Testing the state-dependent behavior models in humans: Environmental harshness moderates the link between personality and mating

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ABSTRACT

In behavioral ecology, state-dependent models are frequently used for the explanation of inter-individual variance in personality traits. Environmental characteristics are one of the external states which could influence this variance. The model predicts that environmental harshness should be related to fast life-history personality traits and that these traits should be more beneficial for fitness-related behavior in a harsh environment. In order to test the state-dependent behavior models in humans, we explored the relations between environmental harshness (exposure to long-term inter-group conflict), HEXACO personality traits and mating success (N = 204). We found that exposure to conflict is related to a fast life-history personality profile: lower Honesty, Agreeableness and Conscientiousness, followed by higher Extraversion. Furthermore, interaction effects showed that high Extraversion and low Emotionality are related to higher mating success, but only in a harsh environment. All obtained results are in line with state-dependent models predictions. Research findings reveal the rich explanatory potential of behavioral ecological models in explaining key questions of human behavior, such as inter-individual variance in personality.

1. Introduction

1.1. State-dependent behavior models in behavioral ecology

One of the key riddles of personality is the existence of inter-individual variance in personality traits. Empirical data consistently shows that personality traits depict adaptive variance in behavior, both in animals (Smith & Blumstein, 2008) and in humans (Penke & Jokela, 2016). However, if a personality trait is associated with fitness, then it could be expected that natural selection erode its genetic and phenotypic variance in the population (e.g. if Extraversion is biologically adaptive, then all individuals in a population should be extraverts). Still, this is not the case. Inter-individual variance in personality persists, and its very existence represents one of the crucial phenomena which behavioral scientists seek to explain.

Several theoretical models for explaining the variance in stable behavioral traits have been developed in behavioral ecology. One of the most prominent is the state-dependent behavior model (Dingemanse & Wolf, 2010; Sih et al., 2015; Wolf & Weissing, 2010). States are defined as any condition which influences the adaptive consequences of behavior (Dingemanse & Wolf, 2010). States can be internal, like sex, energy reserves, metabolism etc., and external, like various characteristics of the environment - abundance of resource, predators, density, social competition, etc. Basic assumption of the states model is that certain

behavior would not be equally beneficial in different state conditions. Environmental harshness can be postulated as a state variable, since it facilitates the emergence of certain personality traits in population. For example, it has been theorized that low resource availability and high environmental risk would elevate boldness as a personality trait (Luttbeg & Sih, 2010). Hence, bolder individuals are expected to have higher fitness in harsh environmental conditions.

Can we hypothesize what kind of personality traits would emerge in a harsh environment in general? In order to make such predictions, life-history theory can be very helpful. This theoretical framework studies the pathways organisms take in order to optimize fitness, depending on individual and environmental characteristics (Roff, 2002). For example, in harsh environments with low resources, individuals that reproduce earlier in their lifetime tend to have the highest fitness, even if it decreases their own longevity (a fertility-mortality trade-off: Rose, 1991). Hence, natural selection would favor the emergence of traits which lead to faster growth and maturation, earlier onset of sexual activity and higher effort in short-term mating, which should consequently lead to earlier reproduction. Such traits are aggressiveness, boldness, higher activity levels and proneness to risk-taking (Biro & Stamps, 2008; Stamps, 2007). These are the traits which belong to the so called fast life-history strategy (Bielby et al., 2007) or fast Pace of Life Syndrome (POLS: Réale et al., 2010). The opposite pattern of reproductive pathways is based on slow growth, later maturity, later onset of sexual

activity, decreased short-term mating and delaying of reproduction; it is labeled as slow life-history strategy or slow POLS.

1.2. Fast life-history profile of HEXACO personality traits

Differing from behavioral ecologists, personality psychologists often use comprehensive personality models in their research. One of the most prominent models is the HEXACO personality framework (Lee & Ashton, 2008). It consists of six broad personality domains: Honesty-Humility (sincerity, fairness and reciprocity), Extraversion (sociability, activity, and gregariousness), Emotionality (emotional instability, tendency to experience negative emotions), Agreeableness (cooperativeness, lack of grudge and antagonism), Conscientiousness (behavioral control, ability to delay gratification) and Openness to experience (inquisitiveness, creativity and unconventionality). Existing data on this model suggest the following fast life-history profile of HEXACO personality traits: lower Honesty-Humility, Agreeableness and Conscientiousness (Manson, 2015; Strouts, Brase, & Dillon, 2017). This implies that manipulation and cheating followed by elevated antagonism and impulsiveness contribute to the fast life-history trajectory, the result which is in line with the data obtained in other animals (Biro & Stamps, 2008). The position of Extraversion in life-history profile is not clear. Previous research showed that Extraversion is positively associated to several fast life-history indicators like short-term mating (Schmitt & Shackelford, 2008) and early reproduction (Jokela, Alvergne, Pollet, & Lummaa, 2011). Differing from this, research which used psychometric evaluations of life-history found that Extraversion is related to slow life-history strategy (Manson, 2015; Strouts et al., 2017). Emotionality and Openness are not found to be reliably related to any life-history strategy.

1.3. Goals of the present study

Explaining the inter-individual variance in personality traits is one of the key goals of personality science. State-dependent behavior models have been widely used in behavioral ecology and they have been proven to have high explanatory power. However, they have never been implemented in explaining variance in human personality. If they can be proven to provide accurate predictions in personality psychology, human personality science would gain an additional explanatory framework with high heuristic potential.

The goal of the present research is to test whether a harsh environment, as an external state variable, can explain the variance in HEXACO personality traits. Based on state-dependent behavior models, we can postulate two hypotheses: 1) harsh environment should be positively associated with fast life-history personality traits; 2) fast life-history personality traits should have higher adaptive potential in a harsh environment. Previous research was congruent in findings that low Honesty, Agreeableness and Conscientiousness are the constituents of fast life-history strategy. However, we believe that we can add low Emotionality and high Extraversion to this profile as well. The reason for this theorizing is the content of these traits: low Emotionality is based on the absence of fear which corresponds to the boldness trait (Pilch, Sanecka, Hyla, & Atlas, 2005; Ruchensky & Donnellan, 2017); high Extraversion is expressed in elevated social boldness and activity (Lee & Ashton, 2006). Both boldness and activity are the part of fast life-history profile in animals (Biro & Stamps, 2008; Stamps, 2007).

As a measure of environmental harshness, we used exposure to violent inter-group conflict. Conflict-affected areas show all characteristics of a harsh environment like scarce resources and elevated safety risk. Previous theoretical work showed that exposure to warfare and large-scale violence should facilitate fast life-history strategy (Belsky, 2008). The specific conflict which was evaluated in the present study is the ethnic conflict between Serbs and Albanians in Kosovo. The conflict is protracted, it has lasted several decades and it peaked in the last decade of twentieth century, with large-scale violence between two ethnic groups. Large military operations were stopped by NATO intervention in 1999; however the conflict is still present and sometimes is expressed in violent incidents between the group members.

Since the participants in our research are young adults (see Method section) we could not assess fitness itself (longevity or fertility/parental effort) as a measure of adaptation. However, previous research showed that individuals react adaptively to harsh environment by activating fast life-history strategy (Belsky, Steinberg, Houts, Halpern-Felsher, & the NICHD Early Child Care Research Network, 2010; Chisholm, Quinlivan, Petersen, & Coall, 2005; Sheppard, Pearce, & Sear, 2016), as a part of Predictive Adaptive Response in humans (PAR: Nettle, Frankenhuis, & Rickard, 2013). This is why we have chosen a measure composed by earlier onset of sexual activity and short-term mating as the criterion variable in the present research: both are considered to be indicators of fast life-history trajectory (Carlson, Mendle, & Harden, 2014; Dunkel & Decker, 2010).

2. Method

2.1. Sample

The sample consisted of 204 individuals (50% female; $M_{age} = 23.08$; SD = 2.96). Half of them were students selected from the University of Pristina, located in Kosovska Mitrovica in Northern Kosovo. Participants from this group were born and raised in Kosovo, so they were directly exposed to violent conflict during their childhood. Participants from the control group were students from the University of Belgrade and Singidunum University. They grew up in central Serbia and were not directly exposed to the conflict between Serbs and Albanians. All participants are of Serbian ethnicity and they should be roughly matched for their cultural and educational background. Participants were included in the research on a voluntary basis and they received additional points on the psychology course they attended. Hence, harsh environment was measured as a binary variable: participants from northern Kosovo were coded by 1 and participants from central Serbia were coded by 0.

2.2. Measures

We used HEXACO-PI-R (Lee & Ashton, 2006) for the examination of six personality traits: Honesty-Humility, Extraversion, Emotionality, Agreeableness, Conscientiousness and Openness to experience. It is a self-report inventory consisting of 100 items with a standard Likert-type response scale with a range from 1 to 5 (1 stands for "I completely disagree" while 5 stands for "I completely agree"). The instrument was recently validated in Serbian-speaking areas (Međedović, Čolović, Dinić, & Smederevac, 2017).

Four items were administrated in order to explore Mating success. Participants provided their age of first sexual encounter, the number of sexual partners in the last 12 months, the number of "one night stands" and the number of partners with whom one had sex despite a lack of long-term relationship interest. The last three items belong to the Behavioral facet of the Revised Sociosexual Orientation Inventory (Penke, 2013). The total score on Mating success was calculated as a first principal component extracted from these four items (Eigenvalue = 2.61; 67% of the original indicators variance explained). The age of first sexual encounter had negative loadings, while the other three indicators had positive loadings on this component. Hence, the criterion variable depicts earlier onset of sexual activity and higher short-term mating success.