ein demografischer Fragebogen, der Fragebogen zum allgemeinen Gesundheitszustand (*General Health Questionnaire 28*, GHQ-28) und die Skala Bewältigungsmethoden bei Trinkwassermangel (*Coping Styles with Drinking Water Crisis*, CSDWS) verwendet. Die CSDW-Skala umfasst die folgenden vier Faktoren: 1. Methoden zur Optimierung des Wasserverbrauchs, 2. wasserfreie Technologien und gesellschaftliche Veränderungen, 3. Einsatz von Spitzentechnologien bei Wassersparmaßnahmen und 4. emotionsorientiertes Coping und Vermeidung. Diejenigen auf dem Land lebenden Personen, die nicht unter Wassermangel litten, waren signifikant erfolgreicher in der Nutzung rationaler Bewältigungsmethoden, wiesen niedrigere psychopathologische Werte auf und neigten weniger zu emotionsorientiertem Coping und Vermeidung als solche, die unter Trinkwassermangel litten. Anhand der Stichprobe konnten die Auswirkungen von Wohnort, Familienstand, Bildungsstand und Arbeitsplatz auf die Bewältigungsmethoden und auf die Mentalhygiene nachgewiesen werden.

Schlüsselbegriffe: Trinkwassermangel, Bewältigungsmethoden, Mentalhygiene, demografische Daten

1. Introduction

There are natural disasters like floods, famine, fire, drought, earthquakes, tornadoes and hurricanes that afflict humans with untimely death and violent suffering (Diamond 1996). Overall, the combination of atmosphere change and population growth is anticipated to reduce the available water resources as a major crisis in the world. According to the current rates of urban and rural population growth it is suggested that half of the world's population will be living under severe water shortage in the near future. Drought is a natural disaster and a recurring feature of environment change and it is the most harmful and costly hazard because of its negative impacts on human resources, sustainable development, and the physical environment (Pereira et al. 2009). In terms of water shortage, the Middle East is the largest contiguous afflicted region in the world (Beaumont 2000; Roudi-Fahimi et al. 2002).

Iran is a particularly arid country with water surpluses to be found in only small portions of the northern and western parts (Beaumont 1974). Water scarcity in the country is combined with an unequal distribution of water. The country receives only a small amount of rainfall, and the overuse of many water sources has transformed it into a dry and drought-prone region, linking up with the arid/semi-arid zone of Asia (Karbalaee 2010). Authorities reported that the country has been experiencing the worst aridity for the past three decades. They have been notified that 12 million people in both urban and rural areas throughout the country might experience drinking water shortage (Deutsche Presse Agentur 2001). Officials have confirmed that the southwestern part of Fars province is facing a shortage of drinking water due to an extraordinary aridity that has dried up rivers and underground water in Darab which is a major threat for residents of the rural areas in the region. Authorities stated that all the villages in this region are experiencing a severe lack of drinkable water,

and all the inhabitants are critically threatened by the drought conditions (DEGHANI 2011). Winter rainfall in this part of the country is fairly condensed and water dearth has taken a turn for the worst in past three years. Furthermore, the earth was still incapable of acting as a reliable source for drinking water in this region during recent years. It is particularly the setting-in of the summer months that brings along a major water shortage in the region (DEGHANI 2011). This study speculates that drinking water scarcity is a disaster in this area, it is a possible source of psychopathology in the case of rural residents, and it can affect their coping styles in crises. Therefore, the purpose of the present study is to investigate the effects of drinking water shortage on the rural residents' mental health and on their coping styles in all villages around Darab in the southern part of Fars province.

In the field of mental health, many clinical investigations have shown that certain climatic parameters such as daily ambient temperature, relative moisture, atmospheric strain, rainfall periods, and hours of sunshine have significant contribution to the rate of admission of in-patients with affective disorders (MAWSON & SMITH 1981; SALIB & SHARP 2002). This phenomenon is called a seasonal mental disorder hypothesis, and it indicates the possible roles of natural and climatic factors on mental health. A number of studies are investigating the effects of natural disasters like drought on the human mental functioning. For example, COÊLHO, ADAIR and MOCELLIN (2004) revealed that residents in the drought region of northeastern Brazil had significantly higher levels of anxiety and emotional distress than residents in the non-drought area. They noted that women in the drought area had higher levels of anxiety than females in the non-drought area, and men in the drought area had significantly higher levels of emotional distress than both genders in the non-drought area. SARTORE and his colleagues (2007) indicated that the residents of local communities were experiencing higher distress in periods of drought. CHAND and MURTHY (2008) suggested that the drought affects rural people because of financial problems, and it can produce severe mental distress among them in the long run. The lack of income and economic insecurity affect the residents of the drought-affected areas, limiting their abilities to obtain sufficient social support. Chand and Murthy pointed out that drought influences family relationships, perceived stress, worry, depression, and the rate of suicide in the case of rural residents. EDWARDS and his colleagues (2009) indicated that around twelve percent of residents in drought-affected areas have mental health problems, particularly psychological distress and depression. Similarly, the World Health Organization reported that one in three Somalis is affected by several kinds of mental disorders because of severe drought, and the prevalence of mental disorders in Somalia is thus higher than in other war-torn and low-income countries (Horn of Africa News Agency 2011). Altogether, research has revealed an established relationship between the drought and mental health problems with residents of regions with drinking water scarcity.

Alternatively, the most encouraging strategy of people, social groups and cultures against the natural and ecological stressors may vary according to the function of physical, economic, and socio-emotional characteristics in a specific milieu

(Crawford & Anderson 1989). Nelson and Demas (2004) suggested that seasonal and annual adaptive patterns among people towards natural disasters are determined by the accessibility of food and water. They noted that people need to be forewarned of the onset of natural and climate changes well in advance in order for them to be able to initiate and practice suitable ways of adaptation to the decrease of resources. Baron (1997) conceptualised that the main reason of people's charitable help in natural crises like water scarcity is an altruistic behaviour in general, and only this altruistic behaviour can motivate people with long-term self-interest toward fighting against natural disasters. From the evolutionary and cognitive points of view, it seems that the human working memory plays a significant role in how people stumble upon and cope with the water crisis as a survival threat (Klein et al. 2002). Therefore, when people are experiencing natural disasters their memory systems are prepared to retain and follow those pieces of information which are related to fitness and survival (Kang et al. 2008; Nairne et al. 2009). Studies, thereby, showed that the human memory as a product of natural selection had been influential in the capacity of humans to cope with environmental disasters because it enhanced the humans' fitness and adaptability in specific environments (Tooby & Cosmides 1992). However, there is some evidence that men surpass women in coping styles entailing skills relevant to navigation and map-reading, whereas women outdo men in coping styles requiring skills relevant to congregation, gathering or remembering the location of food and water resources within an inhibited environment (Tooby & Cosmides 2007). All in all, this study speculates that self-interest, altruism and memory are three intra-personal factors that can help people's psychological adaptation and self-management in times of drinking water shortage. These factors help individuals in how to approach the water supply, in how they can take the management of the accessible water resources into their own hands, as well as in how they can utilise the appropriate coping styles in times of drinking water scarcity. This approach may help people to assess the water crisis in an objective manner and to reach the logical conclusions about rigid requirements and regulations which must be applied in drinking water management in a time of crisis.

Theoretically, the present study views the drought as a natural, slow and prolonged stress and disaster which influences the human mental health and coping style. Here, stress is defined as a physical or perceived imbalance between the ecological and natural demands involved in people's survival and the individual's capacity to adapt to these situations. This imbalance can affect the person's mental health and coping styles (Lazarus & Folkman 1984). This model regards stress as the part of a sequential process in which the objective natural circumstance (i.e. water scarcity) appraised by the individual as either having no adaptive significance or as a stressful situation (i.e. water scarcity presents a potential threat and a challenge to one's well-being or survival). When the water shortage is perceived by the individual as a stressful situation this appraisal may produce a series of stress-response mechanisms which contain all the physiological, behavioural, and psychological efforts to adapt to this natural threat (Lazarus 1999).

According to the psychological stress and cognitive appraisal theory, stress is assumed as a reciprocal process; the environment produces stressors, and the individual looks for ways to deal with these. The cognitive appraisal is a mental process by which people review the aforementioned factors: whether a demand threatens their well-being, or consider that they have the resources to meet the demand of the stressor (LAZARUS 1999). Therefore, appraisal and coping conceptualisations are fundamental to the psychological stress and cognitive appraisal theory.

The appraisal shows the individuals' judgments of the significance of what is happening for their well-being. Coping describes the individuals' efforts in thought and action to handle the specific demands (LAZARUS 1993). In this theory, events are stressful but this stressfulness depends on two personal and situational types of factors (COHEN & LAZARUS 1983). Additionally, LAZARUS (1991) conceptualised that stress is a relational concept, since stress is reflected as a relationship between individuals and their environment. This definition points to two processes as the main mediators within the person-environment transaction. There are cognitive appraisal and coping styles. The concept of appraisal is a key issue for understanding the stress-relevant transactions. These appraisals are determined by a number of personal and situational factors. However, the most significant factors on the personal level are motivational dispositions, goals, values, and generalised expectancies. The most significant relevant situational criteria are the predictability, controllability, and imminence of a potentially stressful event (LAZARUS 1993).

However, LAZARUS (1966) differentiates between two basic forms of appraisal which he calls primary and secondary appraisal. Primary appraisal is concerned with whether something of relevance to the individual's well-being occurs, whereas secondary appraisal is related to the coping options. However, the specific patterns of primary and secondary appraisals might lead to various kinds of stress. These three types of stress are: harm, threat, and challenge (LAZARUS & FOLKMAN 1984). However, LAZARUS (1991) suggested that coping is closely allied to the concept of cognitive appraisal, and to the stress relevant and person-environment transactions. They can alter the person-environment realities behind the stress (i.e. problem-focused coping). They can also relate to internal elements and modify the appraisal of the challenging situation (i.e. emotion-focused coping). In sum, the stress and coping theory suggests that the effects of stress on human mental functioning and the coping pattern for adaptive functioning depends on the type of the stressor, the type of intra-personal capabilities being stressed, and the outcome modality being studied (LAZARUS 1966, 1991, 1993, 1999).

Secondly, based on the resource management theory, this study considers water scarcity as a challenge for both the population and the administrators. VUGT (2009) proposed the four key elements of strategies for successful resource management in water crises: information, identity, institutions, and incentives. Vugt noted that these four components correspond to four central motives of decision-making in social dilemmas: understanding, belonging, trusting, and self-enhancing. Similarly, RANDALL (2009) recognised that rural-based mental health programs in drought-affected regions

are influential in persuading both activists and the government to adopt techniques from social networks, to interrogate their image and communication style and to match their message to the concerns and aspirations of their audiences. SHELDON and his colleagues (2011) suggested that one primary cause of ecological damage is the high-consumption lifestyle to which citizens of the economically developed world have grown accustomed. They recommended that communicators and educators might do well to attempt to activate the aspects of the national character allied with intrinsic values in their attempts to promote acceptance of policies that support environmental sustainability. Research has disclosed that stress-related psychological reactions commonly connected with individual loss, traumatic injury, or physical assault also apply to natural disasters that affect entire communities (COÊLHO et al. 2004).

Third, the Conservation of Resources Theory (COR) offers an integrative stress theory that ponders both environmental and internal processes. COR asserts that people actively seek to obtain, retain, and protect the things which they perceive as value resources. These resources are subdivided into objects, personal characteristics, conditions or energies. According to COR, psychological stress occurs when individuals are threatened with resource loss, actually lose resources or fail to gain desired resources following resource investment. Hobfoll noted that the threat of resource loss can have just as acute consequences as actual resource loss. Previous COR studies attended only to the impact of resource loss and resource gain (HOBFOLL 1989, 1998, 2001; HOBFOLL & SHIROM 2000; WESTMAN et al. 2005). Hence, very little is actually known about the impact of the threat of resource loss on individuals. Given that people who lose resources experience actual stress and distress it can be stated that when individuals' resources are threatened they will experience anticipatory stress. Anticipatory stress might develop when individuals face a critical event that is going to come about in the future (PEACOCK & WONG 1996). The forthcoming event is marked by uncertainty as to the eventual outcome and includes a risk that may cause resource loss later. The COR regards resource gain as an important facet of stress (HOBFOLL 1989, 2001). During stressful circumstances, individuals attempt to make light of the loss of their resources by trying to gain new resources.

The present study is grounded on stress and coping, resource management, and resource conservation theories (HOBFOLL 1989, 1998, 2002; LAZARUS 1991, 1993, 1999; LAZARUS & FOLKMAN 1984; VUGT 2009). From an ecopsychological perspective, this investigation was intended to examine rural people's attitudes and their coping styles in a situation of shortage in an Iranian sample, to explore the roles of gender, marital status, level of education, and location of residence in the mental health and coping styles of rural residents. As research showed a few types in coping styles in different situations, this study suggested that coping with drinking water shortage is a multi-dimensional construct. Perhaps some specific dimensions of coping with drinking water shortage would relate to mental health factors of rural residents. The first hypothesis of the present study is that coping with drinking water shortage will have a multi-dimensional nature with rural residents. The second hy-

pothesis is that drinking water shortage will influence the mental health and coping styles of rural residents. The third hypothesis is that gender, marital status, level of education, and region of residence will have significant effects on mental health and coping styles.

2. Method

2.1. Participants

The participants were 1,198 rural residents from two regions with and without drinking water shortage, from the cities of Darab and Eghlid, Fars province, Iran. Participants in the group suffering drinking water shortage were 1,038 rural residents from 36 villages around Darab, the southern part of Fars province. Participants in the group suffering no drinking water shortage were 160 rural residents from Dejkord district around Eghlid and Sarhad-e-Chahar Dange, the northern part of Fars province. The mean age (and standard deviations) for males and females were 41.20 (SD = 7.69) and 43.81 (SD = 7.89) respectively. The participants were selected from all villages in two groups by random sampling method; they were given a psychological consultation about adaptation during water shortage and some technological information about the drinking water equipment as an incentive for their participation in the present study. This sample was recruited from all villages with more than 10 families in the vicinity of the aforementioned cities. After informed consent was acquired, participants completed a questionnaire containing a few sections on background information, mental health, and coping styles.

2.2. Instruments

The demographic questionnaire included items on age, gender, marital status, ethnicity, level of education, occupation, number of family members, monthly income, monthly drinking water usage, monthly water price, and the city or village of residence. The two inventories used were: 1. the *General Health Questionnaire*-28 (GHQ-28), and 2. the *Coping Styles in Drinking Water Crisis* (CSDWS).

The *General Health Questionnaire-28* (Goldberg & Hillier 1979) is a 28-item self-administered screening test which measures four factors: somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression. The GHQ-28 was invented to identify short-term alterations in mental health. It is a good status measure and it responds to how a subject has felt over the past few weeks. The GHQ focuses on the client's ability to carry out 'normal' functions and the appearance of any new disturbing phenomena. The GHQ-28 scores range from 0 to 28 using the Likert scoring. Higher scores show a greater probability of psychological distress. Total scores that exceed 4 out of 28 suggest probable distress (Chung et

al. 2006). The GHQ-28 has been widely applied and validated in different settings and different cultures (Goldberg & Hillier 1979; Makowska et al. 2002; Rush et al. 2008). Research has affirmed that the four factors which are the basics in this questionnaire have a high internal consistency in Iranian culture (Ebrahimi et al. 2007). Reliability of the GHQ-28, somatisation, anxiety/insomnia, social dysfunction and depression subscales using Cronbach's alpha internal consistency in the present study was 0.90, 0.86, 0.78, 0.92, and 0.90 respectively.

The *Coping Styles in Drinking Water Crisis* was created by the authors of this paper to assess rural residents' coping styles when encountering drinking water shortage in recent years. However, initial items pool the items included in the CSDWS inventory based on stress and coping, resource management, and resource conservation theories (Hobfoll 1989, 1998, 2002; Lazarus 1991, 1993, 1999; Lazarus & Folkman 1984; Vugt 2009). Additionally, for the selection of initial items in the CSDWS authors gathered all formal water usage procedures from the Rural Water and Sewage Corporation of Fars Province (RWSCFP). The initial version of CSDWS included 60 items and after a pilot study the final version was reduced to 52 items. All item-scorings are based on a Likert scale from 0 (fully agree) to 4 (fully disagree). After the construct validity of the CSDWS had been affirmed by a few staff members of the psychology and water management departments at two universities, it was applied in this study. After data collection, the factorial structure of the CSDWS was examined in the present study and it will be set forth in the Results section of this paper.

3. Results

Initial analysis of the data in the first hypothesis included an exploratory factor analysis which was conducted to identify the potential factors in the CSDWS. A principal factor analysis with varimax rotation was used to determine the construct validity, considering eigenvalues higher than 1. Factor analysis specification was satisfactory, KMO = 0.84, Bartlett's test of sphericity = 974, df = 506, p = 0.0001, rotation sums of squared loadings = 74.26. *Table 1* shows the significant rotated correlation higher than 0.30 for 52 items in 15 iterations. Factor analysis indicated that CSDWS consisted of four factors and eigenvalues for nine factors ranged from 1 to 5.49. These four factors explained 74.68% of variance. These factors included: 1. optimising water consumption methods, 2. water-free technologies and social changes in life, 3. use of high-quality technologies for water saving, and 4. emotional-avoidant styles (*Table 2*). Criterion validity was established based on correlation between CSDWS and the Positive and Negative Affect Schedule (Watson et al. 1988) which was r = 0.36 and demonstrated its discriminate construct validity. The internal reliability using Cronbach's alpha was over 0.92 for all factors. There were gender differences in the optimising of water consumption methods and the application of high-quality technologies for water saving factors. Females had significantly

higher scores for the optimising of water consumption methods than males, and males had significantly higher scores for the application of high-quality technologies for water saving factors than females.

Table 1
Rotated component matrix of the CSDWS

	Factors					*Factors*			
Items	*1*	*2*	*3*	*4*	*Items*	*1*	*2*	*3*	*4*
1	0.729				*27*				0.631
2		0.763			*28*		0.573		
3	0.768				*29*				0.703
4	0.773				*30*				0.679
5		0.768			*31*	0.618			
6		0.748			*32*		0.515		
7			0.674		*33*				0.615
8			0.648		*34*	0.348			
9			0.575		*35*	0.427			
10		0.474			*36*	0.510			
11		0.548			*37*	0.369			
12	0.475				*38*	0.477			
13	0.345				*39*			0.630	
14				0.763	*40*			0.438	
15				0.754	*41*			0.522	
16		0.642			*42*	0.540			
17				0.588	*43*			0.588	
18	0.692				*44*	0.688			
19	0.674				*45*				0.487
20				0.648	*46*	0.568			
21				0.475	*47*	0.557			
22				0.557	*48*	0.608			
23				0.681	*49*	0.621			
24				0.428	*50*		0.637		
25				0.578	*51*			0.538	
26				0.709	*52*		0.547		

Table 2
The CSDWS factors and items

Factors	*Items*	*Cumulative %*
1. Optimising water consumption methods	1, 3, 4, 12, 13, 18, 19, 31, 34, 35, 36, 37, 38, 42, 44, 46, 47, 48, 49	13.258
2. Introduction of water-free technologies in life	2, 5, 6,10, 11, 16, 28, 32, 52	24.081
3. Use of high-quality technologies for water saving	7, 8, 9, 39, 40, 41, 43, 51	37.341
4. Emotional-avoidant coping	14,15, 17, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30, 33, 45	74.680

To examine the second hypothesis nine ANOVAs were conducted to evaluate differences between the group of rural residents who had suffered drinking water shortage, the one of rural residents who had not experienced drinking water shortage and the total sample in terms of their coping with water shortage, and of mental health. Findings also showed significant differences between these groups in terms of their coping styles with water shortage. Findings also showed significant differences between these groups in terms of their mental health factors (*Table 3*).

The third hypothesis of this study is that gender, marital status, level of education, occupation, and location of residence will have great significance regarding coping styles during water shortage and mental health in this sample. This sample included 599 individuals in male and female groups. This sample included 1,165 married and 33 single persons. The level of education of this sample included the following illiterate (N = 394), elementary (N = 565), guidance (N = 86), high school (N = 105), undergraduate (N = 28) and postgraduate (N = 18). The job classification in this sample included the following categories: housewife (N = 534), university student (N = 25), unemployed (N = 92), farmer (N = 448), shopkeeper (N = 27) and governmental employee (N = 72). To investigate the possible differences in independent variables, a multi-variate analysis of variance (MANOVA) was conducted in terms of gender, marital status, level of education, location of residence and their interactions as independent variables and in terms of coping styles and mental health as dependent variables. An overall multi-variate effect found for location of residence (Wilks' k = 0.095; F (8,1) = 1.49; $p < 0.0001$; Eta = 0.90), gender (Wilks' k = 0.989; F (8,1) = 1.59; $p < 0.12$), marital status (Wilks' k = 0.954; F (16,2) = 3.34; $p < 0.02$), level of education (Wilks' k = 0.735; F (56,6) = 6.34; $p < 0.0001$; Eta = 0.04) and occupation (Wilks' k = 0.884; F (32,4) = 4.41;

$p < 0.0001$; Eta = 0.03) variables. Also, this analysis rejected the interactive effects for all independent and dependent variables (*Table*s *4–5*).

Subsequently, following the test for marital status, level of education and occupation, the Duncan test indicated significant group differences in mental health and coping styles.

Table 3

The effects of drinking water shortage on mental health and coping styles in water crises

Dependents	*Factors*	*Groups*						*F*	*p*
		Affected by drought		*Not affected by drought*		*Total*			
		M	*SD*	*M*	*SD*	*M*	*SD*		
Mental health	*Somatic symptoms*	12.74	3.58	8.30	1.00	12.15	3.68	242.46	0.0001
	Anxiety/ insomnia	11.49	4.95	4.70	1.49	10.58	5.18	296.76	0.0001
	Social dysfunction	18.00	1.00	11.54	3.88	12.41	4.23	440.76	0.0001
	Depression	10.76	3.62	2.30	0.81	9.32	4.98	409.23	0.0001
	GHQ-28	46.55	3.13	31.00	1.67	44.47	13.34	223.39	0.0001
Coping styles	*Optimising water consumption methods*	15.28	7.47	29.50	3.27	15.84	7.20	49.35	0.0001
	Water-free technologies and social changes in life	13.18	4.75	15.60	2.11	13.50	4.57	39.90	0.0001
	Use of high-quality technologies for water saving	11.50	3.19	17.50	1.43	12.31	3.65	544.77	0.0001
	Emotional-avoidant coping	26.07	7.59	10.20	1.78	23.94	8.92	691.38	0.0001

Table 4
Tests of between-subjects effects of demographic differences in mental health

Independents	*Dependents*	*F*	*p*	*Eta*
Location of residence	*Somatic symptoms*	134.80	0.0001	0.10
	Anxiety/insomnia	112.77	0.0001	0.09
	Social dysfunction	239.06	0.0001	0.17
	Depression	647.43	0.0001	0.36
	GHQ-28	94.02	0.000	0.07
Gender	*Somatic symptoms*	0.03	0.84	
	Anxiety/insomnia	0.20	0.65	
	Social dysfunction	0.34	0.55	
	Depression	0.26	0.60	
	GHQ-28	0.30	0.57	
Marital status	*Somatic symptoms*	1.46	0.23	
	Anxiety/insomnia	5.26	0.005	0.009
	Social dysfunction	5.55	0.004	0.01
	Depression	4.80	0.008	0.008
	GHQ-28	5.86	0.003	0.01
Level of education	*Somatic symptoms*	3.20	0.002	0.02
	Anxiety/insomnia	1.31	0.23	0.008
	Social dysfunction	2.22	0.03	0.01
	Depression	3.94	0.0001	0.02
	GHQ-28	2.07	0.04	0.01
Occupation	*Somatic symptoms*	4.68	0.001	0.01
	Anxiety/insomnia	2.18	0.05	0.008
	Social dysfunction	2.32	0.06	0.008
	Depression	3.44	0.008	0.01
	GHQ-28	2.57	0.03	0.009

Table 5
Tests of between-subjects effects of demographic differences in coping styles with water shortage

Independents	*Dependents*	*F*	*p*	*Eta*
Location of residence	*Optimising water consumption methods*	35.23	0.0001	0.03
	Water-free technologies and social changes in life	42.62	0.0001	0.03
	Use of high-quality technologies for water saving	351.25	0.0001	0.23
	Emotional-avoidant coping	261.66	0.0001	0.18
Gender	*Optimising water consumption methods*	1.30	0.26	
	Water-free technologies and social changes in life	1.59	0.19	
	Use of high-quality technologies for water saving	1.33	0.24	
	Emotional-avoidant coping	1.37	0.24	
Marital status	*Optimising water consumption methods*	2.39	0.09	
	Water-free technologies and social changes in life	0.12	0.88	
	Use of high-quality technologies for water saving	3.30	0.03	0.006
	Emotional-avoidant coping	0.51	0.60	
Level of education	*Optimising water consumption methods*	6.39	0.0001	0.03
	Water-free technologies and social changes in life	5.85	0.0001	0.03
	Use of high-quality technologies for water saving	5.92	0.0001	0.03
	Emotional-avoidant coping	7.62	0.0001	0.04
Job	*Optimising water consumption methods*	1.53	0.18	
	Water-free technologies and social changes in life	1.55	0.18	
	Use of high-quality technologies for water saving	2.44	0.04	0.009
	Emotional-avoidant coping	2.84	0.02	0.01

4. Discussion

The results of this study regarding the first hypothesis demonstrated that *Coping Styles in Drinking Water Crisis* (CSDWS) is a multi-dimensional construct with four factors including: 1. optimising water consumption methods, 2. water-free technologies and social changes in life, 3. use of high-quality technologies for water saving, and 4. emotional-avoidant styles.

The first coping style includes all the procedures which individuals can follow at personal, family and village community levels for the optimum use of drinking water. The first style contains methods such as reducing water usage, not using water for the purpose of car, yard, and carpet washing, decreasing the frequency of bathing, using mineral water, instructing family members on an optimal water usage, consultation with friends and authorities for finding suitable solutions for the problem of water shortage, learning the optimal methods for water usage, overruling the traditions and actions of excessive water usage, off quota for water usage, pride in those who use less water, and warning people of the need to reduce water consumption.

The second style is related to the introduction of water-free technologies and social changes in rural life. This factor includes ideas like garden watering with bathroom and dishwasher waste, use of electrical air-condition and dishwasher for cooling and dishwashing, cutting trees in the garden and prohibiting the growing of vegetables around the house, and thinking about water-free technologies and social change for a healthier life in rural regions.

The third style is related to the application of high-quality technologies for water saving. This style includes the use of modern water technologies in rural areas. These technologies involve using a tap water meter before the meter, checking the operation of water meters, piping and valves, reductions in square tap water before the water meter, and using a water reservoir and high-quality valves.

The fourth style is related to irrational, superstitious, and emotional reactions to water shortage in the rural regions. This style includes all emotional and avoidant reactions to water shortage such as taking refuge in one's hobbies to forget the problem, avowing to fix the problem, anguish, illusionary hope, pessimism, mental distress, physical symptoms, dysfunction in work and life, anger and irritability, guilt, and being overwhelmed by negative emotions.

Although there had been no previous evidence due to the CSDWS's multi-faceted nature, the present findings were in line with the predictions of the psychological stress and cognitive appraisal theory (Cohen & Lazarus 1983; Lazarus 1993, 1999; Lazarus & Folkman 1984). According to this appraisal theory, the three optimising methods of water consumption: the introduction of water-free technologies and social changes in rural life, and the application of high quality technologies for water saving styles altogether show the problem-solving and rational style in case of a drinking water shortage. However, the emotional-avoidant style is a type of emotion-focused coping with the drought resulting in more distress and maladaptive behaviours with rural residents. The multi-faceted nature of the CSDWS shows the

rural residents' appraisals of multiple aspects of drinking water scarcity and its influence on their lives, and how they would cope with this natural disaster. These four coping styles inherent in the CSDWS focus mainly on different practical actions in drinking water management and the optimum usage by rural residents at personal, familial, and village community levels, and on how they would enhance their resilience and coping in contrast with the water shortage shocks. Additionally, the multifaceted structure of the CSDWS is congruent with previous studies in terms of the roles of psychological adaptation, consumption lifestyles, self-interest, emotional reaction, information, social belonging and identity, and institutional factors of efficient coping with tragedies like drought and water shortage (Baron 1997; Coêlho et al. 2004; Hobfoll 2002; Sheldon et al. 2011; Vugt 2009).

The results of this study regarding the second hypothesis demonstrated that rural residents facing no a drinking water shortage have a significantly higher performance in rational coping styles – 1. optimising water consumption methods, 2. water-free technologies and social changes in life, and 3. use of high-quality technologies for water saving – than rural residents affected by drinking water shortage. However, rural residents affected by drinking water shortage have a significantly higher performance in emotional-avoidant coping than rural residents who do not encounter drinking water shortage. Findings showed significant differences between these groups in their mental health factors, and rural residents experiencing drinking water shortage had significantly higher disturbance in somatic symptoms, anxiety/insomnia, social dysfunction, depression and the GHQ-28 than rural residents who were not affected by drinking water shortage. The findings of the present study about coping styles in cases of drinking water shortage are in line with previous literature about the human adaptation and coping with drought and predictions from the psychological stress and cognitive appraisal theory about disasters (Baron 1997; Coêlho et al. 2004; Cohen & Lazarus 1983; Hobfoll 2002; Lazarus 1993, 1999; Lazarus & Folkman 1984; Vugt 2009). However, findings concerning mental health in the current study are similar to the findings of earlier investigations which supported the adverse effects of climate changes and drought as the natural threats and disasters on human mental functioning (Chand & Murthy 2008; Coêlho et al. 2004; Edwards et al. 2009; Mawson 1981; Klein et al. 2002; Nelson & Demas 2004; Randall 2009; Salib & Sharp 2002; Sartore et al. 2007; Tooby & Cosmides 1992, 2007; Horn of Africa News Agency 2011).

The results of this study regarding the third hypothesis demonstrated the effects of location of residence, marital status, level of education, and occupation on coping styles and mental health in this sample. This study indicated that married individuals have significantly higher anxiety/insomnia, social dysfunction, depression and GHQ-28 scores than singles but they do not have significant differences in somatic symptoms. Also, married individuals have a significantly higher tendency to use high-quality technologies for water saving than singles but they do not have significant differences in optimising water consumption methods, using water-free technologies, making social changes in life, and in emotional-avoidant

styles. The present finding about the negative effects of marriage on mental health is in contradiction with prior investigations (Simon 2002). Perhaps married people have more intense worries about the survival of their children and relatives when they experience water shortage. The present finding about the positive roles of marriage on coping with stress is congruent with the previous literature (Chaturvedi & Purushothaman 2009).

Moreover, individuals with an undergraduate or higher level of education have significantly fewer somatic symptoms and lower levels of anxiety/insomnia, social dysfunction, depression and lower GHQ-28 scores than individuals with high school or lower education. Also, individuals with an undergraduate or higher level of education showed significantly higher performance in optimising water consumption methods, in the introduction of water-free technologies and social changes in life, and in the use of high-quality technologies for water saving than individuals with a high school diploma and lower. Individuals with a high school or lower education showed significantly higher emotional-avoidance styles than individuals with undergraduate or higher level of education. The present finding about the positive roles of education on mental health and coping with stress is congruent with the previous literature (Chevalier & Feinstein 2006; Rodriguez-Oreggia et al. 2010).

Additionally, individuals with governmental occupations have significantly fewer somatic symptoms, lower levels of anxiety/insomnia, social dysfunction, depression, and lower GHQ-28 scores than individuals who are workers, farmers, housewives, shopkeepers or unemployed. Finally, people with government jobs have a significantly higher interest in using high-quality technologies for water saving and they have lesser emotional-avoidant styles than individuals who are workers, farmers, housewives, shopkeepers or unemployed. Occupation is one of the key factors that affect the human mental health and coping style (Law et al. 1998; Llena-Nozal et al. 2004; Tooren et al. 2011).

In sum, findings of the present study offer suggestions on how to build the Rural Water Users Association (RUA) and break the vicious cycle of inefficient water use procedures, and how to promote water savings. The present study suggests an alternative management policy for water consumption in the rural areas with water crises. For example, this policy includes the use of electrical air conditioners, the installation of electrical washing machines and dishwashers that consume less water, the reduction of electricity prices in rural areas with water crises, the raising of drinking water prices, mandatory regulations of the use of modern water equipment which is able to prevent water waste, and teaching children and families about standard and optimal methods of water usage through incentives, interactive role play and modelling.

In conclusion, the present study adds to the ecopsychology and the psychology of natural disasters through the exploration of coping styles in cases of drinking water shortage, through the recognition of water shortage effects on coping style and mental health, and through the understanding of the roles of gender, occupation and the level of education in the aforementioned constructs in an Iranian sample. How-

ever, the present study is limited because of its dependence on the survey method and self-rating measures. Prospective investigations may provide longitudinal and cross-cultural designs for this objective.

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