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Original Article

Are extraversion and openness indicators of a slow life history strategy?

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ABSTRACT

Theory and data generally concur that a slower Life History Strategy (LHS) is associated with higher Conscientiousness, Agreeableness and Emotional Stability. Whether Extraversion and Openness are indicators of a slow LH, or whether they include both fast and slow LH components, remains unresolved. I addressed these questions in two studies: one of university students observed via periodic brief audio recordings during 72 h of their daily lives, and the second a re-analysis of data from Block and Block's (2006) longitudinal study. In both studies, I operationalized LHS as the correlation between an individual's California Q-Sort (CAQ) profile and the slow Life History (SLH) CAQ template created by Sherman et al. (2013) and Dunkel et al. (2015). I calculated Five Factor Model dimension scores using McCrae et al's (1986) method. In both samples, individuals whose CAQ profile more closely resembled the SLH template were higher in Conscientiousness, Agreeableness, and Emotional Stability than those pursuing a faster LHS. Extraversion was unrelated to LHS, while Openness in the Block and Block data set was actually associated with a faster LHS. Analysis of individual CAQ items revealed some differences between the studies. Generally, Extraversion-loading items tapping excitement-seeking and self-dramatization, and Openness-loading items tapping nonconformity, were associated with a faster LHS. Participants in the audio recording study also completed a HEXACO personality inventory and the Arizona Life History Battery. LHS as measured by the ALHB was uncorrelated with LHS as measured by the CAQ. Controlling for Extraversion yielded a significant positive relationship between the two LHS measures, suggesting that their poor convergent validity resulted from differences in their coverage of Extraversion-related content.

1. Introduction

Life history theory (MacArthur & Wilson, 1967; Pianka, 1970) draws attention to the trade-offs that organisms face in allocating limited energy among the competing demands of growth, reproduction (including mating and parenting) and bodily maintenance and repair. Life history theory has proven to be a fruitful source of hypotheses about human individual differences, including personality variation (Figueredo, Vásquez, Brumbach, & Schneider, 2004; Rushton, 1985). A slow Life History Strategy or "speed" (LHS), also known as a high-*K* strategy (Figueredo et al., 2005) prioritizes somatic effort (i.e. investment in future reproduction) over reproductive effort, parental effort over mating effort, and quality of offspring over quantity of offspring, whereas a fast LHS prioritizes their opposites.

Some research supports the existence of an apical personality factor, the General Factor of Personality (GFP: Musek, 2007), which is argued to overlap strongly, both theoretically and empirically, with a slow LHS (Dunkel & Decker, 2010; Figueredo et al., 2004; Figueredo, Vásquez, Brumbach, & Schneider, 2007; Figueredo et al., 2014; Rushton, Bons, & Hur, 2008). The GFP is characterized by high levels of the five major dimensions of personality postulated by the Five Factor Model (FFM: Digman, 1990): Emotional Stability, Extraversion, Openness, Agreeableness and Conscientiousness. Debate continues regarding whether the GFP is merely an artifact of measurement instruments or analytical procedures, rather than a real construct (e.g. de Vries, Tybur, Pollet, & Van Vugt, 2016; Rushton & Irwing, 2011). However, even if the GFP is real, it is not isomorphic with LHS (Figueredo et al., 2014). Some of the variation in the FFM dimensions is not associated with LHS, and facets within one FFM dimension may be related to LHS in opposing directions (Del Giudice, 2012, 2014a). The research described in this paper does not measure the GFP directly, but rather focuses on how two FFM dimensions, Extraversion and Openness, are related to LHS.

The core feature of Extraversion is thought to be sensitivity to reward (Cloninger, Przybeck, & Svrakic, 1991; Lucas, Diener, Grob, Suh, & Shao, 2000; Nettle, 2006), and its component facets, in the FFM structure, consist of positive emotions, excitement seeking, activity, assertiveness, gregariousness, and interpersonal warmth (Costa & McCrae, 1995). People pursuing a slow LHS, compared to those pursuing a fast LHS, are expected to invest more time and effort in social relationships, which in ancestral environments may have typically entailed short-

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term costs for which long-term benefits later compensated (Gurven, Allen-Arave, Hill, & Hurtado, 2000). Emphasizing this aspect of Extraversion, some researchers (e.g. Figueredo et al., 2004) have hypothesized a straightforward positive relationship between the *K*-factor (i.e. slow LH) and Extraversion. Several studies using self-report instruments have found support for this hypothesis (Dunkel & Decker, 2010; Figueredo et al., 2004, 2007; Gladden, Figueredo, & Jacobs, 2009). However, one of the foundational formulations of the LHS-based approach to human individual differences (Rushton, 1985) proposed a negative relationship between slow LH and Extraversion. Del Giudice (2012, 2014a) has argued that Extraversion includes both slow LH components (warmth, gregariousness) and fast LH components (sensation-seeking, dominance-striving). Extraversion is positively related to number of sex partners (Nettle, 2005) and either positively related (Holtzman & Strube, 2013; Schmitt & Shackleford, 2008; Simpson & Gangestad, 1991; Wright & Reise, 1997) or unrelated (Bourdage, Lee, Ashton, & Perry, 2007; Manson, 2015; Strouts, Brase, & Dillon, 2016) to self-reported short-term mating orientation. Cortisol reactivity to psychosocial stress may mediate the relationship between Extraversion and unrestricted sociosexuality (Wilson et al., 2015). These findings suggest a positive relationship between Extraversion and mating effort, and hence a neutral or negative relationship between Extraversion and slow LH.

Personality theorists differ regarding the core feature of Openness. Some (e.g. Denissen & Penke, 2008) emphasize its extensive overlap with the construct *need for cognition* (Cacioppo, Petty, Feinstein, & Jarvis, 1996). In this view, the Openness dimension represents variation in the extent to which a person experiences cognitive activity as rewarding. Thus, from a Life History perspective, high Openness represents a form of somatic effort, specifically investment in acquiring knowledge and skills that, in ancestral environments, typically paid off only after a considerable delay (Kaplan, Hill, Lancaster, & Hurtado, 2000). An alternative view is that the core feature of Openness is a propensity for broad interaction between different psychological domains and information processing streams (McCrae, 1987; Nettle, 2006). Del Giudice (2012, 2014a) argues that Openness includes both these facets and that the first, *intellect*, is associated with a slow LHS while the second, *imagination*, is associated with a fast LHS. Imagination is positively correlated with schizotypal traits (e.g. unusual experiences, tendency toward magical ideation), which in turn are correlated with unrestricted sociosexuality (Del Giudice, 2014a; Del Giudice, Angeleri, Brizio, & Elena, 2010). Studies reporting relationships between self-report Openness measures and self-report LHS measures have yielded mixed results (Dunkel & Decker, 2010; Figueredo et al., 2007; Gladden et al., 2009; Manson, 2015; Strouts et al., 2016).

An alternative approach to the observed mixed relationships between Extraversion and Openness, on one hand, and reproductive strategy indicators, on the other, is to reject Life History Speed as a unidimensional construct (Holtzman & Senne, 2014). In this view, the trade-offs postulated by Life History Theory, particularly the trade-off between short-term mating and long-term mating, are milder than commonly assumed. Some people successfully maintain both kinds of mating relationships, and Extraversion may facilitate this dual strategy (Holtzman & Strube, 2013). However, sexual strategies are not isomorphic with LHS (Del Giudice, 2014b); they belong to a lower level of analysis, and are products not just of LHS, but also of phenotypic and environmental variables unrelated to LHS. For example, men's physical strength and attractiveness predict variation in uncommitted mating orientation, but not variation in committed mating orientation (Lukaszewski, Larson, Gildersleeve, Roney, & Haselton, 2014). More generally, Life History trade-offs are sufficiently flexible (Reznick, Nunney, & Tessier, 2000) that the unidimensional fast-slow dimension, though a fruitful source of hypothesis, is not expected to explain all or even most of the variation in specific traits.

Of the other three Five Factor Model traits, two (Conscientiousness and Agreeableness) are unequivocally associated with a slow LHS, both theoretically and empirically (Dunkel & Decker, 2010; Figueredo et al., 2007; Gladden et al., 2009; Manson, 2015; Strouts et al., 2016). Conscientiousness can be defined as self-control in the pursuit of long-term goals (Nettle, 2006), and Agreeableness as a propensity toward altruistic behavior (Denissen & Penke, 2008). Emotional Stability has been consistently found to be associated with a slow LHS (Figueredo et al., 2004, 2007; Gladden et al., 2009; Rushton et al., 2008) but questions persist regarding the theoretical coherence (not the psychometric coherence) of the Emotional Stability dimension. When glossed as susceptibility to negative emotions (Nettle, 2006), Neuroticism includes the reaction norms (see Denissen & Penke, 2008) of a diverse set of mechanisms (anger, anxiety, sadness) with distinct functions (Manson, 2015).

The principal goal of the present study is to test between alternative hypotheses regarding the relationship between LHS and the FFM dimensions. Methodologically, I take two approaches. First, I build on the work of Dunkel, Summerville, Mathes, and Kesserling (2015) and Sherman, Figueredo, and Funder (2013), who independently created theory-derived slow Life History (SLH) templates of a widely used personality measurement instrument, the California Adult Q-Sort (CAQ: Block, 1961). Dunkel et al. (2015) validated their version of the SLH CAQ template by showing that young adults whose CAQ profiles correlated more strongly with it were also characterized by reproductive behaviors indicative of a slow LHS (e.g. later age at sexual debut). As described in detail in Section 2.1.4, published analyses (McCrae, Costa, & Busch, 1986) provide a means to score any CAQ profile on each of the FFM dimensions. The relationships, across individuals, between (1) the correlation between each individual's CAQ profile and the SLH CAQ template (hereafter, CAQ-based slow LHS) and (2) the individual's CAQ-generated score on each FFM dimension, permit inferences about the relationships between the FFM dimensions and Life History Speed. Scores on Conscientiousness, Agreeableness, and Emotional Stability are expected to be higher in individuals scoring higher in CAQ-based slow LHS. If Extraversion and Openness are mixed dimensions with respect to LHS (Del Giudice, 2012, 2014a), then they will be weakly related or unrelated to CAQ-based slow LHS. Analogous analyses using individual CAQ items that load on Extraversion and Openness can shed light on whether different facets of those traits are differentially related to LHS. Are Extraversion-loading items tapping interpersonal warmth (as distinct from assertiveness or excitement-seeking), and Openness items tapping intellect (as distinct from imagination), more likely to be positively associated with CAQ-based slow LHS?

As a second approach, in one of two studies I assess the relationships among (1) LHS and personality dimension measures derived from the CAQ (described above), (2) a self-report LHS measure (the Arizona Life History Battery [ALHB]: Figueredo, 2007), and (3) a self-report personality inventory based on the HEXACO personality model (Ashton & Lee, 2001, 2007). Reasons for measuring the HEXACO dimensions rather than the FFM dimensions are described by Manson (2015) and are beyond the scope of this paper. The analyses reported in the present study afford tests of the validity of the three CAQ-measured FFM dimensions that have HEXACO counterparts: Extraversion, Openness, and Conscientiousness. HEXACO Agreeableness and Emotionality represent an alternative rotation of the personality space covered in the FFM by Agreeableness and Neuroticism (Ashton & Lee, 2001, 2007), so these two FFM dimensions cannot be validated by self-report in the present study. The self-report data also permit tests of the relationships between each HEXACO Extraversion and Openness facet and both the ALHB and CAQ-based slow LHS.

Finally, the self-report data enable the second goal of the proposed study, which is a preliminary attempt to examine the convergent validity of the ALHB and the SLH CAQ template as measures of Life History Strategy. How strongly associated are ALHB scores and CAQ-based slow LHS, and how is their relationship mediated by personality dimensions?