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Impulsivity, sensation seeking and reproductive behaviour: A life history perspective

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ABSTRACT

Impulsivity has often been invoked as a proximate driver of different life-history strategies. However, conceptualisations of "impulsivity" are inconsistent and ambiguities exist regarding which facets of impulsivity are actually involved in the canalisation of reproductive strategies. Two variables commonly used to represent impulsivity were examined in relation to reproductive behaviour. Results demonstrated that sensation seeking was significantly related to strategy-based behaviour, but impulsivity (defined as a failure to deliberate) was only weakly correlated. The effect of impulsivity disappeared when sensation seeking was controlled. Sex differences emerged for sensation seeking but not impulsivity. We conclude that "impulsivity" is not a unitary trait and that clearer distinctions should be made between facets of this construct.

1. Introduction

Life History Theory (LH) proposes (and data confirm) that behaviours cluster together, forming predictable adaptive strategies contingent on experiencing environmental (un)certainty during development (Belsky, Steinberg, & Draper, 1991; Chisholm, 1999). Research also links LHT to individual differences in personality, particularly "impulsivity". This study sought to investigate how "impulsivity" relates to LHT strategy in more detail on a large non-clinical population.

1.1. Impulsivity

Impulsivity is commonly defined as a "tendency to act spontaneously and without deliberation" (Carver, 2005, p. 313). Conceptualisations of "impulsivity" vary tremendously, with Depue and Collins (1999, p. 495) claiming it "comprises a heterogeneous cluster of lower order traits" including sensation seeking (Zuckerman, 1971), delay discounting (Mazur, 1987), venturesomeness (Eysenck & Eysenck, 1985) and lack of perseverance (Whiteside & Lynam, 2001), to name but a few (see Evenden, 1999). Many authors stress the multidimensional nature of impulsivity (e.g. Carrillo-De-La-Pena, Otero, & Romero, 1993; Whiteside & Lynam, 2001). Others note important conceptual differences between "impulsivity" constructs (Cross, Copping, & Campbell, 2011; Evenden, 1999), whilst research demonstrates that different "impulsivity" traits have different effects on behaviours (Derefinko, DeWall, Metze, Walsh, & Lynam, 2011). Other conceptual ambiguities also exist. Is "impulsivity" part of a higher order cognitive process (e.g. executive control) or is it a lower order trait contingent on affective motivation (Carver, 2005; Evans, 2008)? A variety of measures have been developed to investigate "impulsivity" constructs. However, studies indicate that self-report measures and behavioural measures do not correlate significantly and that measures may tap different functions (Carillo-De-La-Pena et al., 1993; Reynolds, Ortengren, Richards, & de Wit, 2006). Precisely what is being measured in studies investigating "impulsivity" can therefore be ambiguous.

1.2. Life History Theory

LH theory suggests that resources in developmental environments are finite, forcing organisms to make allocation decisions that maximise fitness potential (see Kaplan & Gangestad, 2005). This creates trade-offs; an organism can spend more time maturing at the expense of reproductive lifespan, or shorten development and reproduce earlier at the expense of offspring quality. Research indicates that reproductive behaviours form part of a strategy calibrated to local environmental conditions. An individual in an uncertain environment will mature earlier, initiate sexual activity earlier and mate more frequently with multiple sexual partners (adopting a fast LH tempo). Fast strategists exhibit a host of other

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traits including, higher levels of aggression, a tendency to have more children, a shorter lifespan, lower IQ scores and more mental health problems (Chisholm, 1999; Ellis, 1988; Rushton, 1995). Those developing in stable, predictable environments exhibit the opposite pattern of behaviour (adopting a slow LH tempo).

Many behaviours associated with LH strategies express sex differences. There are consistent cross-cultural sex differences in levels of aggression, with men universally being more aggressive (Archer, 2009; Bettencourt & Miller, 1996). Levels of mating-related behaviour, such as higher scores on the Sociosexuality Inventory, more energy expended on mating rather than parenting and stronger preferences for short term mating also show significant differences in the male direction (Buss & Schmitt, 1993; Jackson & Kirkpatrick, 2007; Penke & Asendorpf, 2008). These sex differences emerged due to differences in fitness variance exhibited by the sexes (Bateman, 1948) and evolved via sexual selection to enhance success in the competition for the survival of genetic lineages. A review by Ellis (1989) suggests that males exhibit more behaviour consistent with faster strategies than females due to androgen exposure.

1.3. Life history and impulsivity

As behaviours are sensitive to environmental factors, a proximate mechanism that responds to changes in levels of certainty must exist. Proposals drawing upon various conceptualisations of "impulsivity" have been made. Chisholm (1999, p. 135) claimed that strategy development was guided by an individual's "time preference", an economic term encompassing multiple traits including "intertemporal choice [between alternatives with varying costs or benefits over time], impatience, impulsiveness, self-control and the inability to defer gratification". Figueredo et al. (2005) focused on risk taking and impulsivity measures which correlated negatively with a measure of slow LH strategy (mini K) and impulse control which correlated positively with the "K Factor". Hill, Jenkins, and Farmer (2008) examined future discounting which partially mediated the relationship between uncertain family environments and risk taking behaviours. Previous research therefore implicates some form of "impulsivity" in strategy formation. Like LH behaviours discussed earlier, many "impulsivity" traits also show consistent sex differences. Sensation seeking (Cross et al., 2011; Wilson & Scarpa, 2010), dysfunctional impulsivity (Cross et al., 2011) and risk taking measures (Byrnes, Miller, & Schafer, 1999) indicate that men engage in more thrill seeking activities and take more risks than women. This suggests that sex differences in LH tempo may therefore be associated with sex differences in "impulsivity" traits.

Key questions remain however. Which particular traits are important and how do they relate to strategies? Do all "impulsivity" conceptualisations contribute uniquely and additively to the development of strategy-based behaviour or do some conceptualisations subsume others? Frederick, Loewenstein and O'Donoghue (2002) concluded that 'time preference' is unlikely to be a unitary construct due to weak correlations between different measures and behavioural indicators. Loewenstein, Weber, Flory, Manuck, and Muldoon (2001) suggested instead that time preference is multi-dimensional with three constituent facets: impulsivity (spontaneous and unplanned activity), compulsivity (careful planning) and inhibition (restricting impulsive behaviour). A crucial objective in LH research should be to identify which traits are actually predictive of LH behaviours before endorsing them as proximate psychological mechanisms driving LH trajectories. This is the aim of the current study.

In this study, two measures of "impulsivity" were examined to determine which better predicts LH strategy; impulsivity and sensation seeking. These were selected because an analysis by Cross et al. (2011) indicates that they are likely to be distinct traits. This study defines "impulsivity" as a failure of deliberation measured by items including "I often do things on impulse" and (reverse-scored) "I usually think about what I am going to do before doing it" (Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993). Impulsivity has been conceptualised in terms of a dual process model in which it represents inefficient higher-level inhibitory control over lower-level affective drive states. MacDonald (2008) suggests that, for evolutionary reasons, males demonstrate a weaker ability to inhibit affective impulses than women. Neuroimaging studies indicate that affective activation in the amygdala is modulated by the orbitofrontal cortex (Wager, Davidson, Hughes, Lindquist, & Ochsner, 2008) and that testosterone attenuates orbitofrontal–amygdala connectivity (Van Wingen, Mattern, Verkes, Buitelaar, & Fernandez, 2010; Volman, Toni, Verhagen, & Roelofs, 2011) reducing modulation of affective impulses. Sensation seeking focuses on desire for thrill and excitement, including items such as "I like to have new and exciting experiences and sensations even if they are a little frightening" and "I enjoy getting into new situations where you can't predict how things will turn out". In terms of dual process models, sensation seeking is thought to be a manifestation of lower-level affective and motivational systems governing approach behaviour.

This study asks whether LH decisions favouring a faster LH strategy are linked with deliberative failure, the pursuit of sensation or both. We aim to clarify which "impulsivity" conceptualisation is most closely associated with key life history milestones. Sex differences in strategy-based behaviours should also be reflected in any candidate "impulsivity" measures. In their meta-analysis, Cross et al. (2011) concluded that, whilst consistent and significant sex differences emerged in the domain of sensation seeking, impulsivity measures show weak or no sex differences. It is predicted that these findings will be replicated.

2. Method

2.1. Participants and data collection

Seven hundred and sixty-one British adults were recruited via an independent marketing company to participate in an online questionnaire. Four hundred and nine participants were male (mean age = 40.47, SD = 8.62) and 352 were female (mean age = 37.94, SD = 8.77). Occupation was recorded via social grade categories: 49.9% A&B (high and intermediate managerial and professional), 39.9 & C1 & C2 (clerical, administrative and skilled manual) and 6.7% (unskilled & unemployed), 3.5% unspecified. This is somewhat higher than the national average. No significant differences were found between these groups in variables examined in this study and occupation was discounted from further analyses. Participants were not remunerated for participation.

2.2. Measures

Impulsivity (*Imp*) and Sensation Seeking (*SS*) were measured using the Impulsive–Sensation Seeking sub-scale of the ZKPQ (*Imp–SS*, Zuckerman et al., 1993), a 19-item measure that consists of 11 sensation seeking and eight impulsivity items. The scale was designed to measure impulsivity and sensation seeking as part of a superordinate trait (Zuckerman, 1994) but factor analysis demonstrates that it splits into two distinct subscales (Zuckerman & Kuhlman, 1993). Responses are recorded in a binary true or false format. Subscale alphas were high: .82 for *SS* and .73 for *Imp*.

Participants were asked questions aimed at assessing reproductive strategy. These variables were theoretically appropriate given the focus of LH on accelerated reproductive schedules (see Belsky