



The Relation Between Evolutionary Life Strategy, Temperament and Character in Individuals with Opioid Use Disorder

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Abstract

Background: Although many risk factors have been proposed for the etiology of the addiction, little research has been conducted from the perspective of evolutionary psychology. The theory of life strategies (with respect to evolutionary causes) has led to a new understanding of addiction. While researchers have shown that Cloninger's bio-psychological model is one of the most important personality factors in the etiology of addiction, there is no research about the relationship between life strategy and the temperament-character component of addiction.

Objectives: The main objective of this study was to examine the relationship between these two variables in individuals with opioid use disorder in comparison with the normal group.

Patients and Methods: This correlational study included 96 participants with opioid use disorder selected by convenience sampling from the Iranian national center for addiction studies (INCAS) and 97 participants without any substance use disorder, who were matched to the opioid-use group. After administering the mini-form of Arizona life history battery (ALHB) and the temperament and character inventory (TCI), data were analyzed with Pearson's correlation coefficient and multivariate regression.

Results: Results showed a relationship between fast-life strategy and novelty seeking in the group with opioid use disorder and a positive relationship between slow-life strategy and co-operation in the control group. The regression analysis indicated that novelty seeking was able to predict fast-life strategy in the opioid use group and co-operation could predict slow-life strategy in the control group.

Conclusions: Life strategy could be a new variable in understanding and planning addiction prevention programs.

Keywords: Substance-Related Disorders, Life History Traits, Temperament, Character

1. Background

Substance use has been part of human life for thousands of years, and opium has been used for medical purposes for about 3500 years. Today, however, substance use disorder is one of the most complex psychiatric disorders with both environmental and biological factors involved in its genesis. According to the national institute on drug abuse (NIDA), more than 22 million people have a disorder associated with drugs in 2012 (1). Based on research results, personality could play a significant role in substance use and its etiology (2, 3). Addicted individuals are often different from normal people in personality traits, such as behavioral disinhibition, impulsivity, pessimism, and neuroticism (4). Other studies have also shown a relationship between substance use, conduct disorder, and anti-social behaviors (5, 6).

As a new personality theory, evolutionary psychology

tries to explain different human behaviors (7). From this perspective, individual differences are interpreted as a strategy for solving compliance issues of survival and reproduction (8). Based on this explanation, evolutionary psychology has created a new way for understanding substance use disorder (9). Life history theory (in evolutionary psychology) states that humans are on a spectrum: on one side, are those looking for rapid reproduction and allocating resources for multiple mating efforts, while on the other side, are those, who spend their resources on efficient parenting. This continuum is known as the fast-to-slow strategy (10). High-risk behaviors, such as anti-social behaviors and multiple sexual relationships reflect the fast-life strategy, while sexual restrictions, deliberate behaviors and mental-physical health indicate the slow-life strategy (11). Life strategy and the cognitive dual processing model, explicit and implicit, in combination with

each other, could introduce a new etiology for substance use disorder (9).

In unpredictable, insecure, and dangerous environments, in which life resources were rare, long survival had a little chance. Therefore, fast strategies for a short life were considered more valuable. Such a focus on short-term survival forced humans to use implicit processing of information to make quick and timely decisions. In today's world, however, a fast life strategy and this type of cognitive processing could be a serious risk factor for drug use (9). Because drug, as a primary reinforcement, manipulates the basic emotional system, it leads to experiences similar to consuming food, gaining valuable resources, and escaping from threats (12, 13).

Another relevant character model is Cloninger's biopsychological model (14, 15). According to this view, temperament is based on implicit memory, which is the infrastructure of associative learning and pre-semantic perceptual processing with the components of novelty seeking, harm avoidance, reward dependence, and persistence. Character components, which are responsible for higher functions, such as abstraction and symbolism, include self-transcendence, self-directedness, and cooperativeness (16-18).

All temperament components are inherited. Novelty seeking is a strong response to freshness and signs of reward; harm avoidance is a tendency to respond to painful stimuli; reward dependence is an inclination to responding to social and emotional reinforcements; and perseverance refers to continuous behavior without any reward (19, 20). Unlike temperament components, character components are mostly determined by the environment (21). Self-directedness points out to coping with difficult conditions for goal achievement; cooperativeness indicates how much a person is able to consider others as part of him or herself; and self-transcendence represents the way people obtain their identity by allying with all aspects of the world (17).

Research has demonstrated that individuals with substance use disorder are different from the normal population in temperament-character, life strategy, and cognitive processing (9, 20, 22). While the role of heredity, environment, and risk factors has been known in the development of substance use, little information is available on the relationship between these factors, implicit processing, and cognitive biases (23).

2. Objectives

The aim of this study was to investigate the relationship between life strategy and temperament-character di-

mensions in individuals with opioid use disorder and the normal group.

3. Patients and Methods

This research was a correlational study with 96 participants with opioid use disorder, who were on methadone without any psychosis symptoms, according to the diagnostic and statistical manual of mental disorders, fifth edition (DSM-5). Participants were selected by convenience sampling from the Iranian national center for addiction studies (INCAS). The control group consisted of 97 normal participants, selected from a mosque, a park, and a cultural center in Tehran, who were matched to the opioid-using group in terms of socioeconomic and educational status. After back-translation and acquiring an acceptable Cronbach's alpha, the mini-form of Arizona life history battery (ALHB) (24) and the Temperament and Character inventory (TCI), which were standardized in Iran (25), were administered. The data were analyzed by the Pearson correlation coefficient and multivariate regression.

4. Results

In the opioid use disorder group, the highest correlation was the negative correlation between life strategy and novelty seeking (Table 1), implying that fast-life strategy (lower scores on the test (in individuals with opioid use disorder was associated with greater novelty seeking, a positive approach to reward signs, and active avoidance of punishment. Moreover, there was a positive relationship between slow-life strategy and self-directedness (Table 1), suggesting that among individuals with opioid use disorder, those with a slow-life strategy had greater self-directedness. In the control group, slow-life strategy had a strong relationship with the character component, while the highest correlation coefficient was found with co-ordination (Table 1). Furthermore, a significant positive correlation was found between slow-life strategy and self-directedness on one hand, and self-transcendence on the other hand (Table 1).

The regression analysis showed that among temperament-character components, novelty seeking was able to predict fast-life strategy in the group with opioid use disorder (Table 2), whereas co-cooperativeness was the only character component that could predict a slow-life strategy (Table 2).

5. Discussion

As some studies have demonstrated, life strategy is faster in adults, who smoke and use psychoactive sub-

Table 1. Correlation Matrix of Life Strategy with Temperament and Character^a

Group		Temperament- Character						
		Novelty Seeking	Harm Avoidance	Reward Dependence	Perseverance	Self-Directedness	Co-Operation	Self-Transcendence
Opioid use disorder	Life strategy	0.423 ^b	0.062	0.115	0.256	0.383 ^b	0.229	0.250
Group control	Life strategy	-0.195	-0.054	0.308	0.157	0.428 ^b	0.559 ^b	0.341 ^b

^aP < 0.05.^bP < 0.01.**Table 2.** Coefficients of Multivariate Regression in Assessing Life Strategy

Group	B Coefficients	standard Error	Beta Standardized Coefficients	t	P Value	Tolerance	Collinearity Statistics VIF
Opioid use disorder							
Constant value	29.07	13.47		2.15	0.034		
Novelty Seeking	-2.06	0.663	-0.354	-3.1	0.003	0.664	1.5
Harm Avoidance	0.710	0.506	0.143	1.4	0.164	0.830	1.2
Reward-Dependence	0.128	0.390	0.034	0.329	0.743	0.794	1.2
perseverance	0.445	1.61	0.033	0.275.0	0.784	0.593	1.7
Self-Directedness	0.777	0.474	0.208	641	0.104	0.533	1.9
Co-Operation	-0.176	0.453	-0.047	-0.389	0.698	0.584	1.7
Self-Transcendence	0.143	1	0.017	0.143	0.87	0.630	1.6
Group control							
Constant value	-9.59	6.9		-1.38	0.168		
Novelty Seeking	-0.305	0.322	-0.086	-0.948	0.346	0.865	1.15
Harm Avoidance	0.241	0.387	0.060	622	0.536	0.716	1.3
Reward-Dependence	0.431	0.544	0.084	0.739	0.430	0.625	1.6
perseverance	0.303	0.425	0.063	0.712	0.478	0.910	1.1
Self-Directedness	0.491	0.258	0.189	1.9	0.060	0.713	1.4
Co-Operation	1.22	0.309	0.39	3.95	0.000	0.570	1.7
Self-Transcendence	-0.02	0.338	0.006	-0.058	0.954	0.616	1.6

stances, as well as in alcoholic individuals and those with eating disorders (22, 26-28). Novelty seeking is also higher in addicts than the general population (29-31). Novelty seekers are capricious, curious, impulsive, and chaotic individuals, who desperately look for new stimuli (18). The majority of these features, including high-risk behaviors, impulsivity, anti-social behaviors, substance use, and multiple sexual relations are also observed in the fast-life strategy (32). Studies indicate a correlation between the fast-life strategy and a lower executive function (33), which shows that the fast-life strategy is associated with implicit processing and can harm explicit processing in the pre-frontal

lobe (34). Since novelty seeking is also based on implicit processing (17), the relationship between fast-life strategy and novelty seeking is justifiable.

Similar to self-directed individuals, conscious and purposeful information processing in individuals with a higher slow-life strategy makes them more disciplined and responsible (35). By living in a safe and predictable environment with enough resources for everyone, individuals with a slow-life strategy (9) have developed features of cooperative and self-transcending character, such as empathy and morality (18). In a safe environment, commitment to ethics, supporting others, and having empathy would

not jeopardize the available resources. Therefore, individuals could go beyond themselves.

The result indicates that in the temperament component, novelty seeking was able to predict a fast-life strategy in the opioid-use group. Novelty seeking, which is based on primary information processing and the dopamine system (36), forms the origin of instinctive behavior, and results in an active effort to obtain resources that are able to create pleasure. These mechanisms allow mammals to search for resources that are vital for their survival and avoid threats (37). As studies have suggested, the fast-life strategy has exactly the same task of saving life in dangerous and unpredictable environments (35). Because individuals with a fast-life strategy have no conscious processing of information, they may conceive substance as a rich pleasurable source (by implicit processing) and continue consumption until it leads to addiction (35).

As some fast-life strategy features are rooted in harsh environments (35), it is necessary for individuals with greater novelty seeking and fast-life strategy to have a safe and predictable environment. Since cooperation, which was able to predict slow-life strategy, is one of the character components (36), it could be taught and reinforced as one of the most important prevention factors in substance use disorder. Generally, the slow-life strategy can be a prevention variable, not only for substance use disorder, but also for numerous high-risk behaviors, such as high-risk sexual relations, impulsivity, and crimes.

A sample with only male participants and the mini-form of ALHB were the most important limitations of this research.

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