Mimicking Desirable Intimate Partners:

Adaptationism Applied to an Evolutionary Hypothesis of Psychopathy

by

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Abstract

This thesis sought to examine the fundamental question asking whether psychopathy better represents an evolved personality disposition or is a result of disorder of the developing brain. The central concern for the hypothesis development and study design was to assess the potential function of psychopathy—whether the traits of psychopathy perform a specific function that was selected and shaped over time to have a specific effect on reproduction that explains its existence. From research of female mate preference, psychopathic deception and sexuality, and extreme phenotypic expression in males, a hypothesis is formalised and tested—the sexual exploitation hypothesis. Competing hypotheses—social exploitation and disorder hypotheses—are also included to execute the method of multiple working hypotheses (Chamberlain, 1890/1965). The study used a two-part methodology. Study 1 included university males assessed on psychopathic traits being assessed on fluctuating asymmetry (FA) and video recorded telling feigned remorse stories and in dating scenarios. Study 2 included male and female participants who rated the remorse stories on genuineness, trustworthiness, and believability, and female participants rated the dating scenarios on desirability and left voicemail messages for the males. Results of Study 1 found that psychopathy was unrelated to FA, but inversely related to Factor 1. Results of Study 2 showed that female raters tended to give higher ratings of trustworthiness and believability to males higher in psychopathy compared to male raters. Additionally, single females and those high in Emotionality tended to consistently give preferentially higher ratings for high psychopathy males. Females tended to give higher dating scenario ratings for high psychopathy males (especially Lifestyle facet) and spoke in a higher voice pitch to males higher in Factor 1. Results support the sexual exploitation hypothesis over the competing hypotheses and implications of the hypothesis discussed.

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Dedication

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Mimicking Desirable Intimate Partners: Adaptationism Applied to an Evolutionary Hypothesis of Psychopathy

Psychopathy is a personality construct that describes individuals who have a poverty or absence of social emotions (e.g., guilt, shame, empathy), a preponderance toward social exploitation through manipulation and deceit, an externalising and impulsive behavioural pattern, and a tendency toward unethical and antisocial conduct (Cleckley, 1950/2015; Hare, 1991, 2003). In its fullest manifestation, psychopathy embodies the antithesis of prosocial humanity. Though this fully manifested state—prototypical psychopaths—likely exists in the population (see Hare, 1993 for case history examples), evidence also suggests that these traits exist on a continuum as might be expected of a personality disposition (e.g., Coid & Yang, 2008; Neumann, Hare, & Pardini, 2015; Neumann, Schmitt, Carter, Embley, & Hare, 2012).

Many researchers believe that the existence of psychopathic traits within the human population is the result of something having gone wrong in the *normal* developing brain (e.g., Blair, 1995; Kiehl, 2006; Patterson & Newman, 1993). Although a reasonable possibility, this perspective has been questioned by researchers using an evolutionary perspective, which argues that these traits may underlie an *alternative* developing brain that was shaped over evolutionary time (e.g., Book & Quinsey, 2004; Mealey, 1995). This thesis seeks to contribute to the ongoing research discovering why psychopathic traits exist in the human population.

Although the thesis proposes and tests a novel evolutionary hypothesis of psychopathy, both competing perspectives from above were considered during planning, analysis, and interpretation of the study. While acknowledging that evolutionary hypotheses bear the burden of proof (Williams, 1966), adaptationism was chosen as a guide. Adaptationism is the research program that seeks to identify whether a trait or suite of traits (e.g., psychopathy) was shaped and

selected over evolutionary time for a *proposed* function (what it does) by virtue of the beneficial effect it may have on survival and/or reproduction (Andrews, Gangestad, & Matthews, 2002; Mayr, 1961; Williams, 1966). Adaptationism was chosen for its rigorous standards of illustrating adaptation, which are best accomplished by designing studies that test for the presence of the proposed "special design" features and effects of the trait (Andrews et al., 2002). The process of adaptationism is an example of reverse engineering. As in reverse engineering, parts (traits) are proposed to have a specific function that can explain why they are in the artifact (organism). In contrast to reverse engineering in physics problems, however, evolutionary science studies materials (i.e., organisms) that do not afford the same level of control and manipulation. Instead, function must be inferred from evidence of its special design features, which are experimental observations that indicate the trait is "specially designed" to perform a proposed function.

The evolutionary hypothesis that was developed and tested in this thesis was that psychopathic traits (in males) function to exhibit attractive and desirable qualities of an intimate partner through mimicking interpersonal qualities and patterns of behaviour that is typically found to be attractive and desirable to females. The assumptions that underlie the hypothesis (i.e., why males, mimicry aspect, what is desirable to females) are addressed in later sections.

In the spirit of scientific impartiality, this thesis also considered alternative *competing* hypotheses when developing a study plan and interpreting results (Chamberlain, 1890/1965). Therefore, the thesis included alternative predictions from the perspective of an alternative evolutionary hypothesis and a non-evolutionary hypothesis of psychopathy. All hypotheses guided the study design and were pitted against each other to best explain the results. The results are considered in reference to the predictions made by each hypothesis separately and an overall assessment summarises how each hypothesis performed.

Is Psychopathy Evolved or Disordered: *Why* Does It Exist?

This is the fundamental question that forms the rationale underlying this thesis and the efforts taken to address it through the studies conducted. This question has both theoretical and applied implications that justify its consideration. Disordered implies error while evolved implies "design" (Wakefield, 1992). Depending on the position taken in this distinction, there will be differences in conceptualising psychopathy, which influences the research questions asked and ultimately tested. Applied implications also justify its consideration. Treatment and management strategies for clinical and forensic practitioners working with psychopathic individuals may be offered new perspectives, counselling for those in relationships may change, and educational information communicated to the public may change. Thus, this is a fundamental question that likely needs more straightforward consideration and to be a focal research endeavour in the field.

The motor of science is fuelled by asking *how* and *why* questions of observations or curiosities about the world. Examining the evolution of psychopathy often involve asking why questions. Tinbergen (1963) proposed a comprehensive model for guiding *ethology*—the biological study of behaviour—in understanding an organism's behaviours (and can be extended to include their *traits* more generally). Four related but distinct causes of behaviour are proposed from this model, which are divided into *proximate causes* (asking *how* questions) and *ultimate causes* (asking *why* questions) (Mayr, 1961). Proximate causes include the areas of ontogeny (how it develops) and physiology (how it works/its mechanism). Ultimate causes include function (why it does what it does/its reason for having evolved) and phylogeny (its evolutionary antecedents). This model has been and continues to be influential in framing research questions in animal behaviour including human behaviour (Wakefield, 2005). Although there is abundant

research in psychopathy (especially examining its *how*, proximate causes), little attention has focused on the *why*, ultimate causes of psychopathy.

There is potential for confusion when examining ultimate causes of traits and behaviours, however, since not every trait and behaviour was *shaped* by selection to have a function. Some traits are by-products of other evolved traits present simply because they are associated with the evolution of that other trait (Andrews et al., 2002). An example is the belly button, which is likely a by-product of the entry point for the umbilical cord during gestation, a developmental adaptation. Other traits and behaviours are manifestations of malfunction, which result when evolved traits fail to perform the function they were selected to perform (Wakefield, 1992). An example may be autism, which may manifest when the evolved processes of orienting to social stimuli fail to function (Dawson, Meltzoff, Osterling, Rinaldi, & Brown, 1998; Mundy & Neal, 2001; Rutherford, 2007). This assumes that there is no function to autistic traits and that they were not shaped for its features. Autism and psychopathy will be revisited later in the discussion.

These alternatives to function in nature show that investigation into the realm of ultimate causes of psychopathy may reveal that there is no function. However, this conclusion *must* be reached by testing and falsifying hypotheses of function (Ketelaar & Ellis, 2000; Popper, 1935/2002). However, many models of psychopathy seem to conflate ontogeny with function and assume that how it develops (i.e., differently than normal) is suggestive of how it does not have function. Examples involving multiple different male polymorphic strategies described in the next section will suggest why this may not be a proper assumption to make. This is likely why much of the work to tease apart whether psychopathy is an evolved suite of traits or a result of disorder has not been examined directly. A goal of this thesis then is to consider this

fundamental question a key part of the study design by assessing *directly* claims about function/malfunction, and to encourage future research in pursuing this question as well.

Current Models of Psychopathy: Laying the Groundwork to Study Function

The purpose of this section is to review some conventional and evolutionary models of psychopathy and to show how consideration of Tinbergen's (1963) *ultimate causes* of behaviour can be guided by and extend what these models offer. The influential conventional models I will review include the violence inhibition mechanism (Blair, 1995), response modulation (Patterson & Newman, 1993), and the paralimbic system dysfunction (Kiehl, 2006) models of psychopathy. The evolutionary models reviewed include the dual-adaptive model (Mealey, 1995), the cheater-hawk hypothesis (Book & Quinsey, 2004), and fast life history models. Current evolutionary approaches tend to fall into two conceptual categories—balancing selection and contingent shifts (Glenn, Kurzban, & Raine, 2011)—which calls for a brief discussion of these as well.

Conventional Models of Psychopathy. What are considered the conventional models of psychopathy include the more prominent models that have influenced the field that explicitly do not take an evolutionary approach. These models tend to focus on the ontogenetic and physiological aspects of psychopathy. Even though they may operate at different levels of analysis, they often share the common goals of understanding how psychopathy develops (i.e., attachment, genetics) and its mechanism (i.e., cognition, neural processing). The current conventional models do not use reverse engineering of other methods to address what the function of psychopathy may be, which means these models cannot be used to test directly the question of function. The research that these models generate, however, can be a powerful guide in identifying the possible function (if any) of psychopathy, and hence should be reviewed thoroughly and inform evolutionary hypotheses of function.

Blair (1995) proposed that the development of psychopathy is intimately connected to an innate cognitive mechanism called the *violence inhibition mechanism* (VIM). The VIM becomes activated in response to nonverbal communications of distress from others (e.g., crying, wailing) and initiates a withdrawal response. Through learned experiences, this withdrawal response can become associated even with the thought of someone in distress. Blair suggested that psychopathy may result when VIM does not develop, possibly due to genetic anomalies underlying the noradrenergic system or social deprivation (Blair, 2006). Three aspects of morality are affected when VIM does not develop properly: 1) moral emotions become blunted/absent, 2) there is disinhibition of violence, and 3) there is a failure to distinguish between morals and conventions. The model has since been elaborated and developed further to posit integrated emotional disturbances (Blair, 2006). For this review, however, the implication is that psychopathy cannot have a function because it results from genetic anomalies or social deprivation causing VIM not to develop.

Patterson and Newman (1993) proposed that psychopathy is a syndrome of disinhibition when the cognitive-behavioural apparatus referred to as *response modulation* does not activate when a dominant response set has been established. Response modulation generally refers to the temporary suspension of goal-directed behavioural responding and subsequent shifting of attentional resources to evaluate the goal-directed responding. It falls along one stage of four in a cognitive model of disinhibition, which includes (1) becoming activated to attain a goal (i.e., establishing a dominant response set), (2) reacting (physiologically, cognitively) to an aversive, conflicting event, (3) reallocating resources for cognitive and behavioural change, and (4) short- and long-term consequences of reallocation of resources. In psychopathy, stages 1 and 2 are presumed normally intact. In stage 3, response modulation fails to activate in psychopathy

because the activated goal-directed behaviour (stage 1) is unrelenting. In other words, psychopaths focus their attention on salient events, even to an exaggerated degree (Harpur & Hare, 1991; Newman & Wallace, 1993), but are poor at *reallocating* their attention once focused on a goal. This attentional rigidity is manifested as a poor response modulation mechanism.

Kiehl (2006) reviewed the electrophysiological and imaging studies of psychopathy and "acquired psychopathy" (e.g., temporal lobe epilepsy, orbital frontal damage) and suggested that the functional neural architecture of the paralimbic cortex and the amygdala—collectively called the *paralimbic system*—is hypofunctioning or dysfunctional in psychopathy. These functional differences, however, are specifically induced with tasks evaluating language, orienting, and affective processing. This model argues that instances of acquired psychopathy are merely glimpses of the role that the paralimbic system has in shaping our cognition and behaviour, hence why these conditions never manifest as prototypical psychopathy, but instead mirror symptoms of psychopathy (Pemment, 2013). In psychopathy, however, the paralimbic system in its entirety is viewed as developmentally, functionally, and structurally different. Evidence from adult offenders (Ermer, Cope, Nyalakanti, Calhoun, & Kiehl, 2012) and incarcerated youth (Ermer, Cope, Nyalakanti, Calhoun, & Kiehl, 2013) support this contention.

These models may have conflicting arguments about the causal mechanistic nature of psychopathy, but together, explain a substantial portion of research findings in psychopathy. Indeed, a comprehensive model of psychopathy would be incomplete without their inclusion. The issue with these models for the present study is that they have not provided an evaluation of an evolutionary function of psychopathy, and instead have come to consistently refer to the manifestation of psychopathy through these various proposed causal models as a "developmental disorder" (Blair, 1995), "deficit" (Patterson & Newman, 1993), and "mental disorder," (Kiehl,

2006), suggesting that its manifestation is an error. This conflates function with ontogeny and physiology and prevents an evaluation of whether the manifestation of psychopathy is "deliberate" or "intentional." Additionally, the models described here do not contradict a functional nature to psychopathy. That it may represent a reliably-developing, distinctive brain architecture (paralimbic system) and resulting cognitive-behavioural disposition (decreased VIM and response modulation) might suggest a specificity that favours executing a designed function.

The main point to take away from this review while considering possible function is that alternative polymorphisms (in morphology and physiology) do not suggest a failure to develop normally, thus they do not *necessarily* implicate the less frequent polymorphism as a disorder. This can be demonstrated by referencing clear cases from other species. For example, in many fish species, most males are larger than females (Taborsky, 1994). The developmental process of a male differs from a female, producing different-sized fishes by sex. However, in some fish species, some males develop into smaller, *sneaker males* and in other fish species, males may develop into *female mimics/satellite males*, which are also smaller. Are these smaller, phenotypically different males malformed instances of these fish species? Evidence suggests otherwise, that they have comparable ability to fertilise females' eggs and tend to be maintained at a constant frequency in male populations, suggesting an alternative reproductive strategy in males (Jones, Walker, Kvarnemo, Lindstrom, & Avise, 2001; Taborsky, 1994). Examples of these dramatically different morphological polymorphisms helps establishing a ground truth of alternative reproductive strategies, but less salient polymorphisms may be more difficult to identify. Evolutionary models of psychopathy attempt to accomplish this.

Evolutionary Models of Psychopathy. Linda Mealey's (1995) comprehensive review integrated and synthesized across biological, cognitive, and developmental disciplines of

psychopathy (she preferred the term "sociopathy") and proposed a model whereby psychopathy may manifest in one of two forms—hence the *dual-adaptive model*. One form, *primary psychopathy*, represent a group with high genetic load for psychopathic traits. This group has a strong propensity for developing the interpersonal and affective traits of psychopathy early in life and was proposed to be rare in the population. The other group, *secondary psychopaths*, have a moderate genetic load for psychopathic traits, and require environmental and social pressures during the individual's life (prenatal and/or postnatal) for psychopathy to develop. Both represent an evolutionarily adaptive disposition, but for different reasons (or pressures). The primary group is resistant to environmental input whereas the secondary group requires environmental stimulation like a diathesis model. The primary group is "adaptive" given that it exists at low levels in the population and the secondary group is "adaptive" in that it reorients individuals to survive and reproduce better in certain environments.

Book and Quinsey (2004) proposed the cheater-hawk hypothesis that aims to account for both cheater (i.e., lying, manipulating) and aggressive (i.e., hostility, violence) tendencies that manifest in psychopathy within an evolutionary lens. This model relies on the logic of the Hawk-Dove Game (Maynard Smith & Price, 1973), which simulates competition and cooperation for resources between individuals who take different strategies. The simplest form of this game involves a "hawk" or "dove" in competition for a resource (say a piece of food) against other hawks or doves. Hawks define a strategy predisposed to attack until they win or lose (i.e., die). Doves, the more peaceable approach, withdraw when attacked and will not attack others.

The Hawk-Dove Game has more complex variations including the popular tit-for-tat strategy ("you be nice to me and I will be nice to you"). There is also a "warrior-hawk" strategy, which involves cooperating when others have cooperated with them, but occasionally attacking

the other individual unprovoked (see Dawkins, 1976). This strategy may have similarities with the impulsive, aggressive, and antisocial traits found in psychopathy. The cheater-hawk hypothesis, then, describes psychopathic individuals as being both a cheater (e.g., manipulate and use others, be selfish) and a warrior-hawk (e.g., have unprovoked aggression toward others occasionally, be impulsive), which each may have been independently maintained over evolutionary time (Book & Quinsey, 2004; Book, Methot-Jones, et al., 2016).

Psychopathy has also been described as a fast life history strategy using the influential Life History Theory (LHT) approach (Stearns, 1992). LHT seeks to understand how organisms allocate finite material and energetic resources toward growth, maintenance, and reproduction across the lifespan and to explain how these allocation strategies represent *coordinated* trade-offs that have been selected over evolutionary time (Ellis, Figueredo, Brumbach, & Schlomer, 2009; Kaplan & Gangestad, 2005). During development, organisms face multiple decision nodes where a trade-off is inherently present. For example, time and energy spent parenting offspring is time and energy not spent on courting other mates (Griskevicius, Tybur, Delton, & Robertson, 2011). Decisions made by organisms revolve around allocating resources to aspects of survival and reproduction, which tangibly translates into investing in growth (somatic effort) or sexual maturity (reproductive effort). The combination of trade-off decisions made by an organism culminates into what is termed its *life history strategy*.

Life history strategies fall along a slow-to-fast continuum across many species from fishes to great apes and there is documented variation both between and within species (see Ellis et al., 2009; Stearns, 1992). *Slow life history strategies* involve greater investment in growth and delaying sexual maturity, exemplified by later pubertal onset, fewer sexual partners, fewer offspring, and delayed gratification (Ellis et al., 2012). *Fast life history strategies* involve greater

investment in sexual maturity sooner and less in prolonged growth, often manifesting in faster pubertal timing, earlier sexual debut, less investment in offspring, and risk-taking (Ellis et al., 2012). A fast (or slow) life history strategy involves many fast (or slow) life history traits exhibited by an organism that coordinate to optimize inclusive fitness. Fast life history traits seem to be quite prevalent in those with psychopathic traits, so the argument goes, thus it likely represents a fast life history strategy (e.g., Jonason, Koenig, & Tost, 2010).

The evolutionary models of psychopathy can be parceled into balancing selection, contingent shifts, or mutation load perspectives (reviewed in Glenn et al., 2011). *Balancing selection* involves the evolution of a trait (or suite of traits) that provides benefits in recurring environmental circumstances (e.g., presence of kin and neighbours), but considers that those benefits are limited to those specific environmental circumstances and thus prevents the trait(s) from extending throughout the population. This perspective includes Mealey's primary psychopaths and the cheater-hawk hypothesis. Others have also taken this approach (Harpending & Sobus, 1987; MacMillan & Kofoed, 1984).

Contingent shifts models argue that more than one developmental plan was selected over evolutionary time given the range of environments that ancestral humans would have experienced. Therefore, contingent shifts models argue that some traits are developmental "decisions" guiding the organism to a strategy that optimises survival and/or reproduction. This perspective includes Mealey's secondary psychopaths, the fast life history model, and others who take an adaptive calibration model perspective (e.g., Ribeiro da Silva, Rijo, & Salekin, 2015). Lastly, *mutation load* models argue that traits have developed not due to selection forces of evolution, but by accumulation of mutations that disrupts the normal functioning of evolved mechanisms. Therefore, these models argue that traits such as psychopathy may be a result of

accumulated mutations and not due to the sculpting processes of evolution; they are comparable to the conventional theories described above except that they consider the evolutionary implications within the model.

These evolutionary models of psychopathy describe how psychopathic traits can fit into what is typically considered evolved traits (i.e., by showing benefits to survival and/or reproduction), using different levels of analysis. None of these models, however, have promoted research examining a potential function of psychopathy and none suggest special design features of psychopathy that can be tested (Simpson & Campbell, 2005). The dual-adaptive model (Mealey, 1995) does not describe what led to the evolution of psychopathy (i.e., the effect it had to promote its survival/reproduction). Similarly, a fast life history approach may provide evidence that psychopathy *has* evolved, but is not clear about a function that it performs. The cheater-hawk hypothesis, though not describing a function, may be an exception and may inform function, which is why its claims helped form the alternative evolutionary hypothesis that will be considered. This brief review shows that existing evolutionary models may benefit from directly considering Tinbergen's (1963) *ultimate causes* of behaviour to further elaborate on, but mostly clarify, what it is about psychopathy that makes it a potentially evolved personality strategy.

Evolutionary Science: Adaptation, Selection Pressures, and the EEA

Studying adaptations in the evolutionary sciences can be unusual in that it involves counterintuitively thinking about the cause-and-effect relationship (Mayr, 1961). For instance, scientific questions are often posed in a way that seeks to identify the cause from an observed effect (*What makes* [unknown cause] *electrons attracted to protons* [effect]*? Does sugar* [potential cause] *influence the development of chronic disease* [effect]*?*). With adaptations, however, the cause is presumed to be known and the effect sought. The cause *is* the trait that has

been shaped and stood the test of time over a species' evolutionary history (Tinbergen, 1963). The reason the trait is a cause is inherently tied to the effect it reliably produces that benefits its survival or reproduction. The cause/trait is proposed to have an effect and that effect is then sought through study, ultimately informing whether that trait evolved as a cause that produces that effect. Also, since evolutionary science requires analysing past events that cannot be measured directly, relying on hypothetical accounts is unavoidable. A few concepts in evolutionary science should be communicated and elaborated on to strengthen the inferences made from evolutionary analysis (Simpson & Campbell, 2005; Tooby & Cosmides, 1992, 2005). These include adaptation, selection pressures, and the environment of evolutionary adaptedness (EEA), each discussed briefly to strengthen the confidence and rationale in pursuing this thesis.

Adaptations. Existing traits that are due specifically to the shaping forces of selection are called adaptations (Williams, 1966). More specifically, *adaptations* are traits whose existence is due to the functions they performed that produced a specific beneficial effect on survival and/or reproduction, thus they became shaped by the forces of evolution for that function (Andrews et al., 2002; Williams, 1966). The force of evolution usually considered powerful in shaping traits is natural selection, but others have convincingly argued for the *independent* shaping forces of sexual selection as well (e.g., Fisher, 1935; Prum, 2017). Therefore, adaptations represent a specific class of traits acknowledging that selection has occurred on the trait—and thus the trait has been shaped, moulded, and elaborated by selection—across generations.

All adaptations have specific functions that produce specific effects. For example, the eye specifically functions to observe light for the effect of enabling the observation and acknowledgement of objects in space. The function of the eye (to see) does not, for instance, permit moving objects in the environment, or hearing them, but instead has the specific effect of

observing objects (Andrews et al., 2002). Adaptationism is the research program that tries to identify (1) if a trait has a function and (2) the selection pressures that gave rise to the shaping of a trait over generations (Andrews et al., 2002; Mayr, 1983; Williams, 1966). There are six criteria that can suggest function (reviewed in Andrews et al., 2002), but special design is the most rigorous and convincing at assessing proposed functions and their plausibility. Because the biological concept of function and using special design criteria to assess it is central to adaptationism and to the novelty of this thesis, these are elaborated below.

Functions. Much of the novelty of this thesis project rests on the novelty in testing a proposed function of psychopathy, so it is necessary to elaborate on what is meant by function. A general definition is that a function is an *effect* that an artifact has on something in its environment (Wright, 1973). It is an action or performance, unlike a structure, which is the physical artifact itself. Human tools such as coffee machines can be thought of as artifacts that have a single function—to make hot coffee. The *effect* of a coffee machine is to make hot coffee and, extending into evolutionary logic, *that* is what explains the existence of coffee machines in the environment. These coffee machines were gradually selected for certain features that enabled it to produce the best tasting and temperature coffee possible to the human palate. But in this case, the coffee machine was "selected" by human minds to serve its function (to make hot coffee, the *effect*). In evolutionary biology, traits are coded in genes and these traits have *effects* in the world, which, if it influences the survival and/or reproduction of an organism relative to other traits, will often promote the shaping of the trait to perform the function better until either conflicting selection pressures prevent further elaboration or other constraints limit its further evolution (Andrews et al., 2002; Williams, 1966).

Special Design Criteria. The task of identifying if a trait is an adaptation is laborious and ideally involves multiple methods and measures testing for the unique effect of the proposed function (Simpson & Campbell, 2005). Especially powerful evidence of adaptation involves testing for special design features of the proposed function (Andrews et al., 2002). Special design evidence differs depending on the trait, but invariably requires that the trait show *specificity*—the expression of the trait is limited to unique contexts with unique effects—and *proficiency*—expression of the trait produces specific effects exceptionally well—for its proposed function. In addition, depending on the trait, it may need to show precision, efficiency, reliability of development, and complexity of design, among others (Williams, 1966). With special design evidence, it is expected that the trait being investigated for a proposed function does not perform any other function as specific and proficient as the one proposed. Confidence that a trait was "specially designed" by selection for a function "should be most evident when specific stimuli (triggering events) produce specific effects or outcomes (responses) at different levels of analysis" (Simpson & Campbell, 2005, p. 120).

Psychological Adaptations. Since this thesis explores psychopathy (a psychological and behavioural phenomenon), a brief discussion on psychological adaptations is also warranted (for criticisms see Buller, 2005). Natural and sexual selection only acts on genes, the material of heredity (Dawkins, 1976; Williams, 1966). Genes code for the proteins that make up and organize the cells of the central nervous system, which then performs the actions we see in psychological and behavioural traits. While genes may be the unit of selection, it is the effects of those genes that must translate into a reproductive benefit for them to be selected; put succinctly, genes "ensure their survival by means of phenotypic effects on the world" (Dawkins, 1982, p. 5). However those effects are achieved (somatic, behavioural, etc.) matters not to the genes.

Behavioural traits (e.g., the act of manipulating, instrumental aggression) can produce effects that are selected whereas psychological traits (e.g., shallow affect, diminished empathy) are underlying algorithms or tendencies in cognitive and affective experience that promote or encode certain behavioural traits that may themselves be selected (Rutherford, 2011; Tooby & Cosmides, 1992). *Psychological adaptations*, therefore, are psychological traits (algorithms or programs) that process information within the central nervous system that promote, encode, or cause a behavioural trait to be expressed that has a beneficial effect on reproduction. These traits also need not be thought of as genetically "determined" (see Buss, 1995; Dawkins, 1982). They are themselves coded by genes that were shaped by selection for whatever behavioural function they produce (Buss, 1995; Tooby & Cosmides, 1992, 2005). The logic of psychological adaptations has also be extended to personality dispositions more generally (Buss, 2009).

Selection Pressures. Another important concept in evolutionary science that has guided the development of this thesis are *selection pressures*—specific environmental circumstances that present an opportunity for new genes to develop that give a survival and/or reproductive advantage for the individual(s) that has those genes (Darwin, 1859/2008; Rutherford, 2011). In other words, selection pressures open doors for non-existent or latent genes to develop that provide a selective advantage over existing genes (Grant & Grant, 2006). At the phenotypic level, selection pressures can cause new and different traits to emerge that may then permeate the rest of the population or be maintained at a low frequency state (e.g., sneaker and satellite males in fish; Taborsky, 1994). The clearest example of selection pressures is illustrated by comparing the subsequent evolution of a single species that inhabits two different geographical locations: say an ocean-side beach compared to a dense forest. Each environment provides distinct challenges and problems that may lead to the evolution of two quite distinct species due to

differential traits evolving to *solve* those problems (Buss, 1995). The stronger the selection pressures (i.e., the more beneficial it is having a new trait as a solution), the faster the likelihood a species will either evolve to fit that environment or become extinct.

The Environment of Evolutionary Adaptedness. The last critical evolutionary concept considered when developing this thesis is the *EEA* (environment of evolutionary adaptedness; Tooby & Cosmides, 1990). Genetic evolution is a slow process and the genes that underlie traits that humans bear today are largely genes that were selected and evolved many generations ago (Symons, 1979; Tooby & Cosmides, 1990). This assumption seems warranted when we consider that approximately 99.5% of the lives of humans existed in the Paleolithic era as hunter-gatherers (more than 100,000 generations), whereas the remaining 0.5% has been spent largely living in agricultural (around 600 generations) and industrial (around 10 generations) settings (Harari, 2014; Taubes, 2011). The environmental conditions of that 99.5% of humanity has had more time to shape the traits that we have come to exhibit and thus is essential to consider when evaluating our own evolution (Tooby & Cosmides, 1990).

The EEA can be defined as a statistical composite of the environmental conditions faced over the span of human evolution (with emphasis on the Paleolithic era). Environmental pressures (selection pressures) that were more *consistently* prevalent over a longer period are given a greater statistical weight when conceptualising the EEA and the resulting statistical landscape can be considered a snapshot of the environmental landscape that most consistently provided selection pressures for shaping traits into adaptations (Tooby & Cosmides, 1990).

The EEA for one trait may differ from the EEA of another trait. For example, the EEA that presented selection pressures for the evolution of empathy would be *sooner* in evolutionary time compared to the EEA that gave rise to fear since fear is a universal mammalian emotion, but

empathy may be more distinctive in the great apes and possibly restricted to humans in its strictest definition (de Waal, 2006). If psychopathy is the trait of interest, then the EEA must be placed relatively late in human evolution since the traits of empathy, social cohesion, trust, and communication based on language were likely necessary for psychopathy to develop.

During the development of this thesis, the concept of psychopathy was considered in terms of its hypothetical existence and thus potential beneficial effects that it may have produced while considering the EEA and not its effects in the modern world (Buss, 1995; Tooby & Cosmides, 1990). Psychopathy likely has unique effects in modern environments, but these effects are unlikely to explain why it has evolved since we have not lived in modern environments long enough for genetic evolution to occur and selection pressures have likely not been severe enough to cause genetic evolution since the Paleolithic era (Harari, 2014). Since the central concern of this thesis is the evolutionary function of psychopathy (i.e., why it evolved, if at all), the process must consider *when* they evolved and in what circumstances.

Psychopathy Literature: Sex, Deception, and the Male Phenotype

This section highlights research findings that describes some interpersonally relevant and prevalent aspects of the psychopathy construct: the promiscuous and atypical sexual behaviour, the centrality of deception, and the prevalence of psychopathic traits in males compared to females. Since our species is a richly social species, this review focuses largely on aspects of psychopathy that are interpersonally relevant and thus may have been influential in its evolution.

Sexual Behaviour in Psychopathy. When the construct of psychopathy was first being clarified through clinical observations of psychiatric patients, sexual behaviour was a recurrent theme described and eventually would form a key aspect of assessing the construct. One of Cleckley's (1950/2015) 16 criteria includes "An impersonal, trivial, and poorly integrated sex

life." Later, Robert Hare's *Psychopathy Checklist–Revised* (PCL–R; Hare, 1991, 2003) would include "Promiscuous sexual behaviour" and "Many short-term marital relationships" as 2 of the 20 items used to assess psychopathy. That assessing psychopathy requires a consideration of sexual behaviour suggests that this aspect of the construct may provide clues about its existence and its evolutionary history.

Anecdotally when interviewed, many criminal psychopaths refer to sexual opportunism, sexual coercion, and enjoyment of many sexual relationships (Cleckley, 1950/2015; Hare, 1993; Kiehl, 2014). In students, psychopathic traits, particularly the core personality traits, are associated with increased use of sexual coercion tactics ranging from subtle manipulation to physical force (Muñoz, Khan, & Cordwell, 2010). Additionally, students with more psychopathic traits also show preoccupation with sex and are more likely to carry out their fantasies by acting on them (Visser, DeBow, Pozzebon, Bogaert, & Book, 2015).

Having sex at an earlier age than peers is a tendency that comes up repeatedly in the literature. For example, precocious sexual behaviour associated with psychopathy has been identified in non-psychiatric offenders (Smith & Newman, 1990), sex offenders (Harris, Rice, Hilton, Lalumière, & Quinsey, 2007), community adults (Seto, Khattar, Lalumière, & Quinsey, 1997), and forensic psychiatric patients (Cleckley, 1950/2015; Hare, 1993). Although traditionally viewed as an impulse control problem, the precocious sexuality aspect of psychopathy may be *by design*, as a fast life history tendency to start having sex earlier and maximise the opportunity of successful reproduction. Whereas most people may decide to limit their sexual experiences to a few intimate partners, psychopathic traits may be one way of predisposing individuals to desire indiscriminately and plentifully.

The literature also suggests that psychopathic traits are positively associated with the number of sexual partners in student samples (Jonason, Li, Webster, & Schmitt, 2009), number of one-night stands in community males (Seto et al., 1997), and number of times successfully poaching other mates and themselves being poached in student samples (Jonason, Li, & Buss, 2010). Additionally, convergent evidence is provided for the relationship between psychopathy and number of sexual liaisons from autobiographical accounts of women that were previously in relationships with men purportedly high in psychopathic traits who reported that those men had many concurrent sexual relationships, sometimes with women who were known to the women themselves (Kirkman, 2005). Although not required to constitute adaptation, it seems individuals high in psychopathic traits are also *consciously* motivated to have short-term sexual contacts. For example, higher psychopathic traits are associated with openness to sexual relationships without attachment (Jonason, Koenig, et al., 2010), shorter time known before having sex (Seto et al., 1997), and seeking short-term sexual contacts (Jonason et al., 2009).

Sexual behaviour is a prominent aspect of psychopathy and reliable and predictable patterns of sexual behaviour underlies many adaptive strategies in humans and other species (Buss, 1995, 2009). Theories that do not account for the sexual behaviour and nuances of sexuality within psychopathy can only ever be partial and incomplete theories. It is incumbent upon researchers to explain the aspects of sexual behaviour in psychopathy, accounting for the reliably developing components of precocious and promiscuous sexuality, in addition to the coercive aspects of their sexuality (Harris et al., 2007). The sexual exploitation hypothesis developed later argues that the sexual aspect of psychopathy is central to the construct and may provide information about the likelihood that psychopathy functions around sexual behaviour.

Psychopathy as Pervasive Deception. You would be hard-pressed to find a personality style that is more chronically deceptive in its manifestation than psychopathy. Some of the earliest clinical observations on psychopathic patients reveal a consistent and often poorly motivated deceptive pattern of behaviour (Cleckley, 1950/2015). Other clinical observations bear this out reliably and predictably (e.g., Hare, 1993; Harrington, 1972; Kiehl, 2014). Not only does the assessment of psychopathy typically include items related to deception directly (e.g., lying, fraud), but other aspects of the construct can be conceptualised as manifested deception. For example, the grandiosity often shown in psychopathy can reflect the tendency to portray oneself in a way that is inaccurate or exaggerated. Comparably, a combination of superficial charm, parasitic orientation, and lacking goals hint toward a chronic use of positive self-presentation despite ongoing failures in meeting goals and pursuing independence—a deceptive mismatch between what they think of themselves and what they have accomplished. Additionally, unusual word construction and verbal attributes in psychopathy may suggest a deceptive language orientation (e.g., Hare & McPherson, 1984).

Deception is obviously a prevalent aspect in the population generally, and the "everybody lies" adage may indeed be true, but in psychopathy, deception seems to pervade the entire disposition of the individual in many if not most aspects of their lives, whether it is bragging about accomplishments not achieved, education not acquired, or simply telling others what they want to hear to get what they want (Hare, 1993). This tendency toward deception, even subtle forms, seems to increase with higher levels of psychopathic traits. One study provides an example regarding deceptive display of personal physical attractiveness in a student sample (Holtzman & Strube, 2012). First, participants were asked to shave their beards, take out piercings, pull their hair back, and dress in a generic grey sweat suit while being photographed

from the waste up. This photograph was called the baseline attractiveness photograph. Next, participants were asked to dress themselves up however they typically do and have a second picture taken, called the adorned attractiveness photograph. After, a different sample of students provided ratings for each set of photographs. The first finding was that psychopathy was *not* related to attractiveness in the baseline condition, but a second finding was that higher psychopathic traits were related to higher ratings in the adorned condition. This suggests that individuals higher in psychopathy are better able to deceptively portray themselves as more attractive than their baseline attractiveness.

Two other studies are worth reviewing that indicate the deceptive capacity and "skill" of those with psychopathic traits. The first study also used a student sample, but examined the ability to inhibit emotional "leakage" during deceptive displays (Porter, ten Brinke, Baker, & Wallace, 2011). Participants were shown photographs of people displaying different emotional expressions, then they asked to display a *different* emotion that was incongruent with the photographed emotion while being video recorded. Most people will show emotional "leakage" when this happens—the tendency to have the photographed emotion you are looking at leak through into the displayed emotion. The primary finding in this study was that higher psychopathic traits was related to having *less* emotional leakage, suggesting psychopathy can promote the *effective* display of deceptive emotions.

The second study supports this finding, which used a student sample to explore the ability of psychopathic individuals to show what the authors called *affective mimicry* (Book, Methot, et al., 2015). Affective mimicry is the ability to mimic affective states or emotions despite not feeling the emotion oneself (Frank, 1988; Jones, 2014). First, participants were video recorded telling feigned remorse stories. These were true stories that happened to them where they did *not*

feel remorse, and participants were asked to act as though they did feel remorse for what happened in the story while they were being video recorded. Participants were incentivised to do this to the best of their ability. These videos were then shown to another set of participants, who then rated them on how genuine the emotion was that the person showed in the video. In this study, there was a significant partial correlation (controlling for the impulsive and antisocial traits) between the core personality traits of psychopathy and ratings of genuineness. This finding supplements the Porter et al. (2011) study and suggests that psychopathic traits may influence the capacity to deceptively communicate emotions and be convincing while doing it.

These three studies (Book, Methot, et al., 2015; Holtzman & Strube, 2012; Porter et al., 2011) suggests a tendency in psychopathy toward deception in interpersonally meaningful contexts of emotion expression and physical attractiveness. The sexual exploitation hypothesis to be described later sees the effects of these studies as part of the function of psychopathy in generating favourable impressions from others. The general deceptive nature of psychopathy in generating favourable impressions is also considered during study design of this thesis.

A final consideration for this section involving deception as a central aspect of psychopathy concerns the theoretical argument of Mimicry-Deception Theory (MDT) presented in Jones (2014) of predatory personalities as examples of behavioural mimics. MDT characterizes how some species, or members of a species, can adopt a parasitic and exploitative strategy using mimicry to acquire resources. These individuals are called “mimics” and, broadly, they utilise signals that confuse and/or deceive others into being exploited. MDT includes four components—deception style (superficial or deep), extraction rate, host integration, and detection risk—that make up a mimicry tactic. These components are supported by evidence in micro-organisms, nonhuman animals, and possibly humans (Jones & de Roos, 2016).

Micro-organism and nonhuman animal mimics are clear examples of how selection pressures can give rise to complex species with adaptations largely or solely to function as exploitation tactics of others (Buss & Duntley, 2008). Mimics are examples of adaptations for functions that *depend* on the existence of beneficial effects of other, genuine traits. For example, a poisonous coral snake that evolves to mimic the appearance of a non-poisonous kingsnake would depend on the beneficial effect that the non-poisonous snake's appearance has (e.g., getting close in proximity to prey). As such, the beneficial effect of mimicry is dependent on the beneficial effects of whatever is being exploited. In humans, examples of mimicry may not be as obvious because they may involve exploiting the beneficial effects of our most intimate and trusting of mechanisms: emotions.

Affective mimicry may be the most important aspect of mimicry in humans, with other possibilities including behavioural mimicry, symbolic mimicry, and others (Book, Methot, et al., 2015; Frank, 1988). Affective mimicry shows qualities of being a deceptive display of emotion that may operate naturally for individual benefit. Since the emotion is not genuine (signalling a message without experiencing the message oneself), traits of affective mimicry can be considered exploitation strategies (Buss & Duntley, 2008). In humans, using emotions to communicate messages has been immensely beneficial at promoting group solidarity and togetherness, and faking emotions is difficult and uncomfortable because of their importance in signalling as commitment devices with other individuals (Frank, 1988). However, because these messages were so prevalent, embedded, and reliably developing, they may have provided a selection pressure for the evolution of deception through affective mimicry to exploit them.

Psychopathy as a Male Phenotypic Phenomenon. Traits that are passed on to future generations must do so through sexual reproduction. Even cultural and learned traits require that

offspring inherit and express traits that allow for learning to occur (Tooby & Cosmides, 1992). Since heredity is tied to sexual reproduction, it is not surprising that many adaptations revolve directly around sexual behaviour and solving mate acquisition problems (Buss, 1995). As noted earlier, fast life history strategies involve reproducing early and often with little to no care for offspring whereas slow life history strategies involve reproducing selectively and later in development with abundant and extended care for offspring (Ellis et al., 2009). Both show characteristics that suggest an adaptive strategy for reproducing and contributing genes into the next generation. While a slow strategy may be more "moral," it does not suggest that it is the only or "best" strategy.

Because of gamete size differences and time spent investing in offspring, males and females intrinsically vary in their reproductive strategies (Symons, 1979; Trivers, 1972). For example, because female mammals carry offspring from zygote to infant and then nurse after birth, they produce a limited number of offspring with intervals in between. Male mammals, however, can theoretically produce an unlimited number of offspring given unlimited access to females. This dichotomy provides the foundation for many gender differences and the different reproductive strategies of the sexes (Buss, 1998, 2016). A consistent result across several species is that males have higher variance in reproductive success whereas females tend to have more comparable reproductive success (Symons, 1979). This suggests that unique selection pressures often exist for males to be counted among the few with preferential access to females.

Selection pressures that produce reproductive variance in males has promoted the evolution of elaborate mate acquisition strategies including male-male posturing and violence in humans (Wilson & Daly, 1985), sexual coercion in non-human apes (Smuts & Smuts, 1993), and deceptive exploitation in harriers (Simmons, 1988). When taking a sexual selection perspective,

it is mostly the males who are being selected to have elaborate traits—the peacock's tail, the bowers of bowerbirds, the colourful faces of mandrills—suggesting that over that species' evolutionary history, some males (the ones with desirable traits) reproduced a lot, but those without those traits lost out (Geary, Vigil, & Byrd-Craven, 2004; Prum, 2017). Whereas most females in most species tend to have comparable reproductive success, the variance in success in males from many species can promote a "do or die" mentality of attracting partners.

These suggestions from sexual selection and mate choice literature indicate that psychopathy—an extreme phenotypic pattern—may underlie a "solution" to male-specific selection pressures. Evidence from a variety of samples shows that psychopathic traits manifest to a greater degree in males than females (e.g., Cale & Lilienfeld, 2002; Coid & Yang, 2008; Hare, 2003; Neumann et al., 2012), supporting the contention that they may be more relevant and beneficial (reproductively) to males than females. For males, having psychopathic traits may have provided beneficial effects that solved a recurring EEA selection pressure of access to mates (due to high variance in reproductive success in males). Although psychopathic traits may provide beneficial effects for some females (see Harpending & Sobus, 1987; Mealey, 1995), selection pressures for alternative mating tactics in males suggest that psychopathic traits, if they do constitute an adaptation, were likely shaped by natural (or sexual) selection to solve those problems and thus selected because of the function they served in male brains.

The approach taken in this thesis is that the evolutionary relevance of extreme phenotypes in males and the consistently higher prevalence of psychopathic traits in males across different samples suggests that psychopathy, if an adaptation, likely functions in the male phenotype; indeed, may even have evolved because it functioned to solve a male-specific selection pressure of acquiring access to mates.

Female Preferences and Male Display

The purpose of this section is to provide a brief review on mating preferences in females and typical nonverbal and verbal display patterns of males in mating contexts. This review provides background for the development of the sexual exploitation hypothesis of psychopathy, to be described after this section.

Female Preferences in Human Mate Choice. Studies from many different cultures around the globe have examined what women prefer in a partner when deciding on intimate partnerships (for a review, see Geary et al., 2004). In a study involving over 37 cultures from around the world, women strongly, reliably, and differentially prefer mates that have resources, status, and power (Buss, 1989; Buss et al., 1990). While these were rated quite highly, other preferred characteristics included honesty, kindness, and sincerity. Likely in relation to the preference for resources, women also strongly prefer men who show ambition and industriousness, including desiring mates with advanced education and knowledge, symbols that he has what might be called "resource-holding power."

A noteworthy distinction made in the literature on human mate choice is the difference in preference for long-term versus short-term mating partners (Buss, 2016; Buss & Schmitt, 1993). This perspective suggests that people prefer different traits in the opposite sex depending on whether they are interested in a long- or short-term partner. Some women have an exclusive preference for a long-term intimate partnership, other women may have an exclusive preference for short-term partnerships, and still others may have occasions where they prefer a long-term partnership at some point in their lives yet prefer short-term partnerships at others. These different "strategies" have been called the sexual strategies of women and are found across cultures and possibly represents a human universal tendency (Buss & Schmitt, 1993). Women

looking for a long-term mate tend to prefer honesty, kindness, and sincerity as well as resource-holding power in men. Women seeking short-term mates tend to prefer physically masculine traits—height, V-shaped torsos, and facial features such as broad jaw and strong cheekbones—and resource-holding power in men. Kindness and honesty appear less important for women seeking short-term partnerships with men whereas resource-holding power tends to be important regardless of the strategy (Buss, 2016). The existence of strong and reliable female preferences suggests two likely scenarios: 1) women look for cues that indicate the presence of these traits in men and 2) men will often display cues that show they have these traits.

A final consideration involves *how* women demonstrate preference for a mate. Some studies have used self-report of women's preferences for male traits (Buss & Barnes, 1986; Regan & Berscheid, 1997). While these studies provide evidence of traits that women say they look for in a mate, other studies have examined biological proxies that demonstrate mate preference or sexual attraction. Physiological measures such as pupil dilation has been shown to indicate sexual arousal (Zuckerman, 1971) and hormones such as oxytocin have been found to increase attraction and trusting in unfamiliar others (Theodoridou, Rowe, Penton-Voak, & Rogers, 2009). Fraccaro et al. (2011) also found that women spoke in a higher voice pitch to men they found more attractive, suggesting voice pitch may be a cue to attraction and mate preference as well. Women may alter their voice pitch to men they find attractive in order to display interest and appear more attractive, which supports evidence that also suggests men find higher voice pitch in women attractive (Feinberg, DeBruine, Jones, & Perret, 2008).

Male Display in the Courtship Context. The first question that might be asked (perhaps innocently) is whether men tend to be deceptive about themselves in dating contexts. In a study examining self-reported use of deception in mating contexts, male students reported using more

deception regarding dominance/resources (e.g., misleading women about career expectations, spending money on women they cannot afford) and sincerity/trust/kindness (e.g., intentionally appearing vulnerable to women, acting more humble than they really are) than female students, and they lied most about these traits (Tooke & Camire, 1991). Although this study included only self-report indices of tactics used, it is nonetheless interesting and corroborating that the same traits that women find attractive that is supported in cross-cultural studies are also the traits that men tend to lie about most.

For anyone that has gone to a bar or club on a Friday or Saturday night, attempted displays of male virility are not difficult to observe. Often referred to as the "Monkey Dance," male-male intimidation and posturing often serves the function of displaying courage, strength, and power, especially if there are women present who may be eyeing up the men as potential mates (Gottschall, 2015). Indeed, in one study at a bar, men exhibited different nonverbal behaviours when the bar was manipulated to have no women in it compared to when women were present (Renninger, Wade, & Grammer, 2004).

Nonverbal behaviour can provide powerful cues to the opposite sex that you possess the valuable traits they are looking for in a mate. Much of the work in nonverbal courtship behaviour has focused on women (Moore, 2010). However, in the study by Renninger et al. (2004), the nonverbal behaviour of men was examined in a bar context and used as a predictor for successfully initiating and maintaining a conversation with a woman. Men who took up more space in their social groups (e.g., putting their arms around chairs, stretching out), had more open-body movements, took more glances around the room, and touched other men in their social group without being touched back (a sign of social dominance) were significantly more likely to start and maintain a conversation with women later in the night. In a review of

nonverbal courtship, Moore (2010) suggests that women use reciprocal eye-gazing as an indication of interest whereby *repeated* glances indicate interest. This suggests that women may be observing the nonverbal behaviours of men in these types of contexts and then provide occasional glances in a man's direction signalling her interest.

The next step in this courtship dance would then involve approach and verbal communication: two steps that seem second nature to a psychopathic individual. The next section will describe the evolutionary hypothesis of psychopathy that brings together female preferences in mates, a psychopathic individual's deceptive and disinhibited disposition, and suggests that the latter evolved to sexually exploit the former through the forces of evolution.

Mimicking a Desirable Intimate Partner: Sexual Exploitation Hypothesis of Psychopathy

The novel hypothesis proposed in this thesis project is the adaptationist hypothesis that psychopathy functions in males to sexually exploit a females' mate preferences through mimicking what is typically deemed attractive and desirable to females. The hypothesis argues that the entire disposition of psychopathy (e.g., the core personality and behavioural features) operate to perform this function; the more psychopathic traits present, the better able to sexually exploit using this "strategy." This is an adaptationist hypothesis in that it claims that psychopathic traits were specifically selected *for this function*, which gave the beneficial effect of increasing reproductive success, likely through mating opportunity and fertilisation success but not survival. The function part of the hypothesis is unique in the literature insofar as it follows the guidelines of Tinbergen (1963) and Andrews et al. (2002) for investigating the *ultimate causes* of psychopathy as a suite of proposed adaptive traits. The hypothesis also promotes and enables direct testing of psychopathy using the function level of analysis of evolutionary science, a goal of this thesis.

Women vary in the attributes they find attractive in men, but a consistent finding is that women are attracted to men with resources, status, and power; those who are honest, sincere, and kind; and show ambition and industriousness (Buss, 1989, 2016; Buss et al., 1990; Buss & Barnes, 1986). In support of the sexual exploitation hypothesis, a large community sample found that individuals higher in psychopathy are more likely to aspire to power (but not necessarily with achievement), financial success, and acquiring material possessions (Glenn, Efferson, Iyer, & Graham, 2017).

The traits of superficial charm, lying, and shallow affect may suggest emotional dampening, but some evidence suggests an unusual ability to display emotion deceptively (Book, Methot, et al., 2015; Porter et al., 2011), including remorse, an emotion that signals honesty and kindness. Clinical (Cleckley, 1950/2015; Hare, 1993) and biographical (Kirkman, 2005) reflections also suggest an ability to give impressions of honesty and kindness at first, only to lose those attributes after the partnership is formed. Love-bombing—the excessive showering of love on another with flattery, sweet talk, and attention (Brown, 2008)—has also been reported as a more frequent experience for women dating psychopaths (Deck, 2017). Lastly, psychopathic individuals often exaggerate their competences (industriousness) and describe confidently their ambitions for success (e.g., Babiak & Hare, 2007; Dutton, 2013; Hare, 1993; Kiehl, 2014). A primary concern and "skill" in psychopathy then may be to seek resources and power, to exaggerate competence, and to appear honest, kind, and sincere when it suits their needs.

The sexual exploitation hypothesis argues that the deceptive nature of psychopathy (e.g., lying, superficial charm, grandiosity, etc.) serves those who have these traits beneficially by making them look attractive and desirable to potential mates, thereby increasing the chances of forming an intimate partnership and eventual reproductive success. This hypothesis is further

structured and informed by MDT, which suggests that some individuals take on an exclusively parasitic orientation involving mimicry (Jones, 2014). This perspective argues that psychopathy may represent a personality disposition that makes someone chronically predisposed to think and behave in ways that make them mimic desirable attributes confidently and effectively without regard for their genuineness.

One caveat is necessary to describe upon developing the sexual exploitation hypothesis, which is that not all women should be equally exploitable using this "strategy." Some women prefer and expect extensive courtship before a partnership is considered intimate (often referred to as "Madonnas") whereas others enter an intimate partnership faster (unflatteringly called "whores"). Depending on whether these different female dispositions are informed by the EEA, they may have created unique selection pressures for the evolution of sexual exploitation strategies to develop (Dawkins, 1976; Wright, 1995). This requires a consideration of the attributes of the individual being exploited, or targeted, when considering this hypothesis as well.

Some evidence suggests this is warranted. Individuals high in the personality trait of self-monitoring may be better at deception detection (Aamodt & Custer, 2006) and when deception involves specifically emotional content, personality differences in extraversion, neuroticism, and openness influence the ability to make accurate judgments of true and false stories (Peace, Porter, & Almon, 2011). Examining victimisation research involving psychopathic traits also suggests the possibility of differential targeting of individuals based on different features including walking style and gait. Psychopathic traits have been associated with making accurate judgments about a person's victimisation history from observing them walking (Wheeler, Book, & Costello, 2009) and they can accurately describe what cues they are using to make these judgments (Book, Costello, & Camilleri, 2013). These findings together suggest that the sexual

exploitation hypothesis should take into consideration that some females may be 1) targeted more and 2) more susceptible to being deceived depending on certain attributes.

Competing Hypotheses: Social Exploitation and Disorder Hypotheses

A goal of this thesis is to use the recommendations of Chamberlain (1890/1965) to incorporate multiple competing hypotheses that guide study design and attempt to explain results. The purpose of this is to prevent confirmation bias and over-interpreting the data to fit a single hypothesis. Thus, two additional hypotheses were included that compete (i.e., have mutually exclusive claims) with the sexual exploitation hypothesis that is being proposed. These two hypotheses are the social exploitation hypothesis and the disorder hypothesis.

Social Exploitation Hypothesis of Psychopathy. The review of the evolutionary models of psychopathy revealed that there are no clearly defined functional hypotheses that can compete with the sexual exploitation hypothesis proposed in this thesis. However, many of the theoretical positions that researchers have taken regarding the evolution of psychopathy can be grouped together under a single category of social exploitation.

The cheater-hawk hypothesis (Book & Quinsey, 2004) may fall into this category. Its claim is that psychopathy is an evolved strategy that predisposes individuals to excessively lie, cheat, and steal when it serves their needs and to cooperate often with occasional outbursts of aggression to maintain status and promote intimidation. Some evidence does suggest that psychopathic individuals can preferentially cooperate (Gervais, Kline, Ludmer, George, & Manson, 2013; Rilling et al., 2007) and there is, of course, abundant evidence of aggression and intimidation in psychopathy (Book, Methot-Jones, et al., 2016). Even though the details of *how* this strategy is functional (i.e., what made it evolve) are not spelled out, it is reasonable to assume that, provided it is maintained at a relatively low level in the population, this disposition

can provide benefits through cheating and intimidation—i.e., social exploitation (Buss & Duntley, 2008)—which might underlie its potential function. Other researchers have proposed other explanations about where the benefits of having psychopathic traits come in (e.g., MacMillan & Kofoed, 1984; Harpending & Sobus, 1987; Ribeiro da Silva et al., 2015), but each proposes that the benefits occur through cheating, breaking the rules, and/or not being "hindered" by emotion. Thus, the social exploitation hypothesis broadly argues that psychopathy functions to gain resources (e.g., status, power, mates) through methods of social exploitation—cheating, bullying, aggressing.

Disorder Hypothesis of Psychopathy. The disorder hypothesis of psychopathy is in line with many of the conventional models described earlier in that it claims that psychopathy does not have an evolutionary function (i.e., it did not evolve because of any beneficial effect on survival/reproduction). This hypothesis argues that psychopathy is a result of what can be called *harmful dysfunction*: it causes social harm and it is a result of normal adaptive trait(s) failing to perform its function (Wakefield, 1992). What usually underlies a disorder from this perspective usually implicates accumulated mutations that can affect polygenic traits and developmental disruption from environmental perturbations. If evidence fails to consistently support a proposed function when conducting adaptationist research, then this suggests that the trait or suite of traits are likely a result of disorder (Andrews et al., 2002). Alternatively, however, disorder hypotheses can be examined directly through other means of evidence, such as genetic mutation load or assessments of developmental instability, which includes fluctuating asymmetry.

A reliable measure of developmental instability is fluctuating asymmetry (Graham, Raz, Hel-Or, & Nevo, 2010). *Fluctuating asymmetry* (FA) is a measure of how much the two sides of a symmetrical bilateral trait (e.g., hands, ears) differ in size and shape in a randomly fluctuating

way (i.e., not consistently larger on one side than the other; Palmer & Strobek, 1986). Conceptually, FA is the random developmental noise that results from errors in gene expression, insults from environmental toxins and particles, and the inability of the genome to resist disruption (Graham et al., 2010).

One study has examined FA in psychopathy by comparing non-offender, psychopathic offender, and non-psychopathic offender men (Lalumière, Harris, & Rice, 2001). Non-offender men (who did not have a measure of psychopathy taken) had lower FA than both offender groups. However, psychopathic offenders had lower FA than non-psychopathic offenders suggesting that within offender populations, psychopathy may be associated with less developmental instability compared to non-psychopathic offenders. No studies have investigated the relationship between psychopathy and FA in non-offender populations. Thus, assessment of FA can be used as a direct test of the disorder hypothesis.

Current Study

This thesis project was committed to testing an evolutionary hypothesis that considers the potential function of psychopathy in ancestral environments, which, when using an adaptationist research program, involves designing a study that can test for "special design" features of the proposed function (Andrews et al., 2002). The sexual exploitation hypothesis proposes that psychopathy is a suite of adaptations that predisposes an individual to function in a way that has beneficial effects on reproduction. The functioning manifests at the personality level (i.e., predisposing a male to specific thought patterns and behavioural tendencies) and the effects it has are at the social-interpersonal level (i.e., influencing desirability in females). Thus, this hypothesis has two considerations that guided the current study: 1) the proposed function (and thus its evolved effects) of psychopathy manifests at a social-interactional level and 2) it evolved

in males to successfully deceive and (sexually) exploit females differentially from males. In addition, the competing hypotheses also influenced how the study was to be designed to test each appropriately. The current study included a two-part methodology using a sample of university students in both to meet the experimental requirements.

Study 1. To address the first consideration above, it was important to include a study design using interpersonal interactions of individuals assessed on psychopathy. Thus, in Study 1, males were assessed on psychopathy and were video recorded during two brief interpersonally relevant contexts—a feigned remorse scenario and a dating scenario (described further in the Method section). To address the disorder hypothesis, these males were also measured on FA. These individuals were also assessed on social intelligence, personality, and sociosexual orientation (i.e., fast life history traits) to assess potential related variables to the hypotheses.

Variables. The independent variable (IV) is psychopathic traits, including the different factors and facets of the construct. The dependent variables (DVs) are FA, social intelligence, personality, and sociosexuality.

Predictions. The disorder hypothesis predicts a positive association between psychopathic traits and FA. The sexual and social exploitation hypotheses predict *no* association with FA. No association is expected (instead of a *negative* association) between psychopathy and FA because the sample consists of students and there is no expectation that *lower* levels of psychopathic traits would be related to higher FA (a necessary condition for a negative association to be found). The evolutionary hypotheses also predict a positive association with social intelligence (required to navigate social situations as an effective deceiver) and sociosexuality (more fast life history traits). The disorder hypothesis predicts there should not be a positive association with social intelligence and does not have predictions for sociosexuality.

Study 2. To address the second consideration from above (differential effect on gender), male and female students watched and rated the remorse story videos from Study 1 on judgments of genuine remorse, perception of trustworthiness, and believability. Additionally, the dating scenarios from Study 1 provided an additional test of the sexual exploitation hypothesis in Study 2 by having females view and rate these videos on different attributes of desirability and approachability. To promote the use of multiple measures, the females were also asked to provide voicemail messages to the males in the dating videos they saw, which allows for an analysis of voice pitch to assess a biological indicator of interest and attraction (Fraccaro et al., 2011). Participants in Study 2 were also assessed on social intelligence, personality, and sociosexual orientation to examine whether there is differential susceptibility from ratings in favour of higher psychopathic males.

Variables. The IV is psychopathic traits and its factors and facets from the males in Study 1. The DVs are ratings of the remorse stories, ratings of the males in the dating scenarios, and a difference score in voice pitch frequency. Remorse story ratings comprise genuineness, trustworthiness, and believability categories. Dating scenario ratings comprise overall mate value, desirability, and romantic approachability categories. Control variables (CVs) include still photograph attractiveness ratings (completed by independent raters of photographs of Study 1 participants), social intelligence of Study 1 participants, and sociosexuality of Study 1 participants. When controlling for these variables, the predicted effects may be enhanced or, if reduced, mediated[1] by those variables. Moderator variables (MVs) consisted of those variables that may inform the *differential* effect of psychopathic traits predicted by the sexual exploitation hypothesis. These include gender (necessary for the hypothesis), relationship status of females

[1] Mediation analysis was not conducted in this study. There were too few Study 1 participants to carry out this analysis (Fritz & MacKinnon, 2007).

(indicating availability or "mate searching"), social intelligence, personality traits, and sociosexuality (all measures of Study 2 participants).

An alternative analysis was also conducted with the remorse ratings, where the IV/DV relationship changed such that the DV is the aggregated ratings across either a "high psychopathy" or "low psychopathy" group (see Methods) and the MVs (social intelligence, personality, sociosexuality) are the IVs. The gender and relationship status MVs remain MVs for this alternative way of analysing the data.

Predictions. The special design prediction of the sexual exploitation hypothesis is that the IV and remorse ratings DV will show differences when accounting for the gender MV: positive associations for females and negative or no associations for males. The social exploitation hypothesis predicts that there will be a positive association between the IV and remorse ratings DV with no consideration of the gender MV (i.e., across the entire samples' ratings). The sexual exploitation hypothesis also predicts that there will be a positive association between the IV and dating scenario ratings and voice pitch difference DVs across the entire female sample. The social exploitation hypothesis claims that the reproductive benefits (i.e., sexual access and success) of psychopathy are tangential or consequential to the psychopathic individual stealing and acquiring resources by force and gaining power and status in their social group. Thus, it does not predict that there should be an association between the IV and dating scenario ratings or voice pitch difference DVs. The disorder hypothesis predicts that there will be no association, or a negative association, between the IV and *all* DVs. If there are spurious positive associations from the disorder hypothesis perspective, including the CVs in the analysis should reduce those associations dramatically.

In addition to these predictions, the sexual exploitation hypothesis also predicts there *may* be a moderated relationship between the IV and any of the DVs when considering the other MVs within the female gender, including relationship status, social intelligence, personality, and/or sociosexuality. There is a paucity of research findings to make a reasonable prediction of *how* social intelligence, personality, or sociosexuality might influence the IV/DV relationship. For relationship status, however, the sexual exploitation hypothesis may expect that single females who are potentially available and "mate searching" are differentially influenced by the IV on the various DVs compared to females in a relationship (who are not available and not "mate searching"). The social exploitation hypothesis predicts that there may also be an MV influence of social intelligence, personality, or sociosexuality as well, but *not* only for females (again, this hypothesis predicts that influence of psychopathy should be across all individuals, not just females). If the MV effect on the IV/DV relationship is found in females, this hypothesis predicts it should also be found in males. The disorder hypothesis predicts that there should be no MV affecting the IV/DV relationship since this suggests specific effects of psychopathy, a strongly opposed claim by the hypothesis.

Study 1: Method

Participants

Participants were male university students (n = 46) with a mean age M_{age} = 18.71 (SD = 1.46) and enrolled in first and second year psychology courses at Carleton University. 89.1% were heterosexual, 4.3% bisexual, and 4.3% no classification[2]. One participant was homosexual and was thus removed from all analyses for Study 2. For ethnicity, 52.2% were Caucasian, 13.0% Black, 10.9% Southeast Asian, 6.5% South Asian and Mixed ethnicity, 4.3% East Asian and Arab, and 2.2% Latin American, constituting an ethnically diverse sample.

These participants were recruited using a pool of respondents who completed the Self-Report Psychopathy Scale Short Form (SRP 4: SF; Paulhus, Neumann, & Hare, 2016) in the mass testing protocol of the 2016 Fall semester at Carleton University. Participant groups were originally planned to consist of the lowest and highest quartiles from the SRP 4: SF scores from mass testing. Thus, the principal investigator (PI; myself) sorted the mass testing codes into the lowest quartile (approximately 100 mass testing respondents) and highest quartile (approximately 100 mass testing respondents). These codes were then sent to a research assistant (RA) who then randomly choose 10 from the low and 10 from the high group. These codes were sent back to the PI, who then found the 20 emails associated with those codes and sent the corresponding email invitation to participate. This ensured that neither the PI nor the RA knew whether a participant was in the low or the high group, according to their SRP 4: SF score.

The recruitment system was changed when two problems were encountered. First, upon collecting a dozen participants, group membership of these participants was checked and it was

[2] Demonstrating any sexual interest in females was determined sufficient to fit the criteria of being included in the Study 2 analyses. Thus, the two males identifying as bisexual were included and the two males identifying no classification (one “Unsure” and one “Pansexual”) were also included for Study 2. All participants, however, regardless of sexual orientation, were included for Study 1 analyses.

identified that most participants were from the high SRP 4: SF group. Second, the available mass testing codes that had not been sent email invitations was running low. Thus, a decision was made to send email invitations to the remaining middle 50% of the male mass testing respondents, also without knowledge of their SRP 4: SF score. At the end of recruitment, email invitations had been sent to all male respondents from mass testing. The distribution of SRP 4 Total Scores (see Table 2 in Study 1 Results section) indicated adequate sampling from across different levels of the construct.

Materials

Digital Caliper. To assess fluctuating asymmetry, a Mastercraft® electronic caliper with digital display was used to measure ten distinct body areas including ear width and height, elbows, wrists, hands, three fingers, ankles, and knees (Appendix A). These areas were chosen based on previous research assessing body fluctuating asymmetry (Lalumière et al., 2001). However, whereas Lalumière et al. measured foot width in their incarcerated sample, we changed foot width to knee width since our sample consisted of students and it may have raised ethical concerns to request the removal of clothing (i.e., shoes) to complete the protocol.

Digital Camera. A Canon digital camera was used to take still photographs of participants from the waist to the top of their head against a blank white background. These photographs were used to match participants on potential confounding variables such as attractiveness, status, masculinity, etc. using blind and independent raters (Appendix L).

Video Recording Camera. A GoPro HERO3 camera was used to capture audio-video recorded data from the two video scenarios used in this study. The first scenario captures each participant engaging in a brief 2-minute dating scenario with the RA and the second scenario

captures each participant describing a story (1–3 minutes) involving remorse to the PI. Each scenario was recorded with the full consent and awareness of the participants.

Measures

Self-Report Psychopathy Scale (SRP 4; Paulhus et al., 2016). The SRP 4 is a 64-item self-report scale that was developed to measure psychopathic traits in non-offender populations. Each item is rated on a 5-point Likert scale ranging from (1) "*Strongly disagree*" to (5) "*Strongly agree*." Examples include "I'm a rebellious person," "People sometimes say that I'm cold-hearted," "I would get a kick out of 'scamming' someone," and "I have never shoplifted from a store." As illustrated here, some items are reverse-scored. The SRP 4 items are protected by copyright and are thus not included in the Appendices.

The ratings on the SRP 4 are summed to produce an SRP 4 Total Score that ranges from 64 to 320, where higher scores represent a greater manifestation of psychopathic traits. The SRP 4 was also designed to capture the two-factor, four-facet structure of the Psychopathy Checklist–Revised (PCL–R; Hare, 2003; Neumann & Hare, 2006). The four facets are Interpersonal (INT), Affective (AFF), Lifestyle (LIF), and Antisocial (ANT), and the two factors are separated into Factor 1 (INT and AFF), representing core personality traits, and Factor 2 (LIF and ANT) representing an impulsive and antisocial behavioural disposition. Therefore, the SRP 4 can break down into subscales of the factors and the facets, comprising a total of seven distinct ways of assessing aspects of psychopathy (SRP 4 Total Score, Factor 1, Factor 2, INT, AFF, LIF, and ANT; Paulhus et al., 2016). Structural equation modeling techniques substantiate the four-facet structure of the SRP 4 across reference groups (offender, student, and community) as well as across ethnic groups (Neumann et al., 2012, 2015; Paulhus et al., 2016). Gender, age, and ethnicity also do not differentially influence item responding.

The internal consistency reliability (Cronbach's alpha) of the SRP 4 in student samples is high (.92). However, scales with more items tend to produce higher alphas (Cortina, 1993; Schmitt, 1996). The Factor-level internal consistencies also provide confidence in the reliability of these subscales (Factor 1 = .88; Factor 2 = .85) as does the Facet-level internal consistencies (ranging from .76–.83). Test-retest estimates of the SRP 4 also supports its reliability over time, with correlations of .82 in a student sample (Paulhus et al., 2016) and .92 in a community sample (Gordts, Uzieblo, Neumann, Van den Bussche, & Rossi, 2017). The test-retest of the Factor and Facet Scores were also consistent across time ranging from .70 to .92 (Gordts et al., 2017; Paulhus et al., 2016).

One benefit of using the SRP 4 is that it most closely resembles the structure of the PCL–R, the gold standard of assessing the psychopathy construct, including the four-facet structure and corresponding facet-level inter-correlations. Data from an offender sample shows that individuals score similarly on the PCL–R as they do on the SRP 4, with latent correlations of the facets ranging from .36 to .77 (Paulhus et al., 2016). Other benefits of using the SRP 4 as the measure of psychopathy is that research has demonstrated its convergent, discriminant, and predictive validity. Convergent validity includes the correlations with the PCL–R as well as observer-report versions of the SRP 4 (Nathanson, Paulhus, & Williams, 2003). Discriminant validity of the SRP 4 includes patterns of correlations that are expected for psychopathy, including low correlations with specific normative personality traits such as Openness (Williams, Paulhus, & Hare, 2007). Predictive validity of the SRP 4 includes relationships with multiple measures of antisociality and objective measures of behaviour, including plagiarism (Williams, Nathanson, & Paulhus, 2010) and aggression toward others (Jones & Paulhus, 2010).

Self-Report Psychopathy Scale: Short Form (SRP 4: SF; Paulhus et al., 2016). The SRP 4: SF was administered during mass testing and was originally to be used as the basis for recruitment (i.e., sending invitations to the lowest and highest quartile scorers). It is a 29-item self-report measure with its items drawn from the full-scale SRP 4. The SRP 4: SF items were derived from parceling techniques of the best-performing items of each facet on the SRP 4 (Paulhus et al., 2016). These items contain the smallest amount of information of the SRP 4 that meaningfully captures the construct. This scale is also protected by copyright and not included in the Appendices.

HEXACO–60 (HEXACO; Ashton & Lee, 2009). The HEXACO–60 is a 60-item self-report personality measure that uses a 5-point Likert scale ranging from (1) "*strongly disagree*" to (5) "*strongly agree,*" with some items being reverse-scored (Appendix B). The HEXACO has a six-factor dimensional structure and is a validated short form of the more extensive HEXACO Personality Inventory-Revised (Lee & Ashton, in press). The HEXACO is composed of six factor dimensions underlying personality, which include (1) Honesty-Humility, (2) Emotionality, (3) Extraversion, (4) Agreeableness, (5) Conscientiousness, and (6) Openness to Experience. The HEXACO factor structure has been replicated in many different lexicons across cultures (Lee & Ashton, 2008). The internal consistency (Cronbach's alpha) of the HEXACO–60 factors in student samples is good and range from .77 to .80 (Ashton & Lee, 2009).

The Honesty-Humility factor (H factor) has been regarded as theoretically related to dark personality traits and has been found to be strongly and negatively related to psychopathy (higher H is correlated with lower psychopathic traits; Lee & Ashton, 2005). Furthermore, some evidence suggests the H factor from the HEXACO may constitute the 'core' of the Dark Triad (psychopathy, narcissism, and Machiavellianism) with variance in psychopathy largely being

explained within the core (Book, Visser, & Volk, 2015). The HEXACO was also found to be the strongest predictor of the Dark Tetrad (Dark Triad with sadism added) where the H factor was the largest predictor of psychopathy (Book, Visser, et al. 2016).

Tromsø Social Intelligence Scale (TSIS; Silvera, Martinussen, & Dahl, 2001). The TSIS is a 21-item self-report measure that assesses a three-factor structure of social intelligence, which is defined by the scale developers broadly as "the ability to understand other people and how they will react to different social situations" (Silvera et al., 2001, p. 314; Appendix C). The scale is rated on a 7-point Likert response format ranging from (1) "*describes me extremely poorly*" to (7) "*describes me extremely well*."

The scale was constructed using standard psychometric techniques (see Simms, 2008) in a sample of Norwegian university students and subsequently validated in English-speaking populations (Grieve & Mahar, 2013). The three factors are Social Information Processing (SP; e.g., "I can predict other peoples' behavior"), Social Skills (SS; e.g., "I am good at getting on good terms with new people"), and Social Awareness (SA; e.g., "I have often hurt others without realizing it"). The factors are significantly and moderately correlated with each other (rs = 0.16–0.39), the internal consistency evaluated with Cronbach's alpha range from 0.72 to 0.86 (Silvera et al., 2001), and excellent test-retest properties have been reported (r = 0.90; Grieve & Mahar, 2013). The SP factor and its items are all uniquely uncorrelated with a measure of social desirability, whereas the SS and SA items have some relation with desirable responding. Finally, gender and age do not differentially influence responding on the TSIS (Silvera et al., 2001).

Revised Sociosexual Orientation Inventory (SOI–R; Penke & Asendorpf, 2008). The SOI–R is a 9-item self-report measure of sociosexuality, a concept that captures an individual's tendency toward uncommitted sexual relationships (Penke & Asendorpf, 2008; Appendix D).

The scale is rated using 9 possible response options for each question, but vary depending on the subscale the item is grouped with. The scale separates into three distinct but correlated factors—Behavior, Attitude, and Desire—which allows for assessing each component separately or as a composite measure of "Global Sociosexuality." The Behavior subscale items are rated from (1) "*0*" to (9) "*20 or more*" to questions asking about numbers of sex partners in different contexts. The Attitude subscale items are rated from (1) "*Strongly disagree*" to (9) "*Strongly agree*" and the Desire subscale items rated from (1) "*Never*" to (9) "*At least once a day*" to questions about sexual fantasising.

Males and females tend to score differently on all factors, with males scoring significantly higher than females (Penke & Asendorpf, 2008). Internal consistency of the three subscales tend to range from alpha of .76 to .87. The SOI–R has been validated on a number of external variables including a tendency to be in a long-lasting relationship, number of sexual partners, and sensation seeking. Additionally, the three factors show differential associations with some of these external variables. The current study used a modified version of the SOI–R, adding a question that asked at what age, if at all, the participant has had sexual intercourse. Thus, the modified SOI–R contained 10 items (Appendix D).

Procedure

Recruitment. The SRP 4: SF was distributed to university students in the Fall 2016 semester at Carleton University. Email invitations to participate were then sent to male respondents from mass testing. In the recruitment email, respondents were given a description of the study and a link to the study sign-up page on SONA (Appendix E). Interested respondents then signed up for an available timeslot on their own. Participants arrived at the lab and completed all components of the study in a single one-hour visit. They were given the option of

receiving 1.0 course credit toward their psychology course or $20 cash. During the consent procedure (Appendix F), participants were informed that the study requires audio-video recording, a photograph, physical measurements, and self-report questionnaires.

Study Components. The first component had participants engage in a 2-minute dating scenario with the female RA—a fourth-year psychology student enrolled at Carleton University—while being audio-video recorded. This scenario was intended to capture a brief instance of their interpersonal style in a dating context with minimal instruction. As such, before recording began, participants were briefly introduced to the RA as a "female volunteer for the study" and then given a brief description of the purpose of the dating scenario (see Appendix G for dating scenario instructions and protocol). Both the RA and the participant were asked if they have any questions before recording began. The PI controlled the recording from within the same room, but was out of sight from both the RA and participant. These dating scenarios were recorded between a minimum of one and a half minutes to a maximum of two minutes.

The second component had participants tell a true-but-feigned remorse story to the PI while being audio-video recorded for approximately one to three minutes. The length of the video depended on how much information and details the participant chose to provide. The instructions were to recall a moment where the participant did or said something to someone else and it insulted or hurt them with the caveat that the participant did *not* feel remorse afterward (or still today) (see Appendix H for instructions and protocol). When participants recalled a time (regardless of specific content or the severity of the insult/infraction), they were then asked to tell the PI. While being recorded, however, participants were instructed to describe the story *as if they did and still do feel remorse*. No instructions on how to do this was provided and they were given the opportunity to practice before being recorded. As an incentive to be as convincing as

possible, participants were informed that the two individuals with the most convincing stories (as rated by participants from Study 2) would receive $50 (payable to their Carleton Student Card).

The third component involved taking a still photograph of the participant against a plain white background with a neutral facial expression and typical posture. The fourth component involved measuring the length and/or width of ten areas of the body to assess fluctuating asymmetry (see Appendix I for instructions and protocol). These areas included the height and width of ears, elbow width, wrist width, hand width, length of the third, fourth, and fifth fingers, ankle width, and knee width. The fifth and last component had participants complete four self-report measures including the SRP 4, TSIS, HEXACO, and SOI–R, followed by a brief demographic questionnaire (Appendix U) on a laptop computer. Participants were then debriefed (Appendix J) about the nature of the study and a post-study consent form (Appendix K) was presented to participants to ensure full disclosure and consent of the measurements and recordings taken.

Preliminary Checks of FA Data

Two researchers measured each participant on each of the 10 bilateral traits (except two participants, who did not provide knee measurements). The interrater correlations ranged from .42 (left ankle width) to .93 (left hand width) with a mean interrater correlation of .72 and the median .80 (see Table 1).

First, the raters' measurements were averaged so that a single measurement estimate was provided for each of the 20 trait measurements (left and right sides). Composite FA estimates were then calculated[3], one signed FA and one unsigned FA, taking into consideration body size. Signed FA is used to evaluate the underlying properties of the asymmetry and whether statistical

[3] signed FA = $\left(\sum_{i=1}^{10} \frac{(L-R)}{0.5(L+R)}\right)/10$, unsigned FA = $\left(\sum_{i=1}^{10} \frac{|L-R|}{0.5(L+R)}\right)/10$

tests can adequately be used on the measurements. Unsigned FA provides an absolute value used for the analysis of the FA measurements (Lalumière et al., 2001; Thornhill & Møller, 1997).

Table 1

Interrater Correlations of Fluctuating Asymmetry Measurements between the Two Raters

Measurement	Left	Right	Average
Ear width	.62**	.62**	.62
Ear height^{+}	.80**	.83**	.82
Elbow^{+}	.48*	.58**	.53
Wrist	.80**	.79**	.80
Hand^{+}	.93**	.82**	.87
3rd finger	.88**	.87**	.88
4th finger^{+}	.92**	.89**	.90
5th finger	.91**	.82**	.86
Knee^{+}	.50*	.51**	.50
Ankle^{+}	.42*	.48*	.45

Note. $N = 46$, except Knee, where $n = 44$. $^{+}$ Indicates traits included in the composite FA_6 used in analyses.
*$p < .01$. **$p < .001$.

The statistical requirements for FA analysis are a normal distribution and a mean of zero. The skewness of the signed FA was –.04 ($z = -.01$) and the kurtosis was .56 ($z = .81$) suggesting normally distributed scores. The mean of the signed FA composite was –.00456 ($SD = .01139$; 95% $CI = \pm.00338$). The minimum was –.03176 and maximum .02797. This mean value significantly differed from zero ($t(45) = -2.71$, $p = .009$), suggesting that the distribution of scores was shifted to the left, a reasonable finding in FA research that indicates directional asymmetry (DA) favouring one side: in this case, the right side.

It was necessary to then assess if any of the 10 traits showed DA, which can be eliminated from the composite score to meet statistical requirements of normal distribution and mean of zero. Of the 10, using a significance cut-off of $p < .05$, ear width, wrist width, 3rd finger length, and 5th finger length were significantly right-biased, suggesting DA in these traits across the sample. A signed composite of the remaining 6 body areas was then computed using the

same formula as before, except across 6 traits instead of 10. The mean was .00054 (*SD* = .01069; 95% *CI* = ±.00315) with a minimum of –.01878 and maximum .03114. The mean of this new six-trait composite FA did not significantly differ from zero ($t(45) = .34$, $p = .735$), correcting the DA from the ten-trait composite. Checking the normal distribution assumption, the corrected skewness was .44 ($z = 1.26$) and kurtosis was .34 ($z = .49$). These results combined with the Shapiro-Wilk statistic suggest that the data did not significantly depart from normality. Thus, the analyses of FA data use the six-trait composite (FA_6). Specifically, analyses of FA data used the unsigned FA_6 composite because this composite met the statistical requirements for analysing FA data. The mean interrater correlation for the traits used in the FA_6 composite was .68.

Study 1: Results

Descriptive Statistics and Data Screening

Table 2 displays the mean SRP 4 scores of the current sample. They suggest somewhat elevated psychopathic traits across all facets, factors, and the total score. For example, the SRP 4 Total mean of 161.63 roughly corresponds to the 76th percentile of the SRP norm data (Paulhus et al., 2016). The SRP 4 factor and facet mean scores for the current sample also correspond to roughly the 70th percentile. This may be due to the sample consisting of all males (who tend to score higher on all domains of the SRP 4), whereas the reference sample means and percentiles combined the male and female scores.

Table 2

Descriptive Statistics and Internal Consistencies of SRP 4 Total, Factors, and Facets

	Total	Factor 1	Factor 2	INT	AFF	LIF	ANT
Mean	161.63	86.78	74.85	44.96	41.83	48.59	26.26
(*SD*)	(24.97)	(14.82)	(14.17)	(9.13)	(8.60)	(9.12)	(7.05)
Alpha reliability	.89	.84	.83	.81	.78	.77	.72

Note. N = 46. SRP 4 = Self-Report Psychopathy Scale (Paulhus et al., 2016); INT = Interpersonal facet; AFF = Affective facet; LIF = Lifestyle facet; ANT = Antisocial facet; Alpha reliability = Cronbach's alpha statistic.

Internal consistency using Cronbach's alpha suggest that the facet-level subscales of the SRP 4 show comparable values to prior research (Paulhus et al., 2016), as do the longer-item factor subscales and Total Score, which is to be expected for longer-item scales (Cortina, 1993; Schmitt, 1996). In this sample, Factor 1 and Factor 2 were significantly correlated with each other, $r(46) = .48$, $p < .001$, which is consistent with estimates using the SRP 4 (Paulhus et al., 2016) and the PCL–R (Hare, 2003). The facet scores that make up each factor were strongly correlated, Interpersonal and Affective, $r(46) = .40$, $p < .001$, and Lifestyle and Antisocial, $r(46) = .53$, $p < .001$. All SRP 4 domains were assessed for departures from normality using the Shapiro-Wilk statistic. The Antisocial facet showed possible departures from normality, which tends to be positively skewed in non-criminal populations (Paulhus et al., 2016).

Table 3 provides descriptive statistics and internal consistencies for the HEXACO, TSIS, and SOI–R measures. The TSIS factors showed comparable means as previous studies using male samples (Grieve & Mahar, 2013; Silvera et al., 2001) and the internal consistencies as well, except Social Awareness, which was low. The SOI–R means were higher than what has been reported elsewhere in normative samples for males (Penke & Asendorpf, 2008). This may correspond to the higher level of psychopathic traits found in the current sample as well. The internal consistency was good for all subscales, ranging from .84 to .96.

Tests of normality (Shapiro-Wilk statistic) found that SOI–R Behavior and Social Skills statistically deviated from normal. This is expected for the SOI–R Behavior variable, which tends to be highly positively skewed across samples (Penke & Asendorpf, 2008). Transformations of the variable did not fix the issue of normality. Thus, analyses using SOI–R Behavior should keep this departure in mind. For Social Skills, examination of the distribution did not show outliers or skewness, but there was some indication of a possible bimodal distribution. Using the skewness/kurtosis and standard error assessment of normality ($z = \pm 1.96$), however, Social Skills skewness ($z = .43$) and kurtosis ($z = 1.76$) did not indicate substantial deviation from normality. Analyses conducted with Social Skills for this sample should be interpreted with this distribution in mind, and no adjustment was made to this subscale.

Examination of pairwise scatterplots and boxplots revealed no issues with outliers except for SOI–R Total and SOI–R Behavior. Standardising the SOI–R Total scores, however, indicated that the outlier was within an acceptable range ($z = 2.77 < 3.29$). For SOI–R Behavior, the standardised outlier was $z = 3.41 > 3.29$, suggesting a potential meaningful outlier. Analyses with SOI–R Behavior were conducted with and without the outlier and did not substantially change the results. Lastly, there was no missing data in the current sample.

Table 3

Descriptive Statistics and Internal Consistencies of Self-Report Measures of Study 1

Measures	*Mean* (*SD*)	Alpha reliability
HEXACO		
Honesty-Humility	3.28 (.71)	.76
Emotionality	2.79 (.79)	.78
Extraversion	3.24 (.79)	.85
Agreeableness	3.14 (.61)	.77
Conscientiousness	3.30 (.69)	.80
Openness	3.42 (.58)	.64
TSIS		
Social Information Processing	36.83 (6.22)	.87
Social Skills	32.33 (7.60)	.81
Social Awareness	32.00 (6.00)	.60
SOI–R		
Total	38.71 (14.36)	.87
Behavior	7.09 (5.60)	.96
Attitude	15.71 (6.96)	.88
Desire	15.91 (14.36)	.84

Note. N = 46. TSIS = Tromsø Social Intelligence Scale (Silvera et al., 2001); SOI–R = Revised Sociosexual Orientation Inventory (Penke & Asendorpf, 2008); Alpha reliability = Cronbach's alpha statistic.

Psychopathic Trait Correlates

Table 4 reports the correlations between the SRP 4 Total, Factor, and Facet scores and the other self-report measures. First, considering normative personality traits, SRP 4 Total Scores correlated positively with Extraversion and negatively with Honesty-Humility and Emotionality. This pattern was found across both factors as well, except that Factor 2 did not correlate significantly with Emotionality. The Interpersonal facet correlated strongly with Honesty-Humility and the Affective facet correlated strongly with Emotionality. Both Lifestyle and Antisocial facets correlated with Extraversion, but the Factor 1 facets did not.

SRP 4 Total Scores correlated positively with the Social Processing and Social Skills factors of the TSIS, but not the Social Awareness factor. Factor 1 showed the same relationships,

but Factor 2 associated only with Social Skills. Of the facets, only Interpersonal correlated significantly with Social Processing. Social Skills correlated with all facets except the Affective facet. None of the SRP 4 domains correlated significantly with Social Awareness. Lastly, all domains of the SRP 4 except the Affective facet correlated significantly with SOI–R Total. All domains correlated significantly with SOI–R Attitude. Factor 2 was significantly positively correlated with all factors of the SOI–R and the Antisocial facet specifically showed this pattern. The magnitude of these correlations suggest psychopathy is strongly related to a noncommittal attitude toward sexual relationships. These associations provide support for the sexual and social exploitation hypothesis predictions that psychopathy should be related to social intelligence.

Table 4

Bivariate Correlations of SRP 4 Total, Factor, and Facet Scores and the HEXACO, TSIS, and SOI–R

Measures	Total	Factor 1	Factor 2	INT	AFF	LIF	ANT
HEXACO							
Honesty-Humility	–.41**	–.38**	–.33*	–.51***	–.11	–.31*	–.25
Emotionality	–.33*	–.48**	–.08	–.13	–.70***	–.15	.04
Extraversion	.41**	.30*	.40**	.29	.22	.35*	.36*
Agreeableness	–.12	–.07	–.13	–.16	.05	–.17	–.05
Conscientiousness	–.02	.17	–.21	.11	.18	–.25	–.11
Openness	–.08	–.04	–.09	.11	–.19	–.05	–.12
TSIS							
Social Processing	.37*	.47**	.17	.51***	.26	.10	.21
Social Skills	.45**	.46**	.32*	.37*	.39**	.37*	.16
Social Awareness	–.16	–.16	–.11	–.24	–.02	–.09	–.11
SOI–R							
Total	.53***	.36*	.56***	.44**	.15	.52***	.45**
Behavior	.34*	.14	.45**	.15	.05	.41**	.34*
Attitude	.58***	.50***	.49**	.52***	.32*	.49**	.34*
Desire	.28	.15	.35*	.29*	–.06	.28	.33*

Note. $N = 46$. SRP 4 = Self-Report Psychopathy Scale (Paulhus et al., 2016); INT = Interpersonal facet; AFF = Affective facet; LIF = Lifestyle facet; ANT = Antisocial facet; TSIS = Tromsø Social Intelligence Scale (Silvera et al., 2001); SOI–R = Revised Sociosexual Orientation Inventory (Penke & Asendorpf, 2008).
*$p < .05$. **$p < .01$. ***$p < .001$.

Examining the intercorrelations across all variables, there may be multicollinearity between SRP 4 Total, Honesty-Humility, Extraversion, Social Skills, and to some extent Social Processing. Each variable correlated with each other in consistent linear patterns. For analyses involving Study 2, this was taken into consideration when necessary. Psychopathy and inverse Honesty-Humility are conceptually quite similar, making this relationship less of a concern when assessing outcome variable relationships. However, Extraversion, Social Skills, and Social Processing, which are conceptually distinct from psychopathy, may have a potential influence on determining the unique relationship between psychopathy and the dependent measures.

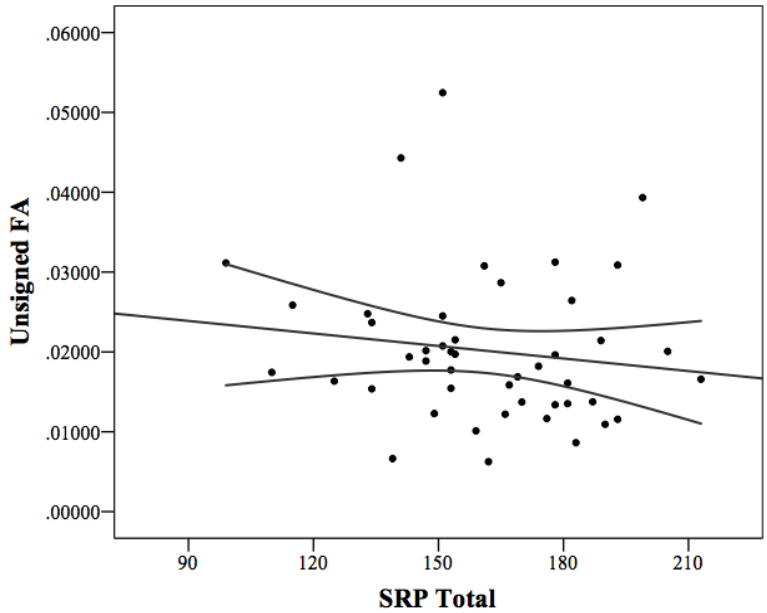
The relationship between psychopathy and sexual experience was examined next. An independent samples *t*-test was conducted on those who reported having had sex (n = 33) and those not (n =12), comparing their SRP 4 Total Scores. The overall test was significant, $t(43) = 3.73$, $p = .001$, indicating that those who reported having sex (M = 169.33, [SD = 22.65]) had significantly higher SRP 4 Total Scores than those reporting not having had sex (M = 141.50, [SD = 20.60]). The next analysis examined the correlation between the age of first sexual encounter and psychopathy. There was a non-significant negative correlation between age of first sexual encounter and SRP 4 Total Scores, $r(33) = –.11$, $p = .528$, with the Lifestyle facet having the strongest negative effect size, $r(33) = –.18$, $p = .317$. Given these findings, then, there was some evidence of psychopathy and sexual activity but not for precocious sexuality in the current student sample. These results provide some support for the sexual and social exploitation hypothesis predictions that psychopathy should be related to fast life history traits.

Fluctuating Asymmetry

The disorder hypothesis predicted that FA would be positively correlated with psychopathic traits. The two evolutionary hypotheses predicted that there would be no

relationship between psychopathy and FA. Figure 1 shows the scatterplot of SRP 4 Total Scores and the unsigned FA_6 scores. The correlation was negative and not statistically significant, $r(46) = -.14$, $p = .355$.

Figure 1. *Scatterplot of SRP 4 Total Scores and Unsigned FA_6*



The relationship between FA_6 and SRP 4 Factor and Facet Scores were examined. These correlations are shown in Table 5. No correlation was statistically significant (all $p > .05$), all effect sizes were negative, and the effect size magnitudes differed across factors and facets. Particularly, Factor 1 was comparatively more negatively correlated with FA_6 than was Factor 2. Interpersonal had the largest negative correlation of the Facet Scores. These results suggest that psychopathy as measured by the SRP 4 does not significantly correlate with FA_6. The results also suggest that the magnitudes and direction of the correlations point to evidence that those higher in psychopathic traits in a student sample may show comparatively *less* FA, especially for Factor 1 traits, and particularly for Interpersonal traits. These results are generally in line with the evolutionary hypotheses expectations and so a follow-up analysis was performed to further

explore the relationship between psychopathy and FA.

Table 5

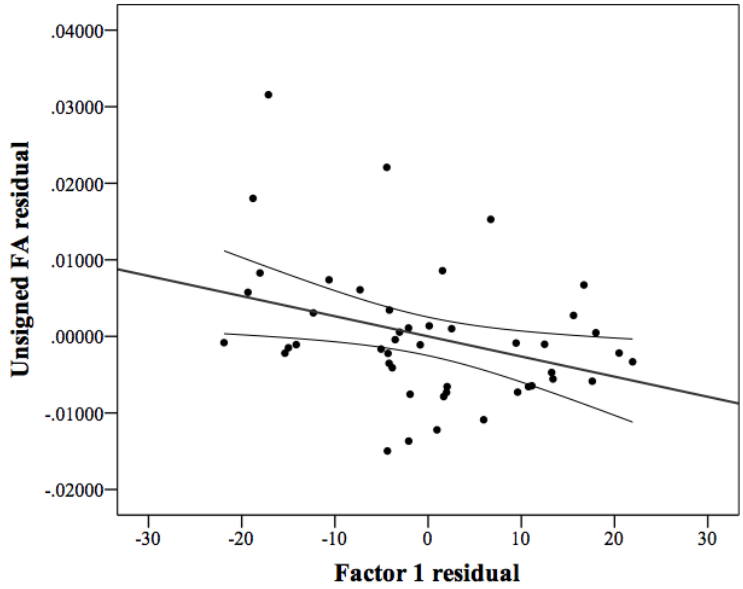
Bivariate Correlations of SRP 4 Domains and Fluctuating Asymmetry (Unsigned FA_6)

SRP 4 Domains	Pearson correlation (r)	Significance value (p)
Total	–.14	.355
Factor 1	–.21	.160
Factor 2	–.03	.867
Interpersonal	–.23	.127
Affective	–.12	.423
Lifestyle	–.02	.900
Antisocial	–.03	.862

Note. $N = 46$. SRP 4 = Self-Report Psychopathy Scale (Paulhus et al., 2016).

The post-hoc exploratory analysis examined FA_6, Factor 1, and the HEXACO personality dimensions. This exploratory analysis sought to assess the unique variance of the personality disposition captured by Factor 1 (considered the core personality traits of psychopathy) and FA_6. Since Factor 1 and Honesty-Humility are conceptually similar personality dispositions, however, the analysis excluded it. A partial correlation was performed on Factor 1 and FA_6, controlling for the remaining personality dimensions (E, X, A, C, and O). This analysis revealed a statistically significant and negative association between Factor 1 and FA, $r(39) = -.34$, $p = .028$, suggesting that Factor 1 may represent a personality disposition that is uniquely associated with less FA and thus more developmental stability (Figure 2). Although not predicted by the evolutionary hypotheses for this study, these results are in line with an evolutionary expectation that when variance in other personality dimensions are accounted for, the core personality traits of psychopathy should show relatively *more* stability.

Figure 2. *Partial Scatterplot of Factor 1 and FA_6, Controlling for Personality Dimensions*



Study 1: Discussion

The purpose of this study was to (1) evaluate the disorder hypothesis of psychopathy prediction that psychopathy will associate with relatively more developmental instability (measured by FA) and (2) evaluate correlated features between psychopathic traits and social intelligence and sociosexuality to inform the evolutionary hypotheses of psychopathy.

FA has been used as an estimate of developmental instability, which can inform the likelihood of mutation load and developmental perturbations having disrupted the development of evolutionarily-designed traits (Møller & Swaddle, 1997; Thornhill & Møller, 1997). The current study added to the limited research that has been done to assess whether psychopathic traits co-occur with higher instances of developmental instability (Lalumière et al., 2001). Indeed, the current findings provide evidence that the core personality traits of psychopathy captured by Factor 1 may be uniquely associated with *less* developmental instability. However,

the results also suggest that the traits and behaviours underlying Factor 2 may be uniquely associated with relatively *more* developmental instability.

Other research has found a positive relation between FA and aggression in boys (Manning & Wood, 1998) and possibly ADHD in male college students (Burton et al., 2003), suggesting a potential link between Factor 2, which associates with both aggression and ADHD, and FA reported here. These findings suggest a need to distinguish between the factors of psychopathy when assessing developmental instability, and this may be extended to other estimates of somatic and genetic stability, including mutation load and developmental perturbations. In terms of the hypotheses, both the social and sexual exploitation hypotheses predictions were supported and the prediction of the disorder hypothesis was not supported.

The current sample presumably comes from a low-risk population for psychiatric and other health issues (estimates of risk were not assessed in this study). Despite this, some differential asymmetry associated with psychopathic traits was still found, suggesting the importance of further assessing this association in other non-clinical populations, and even across different clinical constructs (e.g., depression, anxiety, schizoaffective syndromes).

The findings also support research that found a negative relation between psychopathic traits and FA when comparing offenders on the PCL–R (Lalumière et al., 2001). In that study, however, FA was higher in all offenders when compared to normal controls regardless of psychopathic traits. An offender population likely has increased risk associated with acquiring more FA (e.g., aggression, other correlates of developmental instability), so the comparison between normal controls and offenders may have been misguided. The results of the current study and Lalumière et al. (2001) study, however, suggest that *within* populations, psychopathic

traits may be associated with a relatively developmentally stable personality disposition that shares content across contexts but varies by that context (Paulhus et al., 2016).

The results of this study support the notion that psychopathy represents a fast life history strategy, which tend to emphasise early sexual development, promiscuous sexuality, and discounting the future for the "here and now" (Ellis et al., 2012). The evidence for fast life history traits were shown in the strong positive correlations of SRP 4 domains with the SOI–R, which provides a good measure of the different areas of fast life history traits as they relate to sexual behaviour (Penke & Asendorpf, 2008). Specifically, Factor 2 showed strong associations over all the factors of the SOI–R, including Behavior (having lots of sex with many different partners), Attitude (morals around being committed to one versus several sexual partners), and Desire (thinking about and wanting to have several sexual encounters regularly). In contrast, Factor 1 was most strongly associated with Attitude, and this was mostly driven by the Interpersonal facet. These results corroborate previous findings of fast life history traits and psychopathy (e.g., Harris et al., 2007; Jonason, Koenig, et al., 2010) and strengthen the conclusion that psychopathy evolved as a disposition favouring fast life history trade-offs.

Additionally, participants who reported having had sex had significantly higher psychopathic traits. There was a large difference in the sample sizes (n_{sex} = 33, $n_{no\ sex}$ = 12), suggesting a need for additional corroboration of this finding with future research. Lastly, however, and counter to sexual exploitation expectations, there was no significant association between age of first sexual encounter and psychopathic traits. Although there was a negative relationship, it was not significant. Previous studies have reported an association between early precocious sexuality and psychopathy (Harris et al., 2007; Seto et al., 1997; Smith & Newman, 1990). This discrepancy may be explained by the relatively small sample size (i.e., larger

sampling would indicate a significant negative association), the relatively young age of the sample (i.e., mostly first and second year university students), or that the sample involved students as opposed to offenders or community adults. The studies that found an association for precocious sexuality and psychopathy used adult, and mostly offender, samples.

The finding that psychopathy related to fast life history traits generally support the social and sexual exploitation hypotheses. Social intelligence subscales also correlated significantly with psychopathy, providing evidence for the social exploitation hypothesis, which expects social skills and processing to be necessary if psychopathy evolved to exploit others through social exchange. This finding also supports the sexual exploitation hypothesis which expects a need for social navigation skills to effectively mimic desirable traits. The finding that FA did not correlate with overall psychopathy supported both hypotheses and the unique and negative correlation with Factor 1 is in line with expectations, since it suggests a developmentally stable personality disposition, indicative of an evolved genetic plan.

In summary, the study added evidence to the literature that psychopathy contains fast life history traits, supporting the predictions of the social and sexual exploitation hypotheses, but not the disorder hypothesis. This does not provide evidence for function, however, and should instead be interpreted as an interesting landmark or artifact suggesting that psychopathy may have been shaped by evolution for some unknown quality. Study 2 better assessed the potential function of psychopathic traits in influencing the judgments and perceptions of others. It should be noted that the measures used to assess psychopathy and fast life history traits shared method variance (i.e., self-report) and thus should be corroborated with other measures including behavioural, observer-report, and biological evidence suggesting fast life history traits before this conclusion is accepted with confidence.

Study 2: Method

Participants

Participants were male and female university students (*N* = 143 with 75.5% female and 23.8% male) enrolled in first or second year psychology courses at Carleton University (M_{age} = 20.45 [*SD* = 4.17]). 85.3% of the male sample was heterosexual, 8.8% bisexual, and 5.9% homosexual. 88.9% of the female sample was heterosexual, 7.4% bisexual, and 4% reporting no classification. The sample consisted of 39.9% Caucasian, 16.8% Black, 9.8% Mixed ethnicity, and the remaining 33.5% reporting Indigenous, Arab, East Asian, Latin American, South Asian, Southeast Asian, or West Asian ethnicity. Thus, broad ethnic representation makes up this sample. Participants were recruited through SONA system online where studies are posted for Carleton students enrolled in qualifying psychology courses to sign up and participate.

Materials

Attractiveness Ratings of Study 1 Photographs. The photographs of Study 1 participants were rated by 11 independent raters on seven different characteristics: facial attractiveness, body attractiveness, masculinity, sense of style, status, grooming, and facial symmetry (Appendix L). A scale from (1) "*very unattractive/very poorly groomed/etc.*" to (7) "*very attractive/very well groomed/etc.*" was used to generate ratings. Study 1 participants were then separated into three attractiveness bins based on the mean of their facial and body attractiveness ratings across all 11 raters.

The three bins were labelled "Low attractiveness" (*n* = 16, *M* = 2.47 [*SD* = .29]), "Medium attractiveness" (*n* = 14, *M* = 3.42 [*SD* = .33]), and "High attractiveness" (*n* = 15, *M* = 4.17 [*SD* = .27]) and differed based on their mean attractiveness rating. A test of statistical difference was performed to ensure these three groups differed from each other, $F(2, 42)$ =

125.31, $p < .001$, $MSE = .09$, with all Tukey's post-hoc comparisons showing significant differences (all $p < .001$). The purpose of separating Study 1 participants based on attractiveness was to account for this potential confound in the dating scenario component of Study 2. In this way, participants in Study 2 saw dating scenario videos of two individuals from Study 1 that were matched on attractiveness (i.e., came from the same attractiveness bin). By reducing the variance in attractiveness, this allowed for better isolation of whether the key test variable—psychopathic traits—explained the variance in ratings given by Study 2 female participants.

Videos from Study 1. The feigned remorse story videos were edited (only the beginning and end of the videos, where participants may not have been ready for recording), compressed (using HandBrake software), and then uploaded to Qualtrics. Four videos were not included in the final selection. One video was not included because the participant identified as homosexual, whereas the study rationale required the testing of heterosexual (or bisexual) males. Three other videos were not included because the participants had difficulty recalling a time where they *genuinely* did not feel remorse after insulting or hurting someone. These three videos were excluded since they did not meet the *true-but-feigned* remorse criteria. Forty-two remorse videos were included.

The dating scenario videos were also edited (only the beginning and end of the videos), compressed (using HandBrake software), and uploaded to Qualtrics. Three separate blocks were created in conjunction with the three attractiveness categories from the ratings provided by the independent raters. For each participant in Study 2, Qualtrics was set up to randomly select one of the three blocks and then randomly two videos from within that block. One video was excluded because the participant identified as homosexual, resulting in a total of forty-five dating scenario videos being included.

Internal Microphone of Laptop Computer. An internal microphone from a 2016 MacBook Pro or 2013 MacBook Air laptop computer was used to collect two audio recordings from each participant. These audio recordings were approximately 10 seconds in length.

Praat Software Analyzer. Praat software analyzer version 6.0.26 is a free online software program that permits the analysis of voice pitch frequencies by using voice pitch contours. Mean pitch frequencies can be calculated over a selected part of the pitch contour.

Measures

HEXACO–60 (Ashton & Lee, 2009). The HEXACO–60 is a 60-item self-report measure of personality traits. See Study 1 for additional details on this measure (Appendix B).

Tromsø Social Intelligence Scale (TSIS; Silvera et al., 2001). The TSIS is a 21-item self-report measure of social intelligence that separates into three factors. See Study 1 for additional details on this measure (Appendix C).

Revised Sociosexual Orientation Inventory (SOI–R; Penke & Asendorpf, 2008). The SOI–R is a 9-item self-report measure assessing disposition toward sociosexuality. The current study used the modified SOI–R described in Study 1 (Appendix D).

Remorse Story Questionnaire (RSQ). After viewing each remorse story video, participants were given a 7-item self-report measure that was constructed for this study to assess ratings of remorse, trustworthiness, and believability called the RSQ (Appendix M). The RSQ has a 7-point Likert scale ranging from (1) "*strongly disagree*" to (7) "*strongly agree*." The RSQ is conceptually split in to three categories that assess ratings of (1) genuineness of remorse, (2) trustworthiness and approachability, and (3) believability of the story. Questions 1–3 formed the RSQ Remorse variable indicating a judgment of the genuineness of the remorse shown by the person in the video. Questions 4–6 formed the RSQ Trust variable that indicates the level of

trustworthiness and approachability the viewer attributes to the person in the video. Question 7 (RSQ Believable) was a standalone item that assessed being judged as having told a true story.

Dating Scenario Questionnaire (DSQ). The DSQ is a 5-item self-report measure constructed for this study that assessed female attractiveness and interest in the males from the dating scenario videos (Appendix N). The DSQ asks participants to rate their level of agreement of statements about the male participant they viewed in the video by using a 7-point Likert scale ranging from (1) "*strongly disagree*" to (7) "*strongly agree*." The DSQ included two conceptual domains that assessed desirability using (1) attitude and (2) behavioural approach ratings. The attitude domain (DSQAtt) consists of statements of attractiveness, confidence, and sexual attractiveness (Questions 1–3). The behavioural approach domain (DSQBeh) consists of statements that assess going on a date and being receptive to sexual approach (Questions 4 and 5). These were also combined to form an overall assessment of what might be considered an overall favourably desirable impression (DSQTotal).

Voice Pitch Manipulation and Analysis. Voice pitch analysis was conducted on Praat software (www.praat.org). The voice message recordings (n = 99, with two messages per participant, making a total N = 198) were saved as .mp3 files and uploaded into Praat. Voice pitch analysis was performed using the autocorrelation function and searching for pitch between 100 and 600 Hz (recommended when sampling female voices; www.praat.org). Other parameters were set to standard settings (0.03 silence threshold, 0.45 voicing threshold, 0.01 octave cost, 0.35 Octave-jump cost, and 0.14 voiced/unvoiced cost) except when background noise distorted the pitch reading (which happened for four recordings), where the "voicing threshold" parameter was reduced to 0.25 (recommended on www.praat.org FAQ). Mean pitch was recorded for each message over the span of the spoken voice message (range: ~5–15 minutes). The mean pitch

difference for each female participant was then calculated by taking the difference of the first message mean frequency and second message mean frequency[4].

Procedure

Participants arrived at the lab and completed all components of the study during a single one-hour session. For making their appointment, participants were given 1.0 course credit toward their psychology courses. Participants were taken through the consent procedure and informed about the different components of the study. In the consent procedure for female participants, the audio recording component was explained and they were shown the script that they would be reading into the microphone while being recorded. Consent was sought for all components of the study and participation did not require agreement to all the components (see Appendix O for male consent forms, Appendix P for females consent forms). Male participants completed the first two components of the study (approximately 40 minutes), whereas female participants completed these two components plus an additional component at the end, which took an additional 10 minutes.

The first component had participants watch a random selection of 10 feigned remorse videos from Study 1. Importantly, participants were not aware that the remorse stories were *feigned* remorse stories nor were they aware of whether they were *true* stories. This ambiguity was important for acquiring variance in the responses that participants would give to different stories. After each video, participants provided their ratings using the RSQ for each video and this formed the feedback that would assess how convincing the person was from the video and how trustworthy they seemed. The second component involved completing three self-report measures on a laptop computer including the HEXACO, TSIS, and SOI–R, followed by a brief

[4] Mean pitch frequency = Mean pitch (Hz) message of first video seen – mean pitch (Hz) message of second video seen.

demographic questionnaire (Appendix U) at the end. At this point, male participants were debriefed and told the true nature of the remorse stories followed by the opportunity to sign their consent with a post-study consent form (Appendix R).

Female participants moved on to the third component of the study, which had them view two paired-on-attractiveness-but-randomly-selected dating scenario videos. After watching each video, participants were given a five-item questionnaire that assessed the subjective attractiveness, confidence, and sexual appeal that the participant judged of the individual in the video. Following the questionnaire, participants were instructed on how to audio record themselves leaving a scripted voicemail message for the individual they saw in the video. Participants were informed that these messages were not going to be sent to the individuals and were for data analysis only. The script[5] appeared on the screen for them to read while recording (see Appendix Q for instructions and protocol). This procedure was repeated for the second dating scenario video.

Female participants were then debriefed on the true nature of the remorse videos and told that the audio recorded voicemail messages would be used to analyse voice pitch. They were given the opportunity to sign their consent with a post-study consent form (Appendix R) after being made aware of these aspects of the study. Additionally, during the debrief for both male (Appendix S) and female (Appendix T) participants, they were asked if they knew any individuals from the videos. This was asked because the study protocol required first impressions on the participants. Those indicating that they knew an individual from the video were asked to describe that individual and then the responses provided on the questionnaire(s) following the remorse or dating videos were deleted from the data set by the PI.

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[5] "Hi there, I saw your dating video. I'm just calling to see if you want to meet up sometime. Call me back."

Study 2: Results

Descriptive Statistics and Data Screening

Descriptive statistics and internal consistencies of self-report measures are presented in Table 6. The means of the HEXACO variables were all above the half-way point of the scale, but this is consistent with prior research (Ashton & Lee, 2009). The internal consistency of the HEXACO factors ranged from .73 to .77. The TSIS means were comparable to Study 1 means and approximate the values found in other studies (Grieve & Mahar, 2013; Silvera et al., 2001). Internal consistency for these subscales ranged from .71 to .78. The SOI–R means for each factor are relatively higher in this sample compared to previous reported samples (Penke & Asendorpf, 2008). The internal consistency ranged from .82 to .86.

Table 6

Descriptive Statistics and Internal Consistencies of Self-Report Measures of Study 2

Measures	*Mean* (*SD*)	Reliability (Cronbach's α)
HEXACO		
Honesty-Humility	3.31 (.62)	.72
Emotionality	3.42 (.64)	.76
Extraversion	3.27 (.61)	.77
Agreeableness	3.14 (.57)	.72
Conscientiousness	3.57 (.59)	.78
Openness	3.50 (.62)	.73
TSIS		
Social Information Processing	36.64 (5.10)	.71
Social Skills	32.45 (7.15)	.78
Social Awareness	33.44 (6.91)	.77
SOI-R		
Total	29.29 (13.73)	.84
Behavior	6.15 (4.36)	.82
Attitude	13.17 (7.52)	.84
Desire	9.97 (5.91)	.86

Note. N = 143. TSIS = Tromsø Social Intelligence Scale (Silvera et al., 2001); SOI–R = Revised Sociosexual Orientation Inventory (Penke & Asendorpf, 2008).

The self-report measures were not collected to be dependent variables in analyses making tests of normality unnecessary for these variables. However, examination of influential outliers was conducted. Starting with the HEXACO, examining the scatterplots and boxplots suggested potential outliers in H, E, X, A, and C. The standardised values of Honesty-Humility and Emotionality did not indicate outliers based on the ±3.29 cut-off traditionally used, but two outliers approached this cut-off value for each ($z = -3.22$ for H and $z = -3.17$ for E). Standardised values of Extraversion indicated one outlier, $z = -3.37 > \pm 3.29$, one outlier was indicated for Agreeablness standardised values, $z = -3.52 > \pm 3.29$, and standardised Conscientiousness values did not indicate substantial outliers. These outliers were examined further for their potential influence on the dependent variables during analyses and are reported separately if they differentially influenced the results.

Next, examination of the TSIS subscale scatterplots and boxplots showed potential outliers in Social Awareness only. The standardised Social Awareness values did not indicate serious outlier behaviour. The SOI–R Behavior, Desire, and Total distributions also revealed outliers, especially for SOI–R Behavior. Standardised values indicated serious outliers in SOI–R Behavior ($z = 3.40$ and 4.09), but not SOI–R Desire or Total. Outlier behavior on the SOI–R may not be a substantial issue since the mean is expected to be very low and yet some individuals can and often do score very high above this mean. However, exaggerated responding may also be an issue especially with the SOI–R Behavior subscale, suggesting a need to consider its outliers as meaningfully influencing the data. Thus, these outliers, when using SOI–R Behavior in analyses, were examined for potential influences.

Feigned Remorse Ratings

Descriptive Statistics and Diagnostics. There were two ways that the feigned remorse ratings of the Remorse Story Questionnaire (RSQ)[6] were analysed: (1) using the males of Study 1 as the independent variables and the mean ratings given to each of them as dependent variables (Overall RSQ) and (2) using the participants of Study 2 as the independent variables and the mean RSQ ratings given to the high and low psychopathy scorers as the dependent variable (High vs. Low SRP 4). Thus, both sets of dependent variables were assessed for normality and outliers.

The RSQ ratings were divided into five distinct subsamples based on the analyses that were performed on them: entire sample, male, female, single female, and females in a relationship. Evaluating RSQ ratings across the entire sample provided a test of the social exploitation hypothesis prediction that psychopathy would be associated with higher ratings overall. The male and female distinction is a test of the special design prediction of the sexual exploitation hypothesis that psychopathy will differentially influence ratings of females but not males. The single and relationship female distinction allows for a prediction of the sexual exploitation hypothesis that key demographic variables including relationship status within females may moderate the relationship between psychopathy and higher ratings. Table 7 shows the descriptive statistics of the subsample means and standard deviations.

[6] The alpha reliability could not be calculated for the RSQ subscales because participants from Study 2 saw a random sample of 10 videos and thus did not provide answers for all Study 1 participant videos. This prevented the ability to examine the reliability of the scale when considering all Study 1 participants.

Table 7

Descriptive Statistics for RSQ Ratings across Demographic Groups

Sample	RSQ Subscale/Question	*Mean (SD)*
All (*N* = 143)	Remorse	4.52 (.77)
	Trust	3.92 (.43)
	Believable	5.20 (.36)
Female (*n* = 108)	Remorse	4.45 (.81)
	Trust	3.82 (.50)
	Believable	5.20 (.37)
Male (*n* = 34)	Remorse	4.67 (.75)
	Trust	4.18 (.51)
	Believable	5.20 (.63)
Single (*n* = 47)	Remorse	4.40 (.80)
	Trust	3.79 (.60)
	Believable	5.09 (.51)
Relationship (*n* = 53)	Remorse	4.50 (.97)
	Trust	3.92 (.50)
	Believable	5.27 (.47)

Note. RSQ = Remorse Story Questionnaire.

Tests of normality using Shapiro-Wilk statistic indicated there were no significant departures from normality across these aggregated rating variables. Examination of the boxplots and histograms suggested that the male RSQ Trust rating may have an outlier. The standardised value, however, suggested that it did not depart drastically from the rest of the distribution, $z = -2.81 < \pm 3.29$. The diagnostics for RSQ Believable for all subsamples showed no significant departures from normality and no significantly deviating outliers. Diagnostics for the first way to assess the RSQ data, thus, indicated meeting the assumptions necessary for analysis.

Now, considering the second way that the RSQ data were analysed, two groups were defined by the highest ten SRP 4 Total Scores (High SRP group, $M = 193.40$ [$SD = 9.78$], *T*-Score = 68) and the lowest ten SRP 4 Total Scores (Low SRP group, $M = 139.40$ [$SD = 7.98$], *T*-Score = 49). Five participants did not see any high SRP group videos and thus do not have a mean rating for that group, and ten participants did not see any low SRP group videos. Mean ratings across all members of each group were calculated within rating participants. An

independent samples *t*-test indicated that the two groups significantly differed on the SRP 4 Total Score, $t(8) = 15.25$, $p < .001$. Table 8 shows, for each group, RSQ Remorse, Trust, and Believable cumulative mean scores across the entire sample. Analyses involving subgroups are presented later, in Table 11.

Table 8

Descriptive Statistics and Paired-Samples Differences of RSQ Ratings across High and Low SRP Groups for Entire Sample

	Mean (SD)		*t*-score
RSQ Ratings	High SRP	Low SRP	difference
Remorse	4.67 (1.33)	4.51 (1.07)	1.38
Trust	4.12 (1.16)	3.80 (1.15)	3.04*
RSQ Believable	5.27 (1.29)	4.99 (1.16)	1.59

Note. $N = 127$. RSQ = Remorse Story Questionnaire; SRP = Self-Report Psychopathy Scale (Paulhus et al., 2016).
*$p < .05$.

Data screening of these variables indicated no significant departures from normality. For the composite variables, High SRP group Trust, Low SRP group Remorse, and Low SRP group Trust, there were some indications of outliers upon examining the boxplots and histograms. Examining the standardised values, all outliers did not appear to deviate substantially from the distribution except for one case in Low SRP group Remorse, $z = -3.29$, whose value was exactly the usual cut-off for judging serious outliers. For the High SRP group and Low SRP group Trust ratings, however, there were a few individuals that spread the distribution out on both sides of the mean (i.e., caused kurtosis), which may account for the outliers. Transformations of these data were performed, which did not fix the issues of normality. Analyses conducted on these variables should be interpreted cautiously and with these issues in mind.

Overall RSQ Ratings. The social exploitation hypothesis predicted that overall ratings across the entire sample of raters would be associated with psychopathy traits, and the sexual exploitation hypothesis predicted that there would be either a moderate (driven primarily by

female ratings) or no association with overall ratings. Table 9 shows that there was some variability in the pattern of correlations such that some were negative and some positive, with varying magnitude and no significant association. However, Book, Methot, et al. (2015), doing a similar analysis, reported a significant partial correlation between Factor 1 and remorse ratings while controlling for Factor 2. This analysis was performed, examining the partial correlation between Factor 1 and RSQ Remorse, controlling for Factor 2, showing a non-significant and low magnitude correlation, $r(39) = -.001$, $p = .995$ for RSQ Remorse. Thus, discounting some methodological differences, these results do not corroborate the Book, Methot, et al. findings and thus do not support the social exploitation hypothesis.

Table 9

Bivariate Correlations of SRP 4 Domains and RSQ Ratings of Entire Sample

SRP 4 Domains	RSQ Remorse	RSQ Trust	RSQ Believable
Total	–.04	.18	.13
Factor 1	–.02	.09	.06
Factor 2	–.05	.20	.15
Interpersonal	–.03	.004	.02
Affective	.000	.15	.08
Lifestyle	.05	.20	.26
Antisocial	–.15	.15	–.004

Note. $N = 42$ (Study 1 participants). RSQ = Remorse Story Questionnaire; SRP 4 = Self-Report Psychopathy Scale (Paulhus et al., 2016).

The second objective was to evaluate differences in ratings based on the raters' gender. The sexual exploitation hypothesis predicted that there would be a significant difference in ratings between males and females and that psychopathic traits would associate with female ratings but not male ratings. First, two paired-samples *t*-tests were performed to evaluate differences and similarities across gender overall (*without* regard to psychopathy first), one each for RSQ Remorse, RSQ Trust, and RSQ Believable. RSQ Remorse ratings were significantly

correlated, $r(42) = .79$, $p < .001$, and the means across gender were significantly different, $t(41) = 3.44$, $p = .001$, whereby mean ratings of RSQ Remorse of males ($M = 4.65$ [$SD = .78$]) were statistically greater than mean ratings from females ($M = 4.38$ [$SD = .80$]). RSQ Trust ratings were not significantly correlated, $r(42) = .27$, $p = .083$. There was also a statistically significant difference in the means for RSQ Trust across gender, $t(41) = 3.85$, $p < .001$, suggesting that mean ratings of males ($M = 4.16$ [$SD = .52$]) for RSQ Trust were higher than mean ratings of females ($M = 3.80$ [$SD = .51$]). RSQ Believable ratings did not differ between gender, $t(41) = .10$, $p = .920$ (Male $M = 5.20$ [$SD = .63$], Female $M = 5.20$ [$SD = .37$]). In summary, before considering how ratings were influenced by the psychopathic traits of the males from Study 1, males and females gave comparable ratings on RSQ Remorse with males giving higher ratings overall and RSQ Trust ratings were not associated across gender but they did differ in that males tended to give higher ratings overall.

Considering bivariate correlations across gender, Table 10 shows the associations between the RSQ and the SRP 4 domains. RSQ Believable significantly correlated with the Lifestyle facet in female raters but not male raters and all other correlations were non-significant. The pattern of correlations also suggested a difference in ratings of males and females, especially for RSQ Trust and RSQ Believable. To assess the prediction that the correlations would differ in magnitude for SRP 4 Total, the RSQ Trust correlation coefficients of males and females were compared for statistical difference using Fisher's *r*-to-*z* method. This analysis indicated no significant difference between the two coefficients, $z^*(.95) = .805 < 1.645$. This analysis was also conducted on SRP 4 Total and RSQ Believable, and was marginally non-significant, $z^*(.95) = 1.572 < 1.645$. These results indicate no statistical difference between males and females for RSQ ratings, and minimal statistical difference on believability ratings across psychopathic traits

in the current sample. Although the pattern of correlations was different across gender, this was not statistically significant, which does not support the prediction of the sexual exploitation hypothesis that psychopathic traits should differentially effect the ratings of males and females. Analyses conducted later (High Versus Low SRP RSQ Ratings section) explores this potential difference between male and female raters later.

Table 10

Bivariate Correlations of SRP 4 Domains and RSQ Ratings of Males and Females

	Male Raters (n = 34)			Female Raters (n = 108)		
SRP 4 Domains	RSQ Remorse	RSQ Trust	RSQ Believable	RSQ Remorse	RSQ Trust	RSQ Believable
Total	–.12	.01	–.15	–.03	.19	.21
Factor 1	–.07	.02	–.13	–.01	.09	.12
Factor 2	–.13	–.01	–.12	–.04	.22	.22
Interpersonal	–.08	.004	–.19	–.01	.01	.11
Affective	–.03	.04	.01	–.01	.14	.08
Lifestyle	.02	.03	–.01	.05	.21	.31*
Antisocial	–.25	–.05	–.21	–.12	.18	.06

Note. RSQ = Remorse Story Questionnaire; SRP 4 = Self-Report Psychopathy Scale (Paulhus et al., 2016).
*p < .05.

The third objective was to examine whether there are differences within females for RSQ ratings. The sexual exploitation hypothesis predicted that there may be moderator variables that might influence ratings of females, but the social exploitation hypothesis predicted that moderators within females should only be relevant insofar as they also apply to male raters. Relationship status was a demographic variable that was predicted to have a potential influence, thus relationship status was split into a dichotomous variable to assess the question. Paired-samples t-tests were computed on the means of ratings of single and relationship females for RSQ Remorse, Trust, and Believable (again, without consideration for psychopathy). The

comparisons showed no difference in means across RSQ Remorse[7], $t(41) = -.67$, $p = .505$, RSQ Trust[8], $t(41) = -1.49$, $p = .143$, and marginally for RSQ Believable[9], $t(41) = -1.93$, $p = .061$, suggesting that regardless of relationship status, females tended to give comparable mean ratings. This analysis also showed that both RSQ Remorse, $r(42) = .58$, $p < .001$, and RSQ Trust, $r(42) = .54$, $p < .001$, ratings were highly correlated, but not RSQ Believable, $r(42) = .21$, $p = .176$, between single and relationship females.

Table 11 displays correlations of the SRP 4 domains and female relationship status. The Lifestyle facet significantly correlated with RSQ Believable ratings of single females but not relationship females. Single females also had consistently more positive and higher magnitude associations across the SRP 4 domains than relationship females. This potential difference was examined further by considering two additional post-hoc analyses.

Table 11

Bivariate Correlations of SRP 4 Domains and RSQ Ratings across Female Relationship Status

	Single Female Raters (n = 47)			Relationship Female Raters (n = 53)		
SRP 4 Domains	RSQ Remorse	RSQ Trust	RSQ Believable	RSQ Remorse	RSQ Trust	RSQ Believable
Total	.03	.25	.22	–.09	.16	–.002
Factor 1	–.06	.13	.08	.01	.10	.05
Factor 2	.11	.27	.27	–.14	.16	–.05
Interpersonal	–.09	–.006	.05	.06	.06	.10
Affective	.001	.22	.08	–.06	.10	–.03
Lifestyle	.12	.24	.31*	–.04	.11	.05
Antisocial	.06	.23	.15	–.22	.16	–.16

Note. RSQ = Remorse Story Questionnaire; SRP 4 = Self-Report Psychopathy Scale (Paulhus et al., 2016).
*$p < .01$.

[7] Single $M = 4.35$ [$SD = .79$], Relationship $M = 4.43$ [$SD = .97$].
[8] Single $M = 3.76$ [$SD = .61$], Relationship $M = 3.89$ [$SD = .49$].
[9] Single $M = 5.09$ [$SD = .51$], Relationship $M = 5.27$ [$SD = .47$].

First, it was reasoned that mean attractiveness and perceived status as well as social intelligence may influence the pattern of associations between single versus relationship females (i.e., these variables might influence perception of opposite-sex individuals differently depending on relationship status). Thus, partial correlations were conducted on the same ratings given by single and relationship females while controlling for these variables. In Table 12, RSQ Trust for single females positively and significantly correlated with SRP 4 Total, Factor 2, and Antisocial, which was not the same for females in a relationship. Comparing Tables 11 and 12 suggests that when controlling for attractiveness, status, and social intelligence, single females' ratings (especially trustworthiness) emerge as more strongly correlated with psychopathic traits, but this is not the same for relationship females, where the pattern of correlations largely stays the same. This result supports the sexual exploitation hypothesis prediction that some females (i.e., those single) may be preferentially affected by psychopathic traits.

Table 12

Partial Correlations of SRP 4 Domains and RSQ Ratings across Female Relationship Status

	Single Female Raters (n = 47)			Relationship Female Raters (n = 53)		
SRP 4 Domains	RSQ Remorse	RSQ Trust	RSQ Believable	RSQ Remorse	RSQ Trust	RSQ Believable
Total	.18	.36*	.29	–.10	.18	–.04
Factor 1	.06	.18	.20	.001	.10	.08
Factor 2	.21	.36*	.26	–.14	.17	–.11
Interpersonal	.04	.03	.16	.09	.07	.16
Affective	.05	.22	.12	–.08	.07	–.04
Lifestyle	.20	.29	.30	–.04	.12	.01
Antisocial	.16	.35*	.14	–.21	.19	–.23

Note. RSQ = Remorse Story Questionnaire; SRP 4 = Self-Report Psychopathy Scale (Paulhus et al., 2016). Controlled variables were Social Information Processing, Social Skills, Social Awareness, Attractiveness, and Status.
*p < .05.

The second additional analysis involved comparing the mean ratings of single and relationship females for the five highest SRP 4 Total Scores versus five lowest SRP 4 Total Scores. For this analysis, the five highest scorers were chosen instead of the ten highest scorers (i.e., which was chosen for the next set of analyses) to assess the most extreme difference possible. For the next analysis, the top ten were included because these analyses involved cumulative ratings across all raters from Study 2, and if there were only five individuals from each group (High SRP and Low SRP) then there would have been fewer data observations available for those analyses. Familywise error rate was adjusted for the current highest/lowest-five SRP analyses to account for the three independent post-hoc tests (one for each of the RSQ domains). Independent samples *t*-tests were conducted for this analysis and showed RSQ Trust ratings significantly differed from each other in single females, $t(8) = 3.15$, $p = .014$, $M_{High} = 4.33$ [$SD = .37$], $M_{Low} = 3.43$ [$SD = .52$], but not relationship females, $t(8) = 1.47$, $p = .179$, $M_{High} = 4.25$ [$SD = .21$], $M_{Low} = 3.90$ [$SD = .49$]. This indicates that the highest SRP 4 Total Scores received significantly higher mean ratings of trustworthiness from single, but not relationship females. This result also provides support for the prediction of the sexual exploitation hypothesis that psychopathy should influence the ratings of single females, but not those in a relationship.

High Versus Low SRP RSQ Ratings. The analyses shown in Table 8 were repeated for RSQ ratings given by males, females, single females, and relationship females. The results of these paired-samples *t*-tests are shown in Table 13 (familywise error rate was not adjusted since these were planned comparisons). Females, but not males, gave significantly higher RSQ Trust ($M_{High} = 4.06$ [$SD = 1.22$], $M_{Low} = 3.67$ [$SD = 1.26$]) and RSQ Believable ($M_{High} = 5.34$ [$SD = 1.19$], $M_{Low} = 4.80$ [$SD = 1.30$]) ratings for the High SRP group compared to the low SRP

group[10]. When considering females separated by relationship status, single females gave significantly higher RSQ Trust (M_{High} = 4.23 [*SD* = 1.35], M_{Low} = 3.67 [*SD* = 1.26]) and RSQ Believable (M_{High} = 5.34 [*SD* = 1.19], M_{Low} = 4.80 [*SD* = 1.30]) ratings to the High SRP group compared to the Low SRP group, but this was not the case for females in a relationship. Lastly, the only time the Low SRP group received (non-significant) higher mean ratings than the High SRP group was in the male subsample. These results provide further support for the sexual exploitation hypothesis prediction that ratings of some females should differ from those of others. These results did not inform the social exploitation hypothesis, however, because they did not assess whether the same effect would be found in male raters in a relationship versus single. There were insufficient male raters who were in a relationship to adequately analyse this potential gender comparison.

[10] Male RSQ Trust: M_{High} = 4.39 [*SD* = .93], M_{Low} = 4.22 [*SD* = 1.13]; Male RSQ Believable: M_{High} = 4.86 [*SD* = 1.40], M_{Low} = 5.15 [*SD* = 1.20].

Table 13

Descriptive Statistics and Paired-Samples Differences of RSQ Ratings across High and Low SRP by Gender and Relationship Status of Females

	Mean (*SD*)		*t*-score
	High SRP	Low SRP	difference
Males (*n* = 28)			
RSQ Remorse	4.64 (.99)	4.74 (.85)	–.56
RSQ Trust	4.39 (.93)	4.22 (1.13)	.80
RSQ Believable	4.86 (1.40)	5.15 (1.20)	–1.03
Females (*n* = 99)			
RSQ Remorse	4.75 (1.40)	4.48 (1.12)	1.54
RSQ Trust	4.06 (1.22)	3.65 (1.14)	2.97**
RSQ Believable	5.32 (1.23)	4.99 (1.13)	2.26*
Single (*n* = 43)			
RSQ Remorse	4.75 (1.35)	4.45 (1.25)	1.18
RSQ Trust	4.23 (1.35)	3.67 (1.26)	2.80**
RSQ Believable	5.34 (1.19)	4.80 (1.30)	2.10*
Relationship (*n* = 49)			
RSQ Remorse	4.66 (1.48)	4.55 (.96)	.47
RSQ Trust	3.95 (1.12)	3.71 (1.00)	1.15
RSQ Believable	5.29 (1.26)	5.19 (.98)	.56

Note. RSQ = Remorse Story Questionnaire; SRP = Self-Report Psychopathy Scale (Paulhus et al., 2016).
*$p < .05$. **$p < .01$.

The last objective of the feigned remorse ratings was to evaluate potential differences within raters (personality, social intelligence, sociosexuality) on judgments of remorse and trustworthiness of the High SRP group compared to the Low SRP group. The sexual exploitation hypothesis predicted that some personality traits in females but not males may give favourable ratings to higher psychopathy males. The social exploitation hypothesis predicted that there may be an overall effect of personality traits giving favourable ratings to the high psychopathy group, but that this would be seen across male and female raters. Since these were planned tests, the familywise error rate was not adjusted.

All regressions used a stepwise approach for entering predictors in the final model, if any. The dependent variables were either the High or Low SRP group's ratings of Remorse or Trust

(RSQ Believable was not considered). These analyses were conducted separately on males and females to assess the sexual exploitation hypothesis predictions. With the HEXACO predictors and examining female raters first, the Low SRP group did not have any significant predictors in the model for either the Remorse or Trust ratings of females. For the High SRP Remorse ratings, an overall model was significant ($F(2, 102) = 6.32$, $p = .003$, $MSE = 1.83$) with Honesty-Humility ($t(102) = –2.88$, $\beta = –.270$, $p = .005$) and Emotionality ($t(102) = 2.38$, $\beta = .224$, $p = .019$) included in the final model and an adjusted R^2 of .09. For the High SRP Trust ratings, an overall model was significant ($F(2, 102) = 4.87$, $p = .010$, $MSE = 1.33$) with Openness ($t(102) = 2.15$, $\beta = .203$, $p = .034$) and Emotionality ($t(102) = 2.13$, $\beta = .202$, $p = .035$) included in the final model and an adjusted R^2 of .07.

The same set of analyses were performed for male raters. For males, no significant predictors entered the model for either High SRP Remorse or Low SRP Remorse. However, for High SRP Trust, an overall model was significant ($F(2, 27) = 7.84$, $p = .002$, $MSE = .77$) with Honesty-Humility ($t(29) = 2.98$, $\beta = .446$, $p = .006$) and Agreeableness ($t(29) = 2.46$, $\beta = .368$, $p = .020$) included, and an overall adjusted R^2 of .31. For Low SRP Trust, an overall model was significant ($F(2, 29) = 11.33$, $p < .001$, $MSE = .73$) with Extraversion ($t(27) = 4.25$, $\beta = .618$, $p < .001$) and Honesty-Humility ($t(27) = 2.99$, $\beta = .436$, $p = .006$) included as predictors in the model, and an overall adjusted R^2 of .42 (see Table 14).

For the stepwise regression models of social intelligence and sociosexuality, one model predicting Low SRP Trust in male raters was found, but none in female raters. This model included the Social Skills factor, $t(28) = 3.05$, $\beta = .499$, $p = .005$, and had an adjusted R^2 of .22. This finding does not inform either hypothesis but suggests males higher in Social Skills gave

preferentially higher trust ratings to those who were *lower* in psychopathy and not those higher in psychopathy.

These regression model tests suggest that there were differences in genuineness and trustworthiness ratings given to males high compared to low in psychopathy depending on the raters' gender and personality, but not the raters' social intelligence (except the one case in male raters) or sociosexuality. Particularly, females high in Emotionality consistently gave high psychopathy males higher ratings, but not low psychopathy males. This same relationship was not found for male raters, where Honesty-Humility tended to influence higher ratings of genuineness and trustworthiness *regardless* of psychopathic traits. These results provide support for the sexual exploitation hypothesis prediction that psychopathy may preferentially influence the ratings of certain aspects of females (i.e., personality) and that this relationship should not generalise to those same aspects in males. Thus, these results also do not provide support for the social exploitation hypothesis predictions for generalised effect of personality in giving ratings to high versus low psychopathy males.

Table 14

Regression Model Predictors for High and Low SRP Ratings on RSQ Remorse and Trust across Gender

	Males				Females			
	High SRP (n = 32)		Low SRP (n = 30)		High SRP (n = 105)		Low SRP (n = 102)	
Predictors	Remorse	Trust	Remorse	Trust	Remorse	Trust	Remorse	Trust
Honesty-Humility		.45**		.44**	–.25**	–.11		
Emotionality		.05		.06	.22*	.20*		
eXtraversion		.05		.62***	.17	.19		
Agreeableness		.37*		.09	–.08	.12		
Conscientiousness		.05		.02	–.02	.06		
Openness		.06		.11	.12	.20*		
Overall model F		7.837**		11.333***	6.318**	4.865*		
R^2		.351		.456	.110	.087		
adj. R^2		.306		.416	.093	.069		

Note. Regression model selection of predictors was set to stepwise selection. Empty columns mean no significant predictors entered the model. Reported values of the predictors are standardised β statistics. SRP = Self-Report Psychopathy Scale (Paulhus et al., 2016); HEXACO (Ashton & Lee, 2009): H = Honesty-Humility; E = Emotionality; X = Extraversion; A = Agreeableness; C = Conscientiousness; O = Openness; Adj. R^2 = adjusted R^2.
*p < .05. **p < .01. ***p < .001.

Dating Scenario Ratings

The Dating Scenario Questionnaire (DSQ) ratings were analysed either by comparing the *relative* ratings of the two males that each female participant saw (called relative DSQ ratings) or by comparing the mean ratings that all males received across levels of psychopathy (called absolute DSQ ratings). For the relative DSQ ratings, the difference between the two males' SRP 4 Total Scores was calculated[11]. This was only conducted on the SRP 4 Total Scores since extensive time was required to identify and separately calculate which of the two males was high and which low for each female rating participant.

In addition to the SRP difference score, a difference score of DSQTotal, DSQAttitude (DSQAtt), and DSQBehaviour (DSQBeh) composites were calculated as well (see Methods for content of these subscales). These difference scores would indicate the magnitude and direction of the difference in ratings that a female participant gave to the higher versus lower psychopathy-scoring male. Positive DSQ difference scores indicate a preference for the higher psychopathy male and negative DSQ difference scores a preference for the lower psychopathy male.

Descriptive Statistics and Data Screening. The means and standard deviations of both relative and absolute DSQ[12] ratings are shown in Table 15. The mean of the relative DSQ ratings for DSQTotal and DSQAtt suggest that there was a slightly higher mean rating given to the higher psychopathy male than the lower, but this was not the case for DSQBeh. The absolute values suggest that across the Study 1 male sample, all mean ratings of the DSQ were below the midpoint of the 7-point scale used. Data screening of both relative and absolute composite ratings suggested no significant departures from normality and no significant outliers except for

[11] SRP difference score = SRP 4 Total Score of higher scoring male – SRP 4 Total Score of lower scoring male.
[12] The alpha reliability could not be calculated for the DSQ subscales because participants from Study 2 saw a random sample of 2 videos and thus did not provide answers for all Study 1 participant videos. This prevented the ability to examine the reliability of the scale when considering all Study 1 participants.

the relative DSQBeh ratings, which showed significant departures from normality and a few outliers on both ends of the distribution. Viewing the boxplots and histograms showed that the distribution appeared normal and the outliers were evenly disbursed on both sides of the distribution. The skewness of the variable was acceptable (z = .43) and the kurtosis did appear heavily spread out (z = 2.07), but evenly on both sides. Thus, the variable was left unchanged and may be interpreted with caution when used in analyses.

Table 15

Descriptive Statistics of DSQ Ratings

	Relative DSQ (n = 98)			Absolute DSQ (n = 45)		
	DSQTotal	DSQAtt	DSQBeh	DSQTotal	DSQAtt	DSQBeh
Mean (*SD*)	.15 (1.49)	.29 (1.50)	–.05 (1.73)	3.40 (.93)	3.67 (.95)	2.99 (.99)

Note. DSQ = Dating Scenario Questionnaire.

Relative DSQ Ratings. The sexual exploitation hypothesis predicted that psychopathic traits would relate to higher relative DSQ ratings, suggesting a preference for the higher psychopathy male of the two that were seen by each female. Table 16 shows the bivariate correlations between the relative DSQ ratings and the difference between the SRP 4 Total Score of the two Study 1 males. The DSQAtt composite was positively and significantly correlated with the SRP difference score. Also, the DSQTotal composite was moderately and positively correlated, but not significantly, with the SRP 4 difference score. Figure 3 shows graphically the strength of the correlation of the SRP 4 difference score and DSQAtt difference score.

Table 16

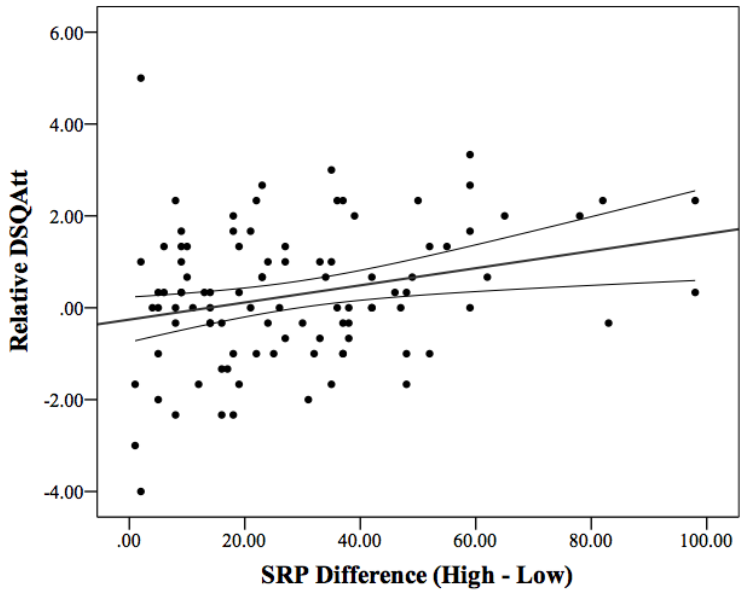
Bivariate Correlations of SRP 4 Differences and Relative DSQ Ratings

	Relative DSQTotal	Relative DSQAtt	Relative DSQBeh
Difference of SRP 4 Total Score between two males	.19	.27*	.06

Note. $N = 98$. DSQ = Dating Scenario Questionnaire; SRP 4 = Self-Reported Psychopathy Scale (Paulhus et al., 2016).
*$p < .01$.

These results indicate that the larger a difference between two males' SRP 4 Total Scores, the greater will be the relative difference in attitude ratings from females. In other words, two males who differ greatly on SRP 4 Total will tend to have females rate them more differently, and in the direction of favouring the higher psychopathy male. Thus, when males are compared, there seems to be a preference for rating higher psychopathy males as more desirable. These results provide support for the predictions of the sexual exploitation hypothesis that females should preferentially give higher ratings to psychopathic males.

Figure 3. *Scatterplot of SRP 4 Difference and Relative DSQAtt Rating*



Absolute DSQ Ratings. The sexual exploitation hypothesis also predicted that males higher in psychopathic traits would receive higher mean ratings of desirability and interest from females. Table 17 shows the bivariate correlations of the SRP 4 domains and absolute DSQ ratings. SRP 4 Total was positively and significantly correlated with DSQAtt and showed a marginally non-significant relationship with DSQTotal as well (p = .078). The results also show that Factor 2 had stronger magnitude relationships than Factor 1, and was positively and significantly related to DSQAtt. Examining the facets, Lifestyle facet showed a statistically significant positive relationship with all DSQ domains. The other facets showed positive magnitude correlations ranging in magnitude from low to moderate. Figure 4 shows a scatterplot of the relationship between Lifestyle and DSQTotal ratings that visually shows the strength and direction of the association. These results provide support for the sexual exploitation hypothesis predictions that there should be higher ratings of desirability and sexual approach from females for males who are higher in psychopathic traits. The social exploitation hypothesis prediction that psychopathic traits should not have a unique effect on influencing the sexual attitude or desirability of females was not supported by these findings.

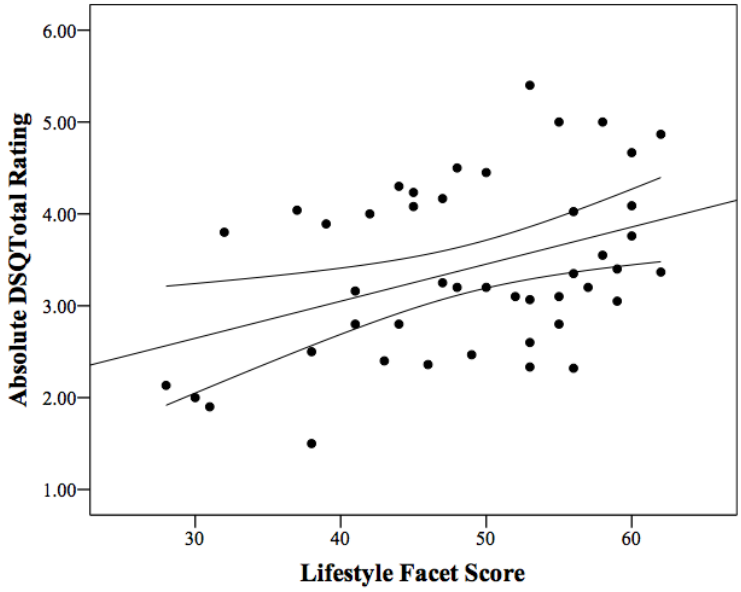
Table 17

Bivariate Correlations of SRP 4 Domains and Absolute DSQ Ratings

SRP 4 Domains	DSQTotal	DSQAtt	DSQBeh
Total	.27	.34*	.13
Factor 1	.18	.26	.06
Factor 2	.28	.33*	.18
Interpersonal	.18	.25	.06
Affective	.13	.19	.04
Lifestyle	.39**	.43**	.31*
Antisocial	.04	.09	–.04

Note. N = 45. DSQ = Dating Scenario Questionnaire; SRP 4 = Self-Reported Psychopathy Scale (Paulhus et al., 2016).
*p < .05. **p < .01.

Figure 4: *Scatterplot of SRP 4 Lifestyle Facet and DSQ Total Rating*



Voice Pitch Analysis

The sexual exploitation hypothesis predicted that there would be a relatively higher voice pitch message left for the higher psychopathy male. In addition to the mean pitch difference score for each female, the SRP 4 Total, Factor, and Facet scores of the paired males that each female participant viewed was recorded manually (considering the order of the videos seen) and difference scores created. All difference scores produced variables that did not indicate departures from normality. However, there was a serious outlier in the voice pitch difference variable ($z = 3.44 > 3.29$). Analyses were considered with and without the outlier.

Figure 5 shows the correlation between SRP 4 difference (video 1 – video 2) and mean pitch difference (video 1 – video 2), which was not significant ($r(95) = .06$, $p = .569$). This indicates that greater differences in the *overall* psychopathic traits of males did not relate to greater differences in voice pitch from females viewing their dating videos. The Factor and Facet

Score differences were also examined for relationships with mean pitch difference. Table 18 shows that the Affective difference score was positively and significantly correlated with the mean pitch difference. Discounting the outlier resulted in a marginally non-significant correlation, $r(94) = .20$, $p = .058$. Additionally, the Factor 1 difference score was positively correlated with mean voice pitch difference and was marginally non-significant ($r(95) = .19$, $p = .070$). The Factor 2 difference score, however, was negatively correlated with mean voice pitch difference ($r(95) = -.10$, $p = .330$), suggesting a possible suppression effect.

Figure 5. *Scatterplot of SRP 4 Total Difference and Voice Pitch Difference*

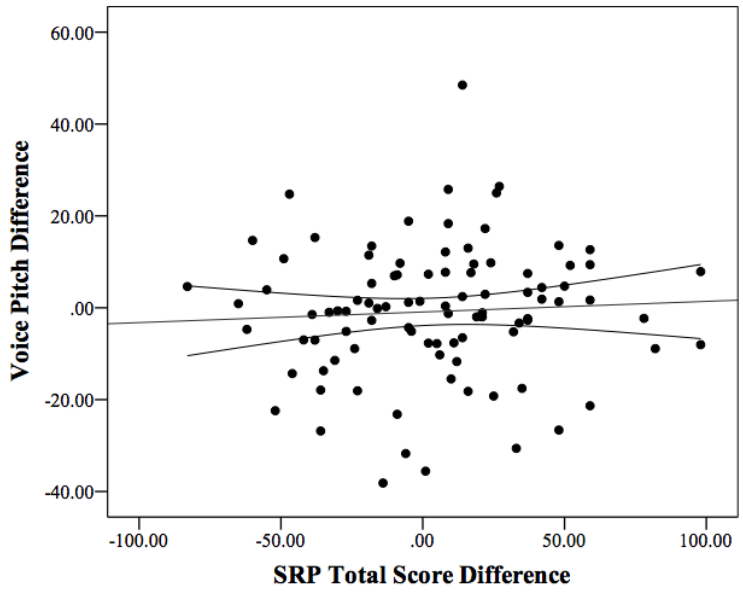


Table 18

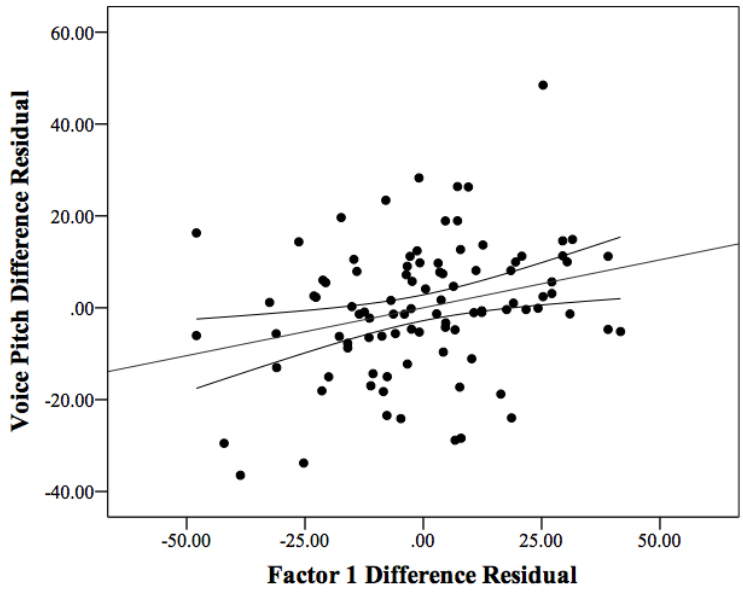
Bivariate Correlations of Mean Pitch Difference and SRP 4 Domain Differences

	Factor 1 Diff	Factor 2 Diff	INT Diff	AFF Diff	LIF Diff	ANT Diff
Mean Pitch Difference (1st – 2nd dating video)	.19	–.10	.12	.21*	–.06	–.12

Note. $N = 95$. SRP 4 = Self-Report Psychopathy Scale (Paulhus et al., 2016); Diff = Difference; INT = Interpersonal facet; AFF = Affective facet; LIF = Lifestyle facet; ANT = Antisocial facet.
*$p < .01$.

To address the potential suppression effect, Factor 1 and Factor 2 difference scores were entered into a regression model as predictors of the mean voice pitch difference. Partial correlations of the predictor variables in this model were examined to evaluate suppression effects. The overall regression model was significant ($F(2, 92) = 4.49$, $p = .014$), with an R^2 of .09. Both predictors were significant, Factor 1 difference score had a positive standardised coefficient, $\beta = .329$, $t(92) = 2.82$, $p = .006$ and Factor 2 difference score had a negative standardised coefficient, $\beta = -.273$, $t(92) = -2.34$, $p = .021$. The partial correlation from this analysis shows that when controlling for the Factor 2 difference score, the Factor 1 difference score and mean pitch difference were significantly and positively related, $r(92) = .28$, $p = .006$ (see Figure 6). Elimination of the outlier also resulted in a significant partial correlation, $r(91) = .25$, $p = .014$.

Figure 6. *Partial Scatterplot of Factor 1 Difference and Voice Pitch Difference, Controlling for Factor 2*



Overall, these results suggest that given a greater difference between the psychopathic traits (Factor 1 traits, specifically) of two males viewed separately in a dating context, females

will tend to speak in a higher mean voice pitch to the male higher in those traits. In other words, the greater the difference in Factor 1 traits, the greater the likelihood of finding a higher voice pitched message for the male higher in psychopathy. These findings provide support for the sexual exploitation hypothesis prediction that female voice pitch should increase when directed toward higher psychopathy males. The results also do not support the social exploitation hypothesis predictions that there should be no influence of psychopathy on female voice pitch. The findings of the dating scenario do not lend support to the disorder hypothesis predictions.

Study 2: Discussion

The results of Study 2 provide support for many of the sexual exploitation hypothesis predictions, including differences in ratings based on the gender of the rater (females greater than males), differences within females when considering relationship status and personality, and a greater indication of desirability from the dating scenario ratings of females and the voice pitch differences from voicemail messages. In contrast, the predictions of the social exploitation hypothesis were unmet for Study 2, particularly the prediction that psychopathy should relate to higher remorse ratings across the entire sample regardless of the gender of the rater. The disorder hypothesis predictions of no unique effects of psychopathy were also not met.

Feigned Remorse: Differential Influence of Psychopathy on the Perception of Others

The sexual exploitation hypothesis predicted that females will rate differently than males depending on the level of psychopathic traits in the male telling the story and it also predicted that ratings may be influenced by other variables within females (i.e., relationship status, personality). The social exploitation hypothesis predicted ratings would be the same across gender and that moderating variables, if they existed, would maintain effects across gender.

Overall, the remorse ratings suggest females rate differently than males (gender effect) and single females rate differently than females in a relationship (moderating relationship status effect). Personality also influenced ratings, but was specific to gender, not general across gender, also in line with the sexual but not social exploitation hypothesis predictions.

The prediction of the social exploitation hypothesis that psychopathic traits should be related to higher overall remorse ratings across the entire sample was not supported in the current study. This also failed to replicate the findings of the Book, Methot, et al. (2015) study that found this relationship specifically for Factor 1 traits. There were some notable differences between this study and the Book, Methot, et al. (2015) study that may account for this. First, Book, Methot, et al. used the Psychopathic Personality Inventory-Short Form (PPI-SF; Lilienfeld & Hess, 2001) to assess psychopathy, whereas the current sample used the SRP 4. Second, Book et al. used a single-item rating scale ranging from 1 (*not at all genuine*) to 10 (*completely genuine*) to assess genuineness, whereas this study used a three-item composite that assessed overall remorse, body language, and facial expressions rated from 1 (*strongly disagree*) to 7 (*strongly agree*).

Lastly, and crucially, there were differences across studies in the latency of time to receiving the incentivising reward. In Book, Methot et al. (2015), participants were incentivised by being told that those who convinced an independent judge of their remorse would receive a lottery ticket immediately after the study. The current study incentivised participants by telling them that the two people who received the highest remorse scores from Study 2 would receive a $50 prize after the study is complete, hence a longer, delayed latency to reward. The incentive used in this study may not have provided the same desire to exhibit remorse as the Book, Methot,

et al. incentive did because (1) it did not ask participants to convince people *in the moment* and (2) it asked them to consider a delayed (albeit relatively larger) reward.

Male and female raters tended to differ on trust and believability ratings, personality associated with higher ratings for the high psychopathy group, and the overall pattern of correlations on the RSQ. This suggests comparatively more support for the sexual exploitation hypothesis than the social exploitation hypothesis. There were fewer male raters as compared to female raters, however, so acquiring more male ratings would have been beneficial for strengthening the conclusions regarding these differences.

As predicted by the sexual exploitation hypothesis (but not social exploitation), relationship status and personality moderated the effect of psychopathic traits and ratings of females. This suggests that when passively viewing the feigned remorse stories of males who vary in psychopathy, some females (i.e., single, high on Emotionality) will tend to judge more favourably males higher in psychopathy. Single females, as "mate searching," might be influenced by the attributes of psychopathy. The relationship effect finding could not be explored for comparisons across gender because of the small sample size for males in a relationship. Emotionality—consisting of traits of dependence, sentimentality, anxiety, and fearfulness—may also be preferentially "targeted" or susceptible to the affective mimicry tactics in psychopathy. These findings together suggest a differential pattern whereby the effect of psychopathy on influencing especially trust and believability is *specific* to females over males, and *more specific* still to single/high E females over females in a relationship/low Emotionality. These findings are hard to interpret using the disorder or social exploitation hypotheses of psychopathy.

When controlling for the potential effect of attractiveness (Buss, 2016), status appearance (Buss, 1989; Tooke & Camire, 1991), and social ability (Buss & Barnes, 1986) on relationship

status in females, there was an increased association for single but not relationship females. This was predicted by the sexual exploitation hypothesis (i.e., controlling CVs), but not the social exploitation hypothesis. Particularly intriguing were the findings that the Antisocial facet of psychopathy was related to higher trustworthiness ratings of single females. The implications for this finding should be explored further. Thus, as predicted by the sexual exploitation hypothesis, the independent variable had a larger effect on the dependent variable ratings after considering control variables, specifically related to female relationship status and the RSQ.

The regressions involving personality on the high and low psychopathy ratings also provides evidence of the differential effect of psychopathic traits on generating favourable ratings from some but not others. Male raters high in Honesty-Humility seemed to indiscriminately indicate trust regardless of psychopathic traits. Counter to the social exploitation hypothesis prediction, females had different personality traits (low Honesty-Humility, high Emotionality, and high Openness) associate with ratings of high psychopathy. It is intriguing that for the high psychopathy group, higher ratings of remorse were given by females who tended to be high on Emotionality but low on Honesty-Humility. These personality traits in females may indicate trends associated with a borderline personality or histrionic personality (Hepp et al., 2014), although low Agreeableness is also associated in these personalities. However, stepwise regression was used which provides unique variance of each predictor to the dependent variable, making the joint occurrence of high Emotionality and low Honesty-Humility as predictors not necessarily meaningful.

These results also suggest that the significant associations between psychopathy and male ratings of trust explained a substantial proportion of the variance in ratings, whereas in the female ratings, the proportion of variance explained was relatively modest. There are likely

many additional factors not entered in the model that might explain this, including attractiveness and social potency of Study 1 males (these factors could not be entered as control variables for these analyses), unique preferences of Study 2 participants, and likely others as well. Focusing on the high psychopathy and male trust ratings model, Agreeableness may be a trait in males that deserves further evaluation in relation to psychopathic traits in other males. Typically, Agreeableness is inversely related to psychopathy within the same person (Lynam & Derefinko, 2006; Paulhus et al., 2016), but there may be a unique (likely exploitative) relationship between high psychopathy in some males and high Agreeableness in other males. The same *unique* relationship in males might not be said for Honesty-Humility, since this was a predictor in both the high and low psychopathy models.

There was a large difference in the sample sizes for males (n = 34) compared to females (n = 108), making these inferences about gender differences tentative until further replication is established. A study capturing only high-scoring psychopathy and low-scoring psychopathy (with more than ten participants in each group) and having their ratings evaluated across equal and large sample male and female raters would be ideal.

Psychopathic Traits in a Dating Context: Evidence for Inducing Favourability

The results of the dating scenario ratings mostly inform the sexual exploitation hypothesis and the predictions were largely supported. Attractiveness of the males was controlled for in which videos females saw. While this limited the number of overall ratings from female raters, it allowed for assessing *relative* preferences for the pair of males they viewed, taking into consideration the *difference* in their psychopathic traits. This might resemble real life situations where a female is pursued by two suitors for her attention, interest, and affections. The ratings provided in this artificial lab environment provide an estimate of the likelihood of her

preferring the higher psychopathic male compared to the lower one. Larger differences in the psychopathic scores between the males suggests a stronger assessment of whether she prefers the higher *or* the lower psychopathy male. In this study, larger differences in psychopathic traits tended to associate positively and linearly with higher ratings of desirable traits (DSQAtt). If it was the opposite (i.e., females preferred lower psychopathic males as the difference in psychopathic traits got larger), then the association would have been negative. The overall "mate value" (DSQ Total) was also positively and linearly associated, but marginally non-significant. These results are consistent with the predictions of the sexual exploitation hypothesis.

The overall ratings from females across the dating scenarios also provides information on the influence that psychopathic traits may have on forming mate preference attributions positively in their favour. This analysis supplements the finding from Holtzman and Strube (2012) that found psychopathic traits were associated with enhancing adorned attractiveness. Intriguingly, the Lifestyle traits of psychopathy were consistently and positively correlated with the entire dating scenario scale and its components: desirable traits and approachability. This suggests that males higher in these traits (e.g., sensation seeking, irresponsibility, lacking goals, impulsivity) are better at eliciting a positive impression from females in a brief dating context and even eliciting their sexual approach. That all ratings (except one) were associated *positively* across psychopathy domains is also suggestive of the influence psychopathy may have on dating relationships in forming attractive and favourable impressions.

Using either relative ratings—comparing the higher to the lower psychopathy male— or absolute ratings –those aggregated for each male from all female participants—has its pros and cons. For the current study, which males' videos were shown to females were randomised within attractiveness bins. This inevitably led to some males' videos being shown more times than

others. Thus, even though each male had their video viewed at least twice, some males had their videos viewed ten times. Since the choice of which videos to pull was random concerning psychopathic traits, however, this method was equally likely to discriminate against either high or low psychopathy males. Future methods may wish to control for how many times each males' video is viewed. The issue with the relative ratings is that which two males got paired was random. Thus, by chance there may have been a high psychopathy male (or a low psychopathy male) in any of the attractiveness bins that just so happened to influence the overall ratings. However, since the selection was random, it is equally likely to assume that a low psychopathy male who was particularly charming or a high psychopathy male who was particularly off-putting may have influenced the ratings in the opposite direction.

The voice pitch analysis of the voicemail messages provided further evidence that psychopathic traits induce favourability by affecting female voice pitch, a biological measure. Female voice pitch tends to increase with increasing attractiveness toward someone (Fraccaro et al., 2011). In this study, voice pitch *increased* more in favour of the higher Factor 1 male when there was a *greater* difference between the two males on Factor 1. However, Factor 2 showed the opposite (i.e., a negative) unique relationship. This result is intriguing in that it seems to contradict the ratings provided by females, which showed that Lifestyle traits (from Factor 2) were strongly *positively* associated with ratings of desirability.

This difference may be explained by several factors. One is that the voice pitch data provides evidence of *relative* preference for a higher Factor 1 male when two males are "competing" against each other. The ratings provide evidence of an *overall* preference for males higher in Lifestyle traits. It is conceivable that both a preference exists for higher Factor 1 traits when comparing males, but that an overall preference for Lifestyle traits is important when

looking across many, aggregated comparisons. Another possibility is that signals of preference that are *not* made available to awareness (i.e., voice pitch) may differ from signals of preference that *are* available to awareness (i.e., rating someone). Both may indicate attraction and preference, but for different qualities. A third possibility is that there may be an influential high Factor 1 male within one of the attractiveness bins that just so happened to have his video shown frequently to less influential males who were lower on Factor 1. This seems unlikely unless that same influential male was also low on Factor 2 to explain the negative relation with voice pitch. Lastly, Factor 1 and Factor 2 can vary substantially in their co-occurrence across individuals, suggesting the possibility of different latent classes of psychopathy to influence these patterns of results (Mokros, Hare, Neumann, & Nitschke, 2015; Poythress & Skeem, 2006).

In summary, Study 2 results provide some support for the expectations of the sexual exploitation hypothesis, counters some of the social exploitation hypothesis expectations, and does not align with the disorder hypothesis. When trying to elicit judgments of genuineness during deceptive emotional stories, males higher in psychopathic traits are more likely to successfully convince females over males, single females over those in a relationship, and females higher in Emotionality and low in Honesty-Humility. They subsequently can extract a veneer of approachability as indicated by higher trustworthiness ratings from females, single females, and females high in Emotionality and Openness. When viewed in a dating context, the Lifestyle traits of psychopathy tended to have females rate them as desirable and Factor 1 influenced biological cues of attractiveness (i.e., voice pitch). These findings suggest a need to explore these effects with future research.

General Discussion

Across the different analyses, this thesis provides supporting evidence for the sexual exploitation hypothesis of psychopathy, and suggests that its consideration in identifying a possible function of psychopathy be explored further. The results especially from Study 1 also suggest some support for the social exploitation hypothesis of psychopathy, but its key predictions in Study 2 were not met. However, given the constraints of study design, this hypothesis did not receive as much rigorous testing as the sexual exploitation hypothesis. This calls for more stringent tests of these competing hypotheses in future research when evaluating the potential function of psychopathy. The results did not provide supporting evidence of the disorder hypothesis of psychopathy. However, this hypothesis was only minimally tested with the current study design (i.e., fluctuating asymmetry measurements). Although failing to predict the evidence in this study for FA, more stringent tests of the disorder hypothesis should be explored as well, including mutation load, developmental perturbations, estimates of inclusive fitness, etc. across different samples of individuals assessed on psychopathic traits (Krupp, Sewall, Lalumière, Sheriff, & Harris, 2012; Lalumière et al., 2001).

Assessing the Hypotheses

Disorder Hypothesis. The results across the two studies failed to provide support for the disorder hypothesis predictions. Particularly, there was no evidence of a positive association between FA and psychopathy (or any of its facets). The disorder hypothesis also predicted (as all null evolutionary hypotheses of function do) that there should be no association between psychopathy and favourable ratings from the RSQ or DSQ, or a biological indicator of interest from voice pitch, which further fails to provide support for this hypothesis. A comprehensive model of psychopathy that integrates across multiple disciplines requires an ability to explain

effects, correlates, and observations of psychopathy from multiple levels of analysis (e.g., genetic, physiological, behavioural, interpersonal, evolutionary). The results of this study and others (Jonason, Koenig, et al., 2010; Krupp et al., 2012; Lalumière et al., 2001) make it difficult for the disorder hypothesis to hold up as a satisfying explanation to be integrated into such a comprehensive model.

Although the current findings did not use a clinical or forensic sample, the disorder hypothesis is still applicable in providing predictions and making interpretations of these data from non-clinical/non-forensic samples. This is because the disorder hypothesis infers developmental instability, mutation load, etc. as an *explanation* for observing particular traits in the human population, not that they need to manifest to a degree of causing issues in modern environments (Wakefield, 2005). Although these traits may be manifested to that extreme degree in clinical or forensic populations, they need not be absent from the normative population and thus make their presence in normative populations suggestive of disorder as well. *Variation* in psychopathic traits (in any sample) is all that is required to assess the hypothesis. This supports what Paulhus et al. (2016) have suggested, that psychopathic traits should be viewed as manifesting a similar trait content varying by context. Content forms the personality disposition, which structurally and constitutionally is the same wherever it is found, but context is the specific subpopulation where these traits are found, which may have distinct correlates, causes, etc. that make how the traits are manifested different from how they manifest in other contexts.

Social Exploitation Hypothesis. The social exploitation hypothesis views psychopathy as a general cheater and aggressor strategy that deceives and aggresses its way to acquiring reproductively relevant benefits such as influence, resources, and mates (Buss & Duntley, 2008). The relationships of psychopathy to a fast life history measure and social intelligence supports

the hypothesis, as does the finding from the FA results. However, the central notion that psychopathy exhibits an ability to influence others at a *population-general* level (i.e., indiscriminate exploitation) was not supported by this study. Studies that have assessed a social exploitation strategy have mostly relied heavily on static self-report measures to assess relationships between psychopathy and various social attributes, including affective mimicry (Book, Methot, et al., 2015), face-to-face negotiation success (Crossley, Woodworth, Black, & Hare, 2016), and successfully reading and defecting on low-value relationships (Gervais et al., 2013). Since the current study used a dynamic method, this may suggest a need for more dynamic methods to explore this functional hypothesis (also see Book, Methot, et al., 2015).

Although there is some evidence from these other studies that psychopathy exhibits a variety of advantages in various social situations, this has led the social exploitation hypothesis to assume that these advantages might explain why the traits exist (i.e., they were selected for enhancing or exacting those advantages during social exchanges.) The current study, especially the results of Study 2, however, suggests that psychopathic traits did not have an overall effect on influencing the perceptions and judgments of others at a population-general level. This means that the current study failed to provide *special design* evidence for its proposed effect. Evolutionary hypotheses that emphasise function rely heavily on special design evidence and the results of Study 2 failed to provide this of the social exploitation hypothesis. More rigorous tests that are designed to assess the specific predictions of the social exploitation hypothesis should still be carried out to corroborate the findings reported here.

Sexual Exploitation Hypothesis. The predictions of the sexual exploitation hypothesis were largely supported by the evidence from both studies and across four areas of measurement: dating scenario ratings, voice pitch, remorse story ratings, and fluctuating asymmetry. First,

psychopathy was significantly related to higher overall dating scenario ratings indicating desirable traits (mostly for Lifestyle traits). There was also evidence that larger differences in psychopathic traits between the paired males was positively associated with higher dating scenario ratings of desirable traits in favour of the higher psychopathy male. Second, in line with predictions, there was also a relationship between psychopathy and receiving higher voice pitch messages. However, this relationship was found to be specific to Factor 1, inversely to Factor 2, and not related to total psychopathy.

From Study 1, the prediction that psychopathy will be associated specifically with promiscuous, uncommitted, and precocious sexuality received mixed results. Promiscuous and uncommitted sexuality was supported based on the associations of psychopathy to the SOI–R Behavior and Attitude factors, respectively, and increased likelihood of having sex. Precocious sexuality was not supported, however, by the evidence of the study, which showed there was no relationship between age of first sexual encounter and psychopathic traits for those who have reported having sex.

Third, for the remorse ratings, the predictions involving moderator variables was most supported by the evidence. This moderation occurred between male and female raters, which provides support for the proposed *special design* features in that there may be a specific and proficient effect of psychopathy on one group but not another. Particularly for this hypothesis, however, the predictions indicating a “differential exploitability” were most supported, especially regarding single females and females who were high in Emotionality. Following the strong inference method proposed by Platt (1964), follow-up studies of the sexual exploitation hypothesis should take these differential effects into consideration when designing the next test

of the hypothesis. If these are indeed special design features, they should be corroborated with future research (Andrews et al., 2002; Simpson & Campbell, 2005).

The Sexual Exploitation Hypothesis: Big Picture Implications and Challenges Ahead

This section discusses theoretical implications and explores how the hypothesis may explain each of the facets of psychopathy to better inform its testing in future studies. First, how does the sexual exploitation hypothesis as a working model of the function of psychopathy hold up alongside the existing models involving physiology and development? One explanation that involves the models examined in this thesis would suggest that reliable (i.e., having a predictable presence throughout human history) developmental signals or triggers lead to the differential development of the paralimbic system structures (Kiehl, 2006) that in turn promote and encode a relatively reduced maturation of the VIM (Blair, 1995) and response modulation (Patterson & Newman, 1993) functions underlying brain circuits. These developmental and physiological differences would have the effect on a male individual to manifest a (albeit risky) personality disposition that causes them to exhibit *traits* promoting them as desirable mates to the opposite sex. These *traits* are the psychopathic traits captured in assessments of psychopathy (e.g., SRP 4, PCL–R). The sexual exploitation hypothesis, thus, supplements existing models.

The current study provides evidence for the sexual exploitation hypothesis and thus requires a discussion of *how* these psychopathic traits may coordinate or function as desirability optimisers. What is it about these traits that may make them effective at mimicking desirable intimate partners to females? These descriptions and the results of this study should inform predictions of the sexual exploitation hypothesis in future research (Platt, 1964).

The interpersonal traits are most obviously representative of attempts to optimise desirability: charming others, believing and convincing others of self-worth and abilities, and

manipulating and lying to either denigrate others or enhance the self. These tactics can be done unconvincingly, however, and likely require extensive social processing abilities and skills to exact them effectively and believably. That interpersonal traits correlated with SP and SS gives evidence that interpersonal traits may coexist with social processing abilities and social skills.

Affective traits may predispose an individual to be able to manifest interpersonal traits without associated feelings of shame and guilt that typically comes from being that way. Second, they may orient individuals such that they can *more easily* say one thing (i.e., "you are my soulmate"), but then do another (i.e., sleep with that person's best friend). Indeed, there is some evidence that individuals higher in psychopathic traits are less susceptible to the influence of cognitive dissonance, suggesting that they are easily able to say and do contradictory things (Murray, Wood, & Lilienfeld, 2012). This ties to Frank's (1988) commitment model, whereby people tend to be constrained by emotions of guilt, shame, and remorse to exhibit a predictable (and highly beneficial) commitment to mutually supportive prosocial values. That these are subjectively reduced or absent in psychopathy but nevertheless may still be expressed (e.g., Book, Methot, et al., 2015; Porter et al., 2011) may suggest the importance of emotional expressions in procuring a mate. With affective traits, there may be the proper expression without the attendant subjective experience of these emotions. This could allow "cheating" on the commitment that underlies those emotions. Thus, higher affective traits may optimise an individual to have a *subjectively* laissez-faire approach to commitment, allowing them to move from partner to partner without guilt, shame, remorse, or concern for their partner's interests.

The lifestyle traits of psychopathy (e.g., impulsivity, sensation seeking, lacking goals, irresponsibility) may optimise an individual's desirability by orienting them as energetic, dominant, and fun individuals. These traits may communicate in a potential romantic context

excitement, adventurousness, and "living in the moment." Indeed, there is evidence that females rank "socially exciting" as the second most important trait they look for in male partners (Buss & Barnes, 1986). In studies that examine relational boredom, a prototypically boring and undesirable relationship tends to contain features such as lack of fun, not stimulating, no more surprises, and no energy (Harasymchuk & Fehr, 2012). Lifestyle traits may signal to the opposite sex that relational boredom is very unlikely with them, and thus stimulate interest in them as potential romantic partners. The evidence from this study that lifestyle traits associated with higher dating scenario ratings supports this contention.

The antisocial traits of psychopathy (e.g., indiscriminate rule-breaking, early behaviour problems, short temper) presents a unique problem in that it is difficult to conceive of these traits being desirable. However, especially in youth, rule-breaking and antisociality may be considered attractive and "cool" as youth maneuver to distinguish themselves from the crowd and find a niche that appeals to others. These traits may predispose male youth to be opportunistic in acquiring a place higher in the social hierarchy, a desirable place to be (Cummins, 2005). More aggressive displays toward other males who acquiesce would elevate their own status in the eyes of their peers and, thus, may enhance their importance in the eyes of potential partners. There is evidence that bullying and popularity are positively correlated (de Bruyn, Cillessen, & Wissink, 2009). Alternatively, these traits may underlie the darkest side of psychopathy: sexual coercion (Lalumière, Harris, Quinsey, & Rice, 2005). From this view, antisocial traits in a dating context may be relevant when the pursued female loses interest or expresses a lack of interest in moving to the next level of the relationship. In support of this, Proulx (2016) described how the sexual offending psychopath typology is one who manipulates and charms until a female agrees to become intimate, but if she does not, then he becomes aggressive and coercive.

A theoretical implication of the sexual exploitation hypothesis requires consideration of the interaction between sexual and natural selection. Sexual selection can produce completely arbitrary display traits and mating preferences for those displays that are “merely beautiful” to the observer that do not need to increase survival (Prum, 2017). This observation suggests that what one sex finds desirable can produce a strong selection pressure on its own. The theoretical implication is that psychopathy may represent a strategy that optimises effort in appealing to mate preferences in the opposite sex (extreme sexual selection strategy) at the expense of traits that ensure stability and survival of the next generation (extreme natural selection strategy). This natural selection strategy compromised in psychopathic males might include traits that promote male-male bonds associated with responsibility, shared purpose, and self-sacrifice, among others.

Since any stable population requires a bias in favour of natural selection pressures (Dawkins, 1976; Williams, 1966), most males will exhibit this strategy, and “choosing” this strategy would more reliably provide fitness benefits, for both males and females (Hrdy, 1999). However, there would also exist a pressure for some males to exhibit the strategy that appeals exclusively to female mate choice (see Kirkpatrick, 1982; Lande, 1981). Based on this observation, a more contentious theoretical implication is that the mate preferences of females as they currently are across human cultures (Buss, 1989) and time (Souza, Conroy-Beam, & Buss, 2016) provide a niche for psychopathic traits to exist. In other words, without female mate preferences for traits like dominance, confidence, sincerity/kindness, etc., there would be no psychopathy. This implication gets dangerously into the territory of “victim blaming” and thus should be approached cautiously and only as evidence suggests. Additionally, the subjective experiences of victimised individuals who have been in a relationship with psychopathic

individuals should not be ignored, whether mate preference traits were influential or not (Deck, 2017; Humeny, 2016; Kirkman, 2005).

Lastly, the sexual exploitation hypothesis should be examined in future research for whether it appeals more to a long- and/or short-term sexual strategy of females (Buss & Schmitt, 1993). The Factor 1 traits might appeal to the long-term sexual strategy—feigning honesty, sincerity, manipulating and deceiving others into believing they are committed. Future research guided by the sexual exploitation hypothesis may want to make predictions that implicate Factor 1 in generating more favourable impressions from females who tend towards a slow life history or long-term sexual strategy on tasks that examine emotion expression, commitment, and other long-term sexual strategy traits of interest. The Factor 2 traits might appeal to the short-term sexual strategy—excitement, adventurousness, toughness and dominance.

On the other hand, females who tend toward a fast life history or short-term sexual strategy may find the traits of Factor 2 more appealing because of the signals of virility, excitement, and energy that they portray. One potential study could ask males assessed on psychopathy to make dating profile videos describing something exciting they have done and then having females rate those males on attractiveness and sexual interest. These suggestions also have a theoretical implication in that they suggest psychopathy may function (with its two combined factors) to opportunistically exploit the two major sexual strategies of females. In this way, this might suggest that the "prototypical" psychopaths who scores high on all facets would be the most exploitative and yet most extreme sexually selected male.

Psychopathy as Design: Implications of Adaptation

Returning to the fundamental question that stimulated this thesis project, the current study hoped to show that it can be a fruitful research endeavour to explore the disorder/design

dichotomy in psychopathy (Glenn et al., 2011). Entertaining this question with an honest effort can stimulate interesting research that deepens our understanding of psychopathic traits and why we see them in the human population. Part of this endeavour must consider hypotheses of proposed functions of psychopathy that test for design features (Andrews et al., 2002; Mayr, 1961; Tinbergen, 1963). These hypotheses should be supplemented with, instead of in opposition to, current models of psychopathy, including models that may *assume* disorder (e.g., Blair, 1995; Kiehl, 2006; Patterson & Newman, 1993).

In concluding, evidence that psychopathy is an adaptation demonstrates that the traits we see in psychopathy *were selected or shaped* to be that way across evolutionary time. Using the methods of evolutionary science and evolutionary inference (Simpson & Campbell, 2005; Tooby & Cosmides, 1990), this can be a powerful method of discovery. Evidence of disorder is the exact opposite: the traits were not shaped to be that way, but instead are that way because something went wrong genetically or developmentally. This helps illustrate why psychopathy and autism, although both considered disorders by conventional standards, are not necessarily both disorders from an evolutionary perspective. There has yet to be a convincing argument that autistic traits *were selected or shaped* to be the way they are by evolutionary forces. Instead, there is accumulating evidence that they occur when a selected trait (e.g., the social orienting response in infancy) fails to develop or trigger properly, which in turn has substantial downstream effects on subsequent development that culminates in autism (Rutherford, 2007). Psychopathy, however, has a plausible evolutionary mechanism (the sexual *or* social exploitation mechanism) that prevents it from being a disorder in evolutionary terms (Wakefield, 1992).

Applied Implications

The findings from this thesis have implications in victim research and recovery, counselling services, especially relationship counselling, and forensic treatment. The current study found that women may be more trusting of and believe the deceptive stories of men higher in psychopathy. Additionally, there was evidence that women who have an emotional disposition (e.g., dependence, anxiety, fearfulness) may preferentially judge as more genuine the emotional expressions of deceptive men and subsequently show higher levels of trust toward them. These more favourable judgments and approach-related impressions may lead some women to be more likely to interact with (either passively or actively) and enter relationships with men high in psychopathy, suggesting that there may be a "type" of woman who "loves" (or is influenced by) psychopaths more than others (Brown, 2008).

These findings may supplement what is found in victim research. For example, psychopathic traits may influence accurate judgments about previously victimised women (Book et al., 2013; Wheeler et al., 2009). The relationship between victimisation and an emotional disposition is one worth exploring further, but the findings from this study may suggest that deception of psychopathic men has a greater effect on those showing higher dependence, anxiety, etc., which may lead to victimisation of these women. This makes for a very volatile potential relationship, and one that can cause severe distress (Deck, 2017; Kirkman, 2005).

The findings also have implications for relationship counselling services. Walker's (1979) cycles of abuse model says that intimate partner violence is often repeated in cyclical fashion between extremes of an acting-out phase (abuse, violence) and a honeymoon phase (apologies, affection). These phases may suggest a mechanism where psychopathic men and dependent, anxious women are locked in a unique cycle of abuse that is self-perpetuating. In this

unique cycle, the honeymoon phase may be compounded by (1) the charm and desirable qualities exhibited in psychopathic men and (2) the dependence and fearfulness of emotional women. Counselling services provided to women in abusive relationships may benefit from knowing the results of this study. Apart from this volatile relationship, the findings also suggest implications for single women who are currently "mate searching." In this situation, women concerned with exploitation may be encouraged to evaluate and test the qualities of potential mates over a longer period and in different contexts to assess whether the desirable traits are genuine.

Lastly, evidence of evolutionary function has implications for treatment and intervention. Since functions are specific to context and are reliably developing in those contexts, if psychopathy's function is to mimic desirable intimate partners, this consideration can assist with guiding what can and cannot be changed in treatment (Wakefield, 2005). For instance, treatments that target recidivism reduction without considering what makes psychopaths recidivists may be short-sighted. In turn, what makes psychopaths recidivists may be compounded by their disposition to appear as relatively more desirable than other men (e.g., ruthlessly acquiring resources and power, aggressing against others for gain, sexual aggression when this does not pay off, etc.). At minimum, keeping function in mind when planning treatment and interventions can assist with organising what is likely *not* to work and to look for plans that can work with, instead of against, the "goals and motivations" of the traits (Ellis et al., 2012).

Limitations and Future Directions

Several limitations should be addressed and noted in this study. The sample size of Study 1 was smaller than ideal to capture a robust estimate of males varying on psychopathic traits across the entire spectrum. Larger sample sizes that capture psychopathic traits more robustly across the scale would provide more powerful tests of the hypotheses. In Study 2, there was also

a sample size issue in that there were substantially more female than male raters. Future studies using students may want to sample from different faculties (i.e., engineering, mathematics) to level the asymmetry of gender.

Methodological issues are also noteworthy. The feigned remorse stories may have been especially difficult for low psychopathy males to do well. Indeed, the current study had to discount three feigned remorse videos from analysis since the participants who told these stories were unable to find a genuinely remorseless story that they experienced. In other words, they did feel remorseful after the event that they described in the stories that they told. Two of these participants scored among the lowest psychopathy scores, suggesting that discounting them prevented from sampling from among the lower psychopathy scores and thus limits the overall analysis (i.e., relatively more stories clustered among those higher in psychopathy).

This suggests that alternative methods to feigned remorse stories that assess the influence of psychopathy on others' perceptions should be used in future studies. If assessing the special design nature of the sexual exploitation hypothesis is to be kept in mind (influence of females but not males), then studies should incorporate methods that can test equally across gender (i.e., not simply dating scenarios) such as dyadic interactions during problem-solving tasks, forming first impressions from short video clips, or the "fast friends" procedure (Aron, Melinat, Aron, Darrin Vallone, & Bator, 1997). The feigned remorse stories also used a questionable method for incentive. As noted earlier, the incentive likely should have involved orienting participants to want to convince someone *in the moment* while telling the story (instead of a hypothetical audience in the camera) and the reward may have more appropriately been a shorter latency reward (see Book, Methot, et al., 2015).

Another consideration for future research is the potential limitation with using remorse as the emotion for the current study. This emotion was chosen because of the success from previous research (Book, Methot, et al., 2015) and remorse represents an important emotion in displaying depth of emotion within the commitment model perspective (Frank, 1988), which is an appealing characteristic when seeking potential mates (Buss & Barnes, 1986). However, remorse may also be unappealing to those who may pursue a faster life history strategy or are interested in short-term sexual partners (Buss & Schmitt, 1993). Instead of examining a single emotion, future studies can explore the effect that psychopathy has on generating favourable impressions from females (sexual exploitation hypothesis) when asked to express or feign different types of emotions while telling true stories or feigned stories. Ultimately, the sexual exploitation hypothesis should promote testing the overall tendency of psychopathic males to use emotion deceptively during conversation with females, convince them, and then gain their favour.

A few issues in the dating scenarios are also worth noting. All dating scenarios took place with the PI in the same room as the "date" (although the PI was out of sight). This may have made some participants feel awkward and uncomfortable but not others (which might create unsystematic error). Future studies using dating scenarios can address this issue either by having the person doing the video recording in another room or using alternative methods. For example, some researchers have used a pre-recorded dating profile that is played to the opposite sex, who are led to believe it is real-time, during a simulated online date (Hill, DelPriore, Ellis, & Proffit-Leyva, 2017). Methods that use real-time and in-person dates as opposed to video recorded dates would be a powerful test of the sexual exploitation hypothesis. Another issue involves the RA. It was beneficial that the same female RA was present for all dating scenarios to eliminate variance in the dating partner for the participants. However, participants may have been differentially

attracted to or affected by the female RA. Additionally, the relationship status of the male participants was not recorded. Future protocols may want to assess these limitations by asking male participants their relationship status in the demographics questionnaire and asking them to rate their attraction toward the female RA after completing the dating scenario as well.

Although there was a significant relationship of psychopathy difference scores to both voice pitch frequency and dating scenario ratings, this analysis limited what can be said from this study regarding the *relative* comparisons and preferences of females for psychopathic traits since the grouped-males differed on psychopathy to varying degrees across each female viewer. Another method would have been to choose *one* pair of males from each of the attractiveness bins and matched on other variables (e.g., ethnicity, age, social intelligence) but differing greatly in psychopathic traits. Differential ratings and voice pitch frequencies using this method would provide corroborating and more precise evidence of the role of psychopathic traits in influencing favourability in females.

Regarding the FA measurements, there were somewhat lower interrater reliability on the traits that were used in the FA_6 composite compared to what has been reported elsewhere (Lalumière et al., 2001). Additionally, FA may not provide a viable measurement of "genetic quality" (Jennions & Møller, 2002; Palmer, 1999), which may draw into question the appropriateness of FA being used to assess the disorder hypothesis. However, others have made the case that FA is still a unique and appropriate inverse estimate of developmental stability, which combines effects of genetic and environmental factors in determining an over stable developmental trajectory (Møller & Swaddle, 1997; Thornhill & Møller, 1997).

Conclusion

This thesis incorporated in its study design the testing of multiple competing hypotheses to address a fundamental question of whether psychopathic traits represent an evolved adaptation through selection and design or an instance of genuine disorder through mechanism failure and malfunction (Chamberlain, 1890/1965; Wakefield, 1992). This distinction matters: one embodies a notion that psychopathy shows functional features toward something in its environment, and hence is "purposeful," and the other suggests errors in genetics and development where effects seen in psychopathy are inconsequential and incidental. Depending on which of these lenses psychopathy is viewed through, what to do about it will differ in the applied fields that closely contact this personality disposition (e.g., forensic, psychiatric, counselling, business).

With effort to explore this distinction, this thesis sought to develop and test a plausible evolutionary hypothesis of psychopathy that focuses on the potential function level of analysis (Tinbergen, 1963; Williams, 1966) and to use special design evidentiary standards when developing a study to test the hypothesis (Andrews et al., 2002; Simpson & Campbell, 2005).

The study examined the perception (i.e., watching videos), judgment (i.e., RSQ Remorse, DSQ), and response (i.e., RSQ Trust, voice messages) after viewing varying levels of psychopathic traits manifested in two interpersonally relevant and dynamic contexts—dates and stories involving emotion. Methods using dynamic contexts may be preferable when examining the function of traits than static contexts (i.e., self-report) and the goal should be to incorporate multiple outcome measures (Simpson & Campbell, 2005). Thus, because of the method design of this study, the results can be viewed as a genuine test of the proposed and alternative hypotheses. The findings from across measures suggest that the sexual exploitation hypothesis was most supported by the evidence and thus requires further attention and research.

References

Aamodt, M. C., & Custer, H. (2006). Who can best catch a liar? A meta-analysis of individual differences in detecting deception. *The Forensic Examiner*, *Spring*, 6–11.

Andrews, P. W., Gangestad, S. W., & Matthews, D. (2002). Adaptationism--how to carry out an exaptationist program. *Behavioral and Brain Sciences*, *25*, 489–504. http://doi.org/10.1017/S0140525X02000092

Aron, A., Melinat, E., Aron, E. N., Vallone, R. D., & Bator, R. J. (1997). The experimental generation of interpersonal closeness: A procedure and some preliminary findings. *Personality and Social Psychology Bulletin*, *23*, 363–377. http://doi.org/0803973233

Ashton, M. C., & Lee, K. (2009). The HEXACO-60: A short measure of the major dimensions of personality. *Journal of Personality Assessment*, *91*, 340–345. http://doi.org/10.1080/00223890902935878

Babiak, P., & Hare, R. D. (2007). *Snakes in suits*. New York, NY: Harper.

Blair, R. J. R. (1995). A cognitive developmental approach to morality: Investigating the psychopath. *Cognition*, *57*, 1–29. http://doi.org/10.1016/0010-0277(95)00676-P

Blair, R. J. R. (2006). The emergence of psychopathy: Implications for the neuropsychological approach to developmental disorders. *Cognition*, *101*, 414–442. http://doi.org/10.1016/j.cognition.2006.04.005

Book, A., Costello, K., & Camilleri, J. A. (2013). Psychopathy and victim selection: The use of gait as a cue to vulnerability. *Journal of Interpersonal Violence*, *28*, 2368–2383. http://doi.org/10.1177/0886260512475315

Book, A., Methot-Jones, T., Blais, J., Hosker-Field, A., Volk, A., Visser, B. A., … DAgata, M. T. (2016). Psychopathic traits and the cheater-hawk hypothesis. *Journal of Interpersonal Violence*, 1–23. http://doi.org/10.1177/0886260516669168

Book, A., Methot, T., Gauthier, N., Hosker-Field, A., Forth, A., Quinsey, V., & Molnar, D. (2015). The mask of sanity revisited: Psychopathic traits and affective mimicry. *Evolutionary Psychological Science*, *1*, 91–102. http://doi.org/10.1007/s40806-015-0012-x

Book, A. S., & Quinsey, V. L. (2004). Psychopaths: Cheaters or warrior-hawks? *Personality and Individual Differences*, *36*, 33–45. http://doi.org/10.1016/S0191-8869(03)00049-7

Book, A., Visser, B. A., Blais, J., Hosker-Field, A., Methot-Jones, T., Gauthier, N. Y., … D'Agata, M. T. (2016). Unpacking more "evil": What is at the core of the dark tetrad? *Personality and Individual Differences*, *90*, 269–272. http://doi.org/10.1016/j.paid.2015.11.009

Book, A., Visser, B. A., & Volk, A. A. (2015). Unpacking "evil": Claiming the core of the Dark Triad. *Personality and Individual Differences*, *73*, 29–38. http://doi.org/10.1016/j.paid.2014.09.016

Brown, S. (2008). *Women who love psychopaths*. Penrose, NC: Mask Publishing.

Buller, D. J. (2005). *Adapting minds*. Cambridge, MA: MIT Press.

Burton, C., Stevenson, J. C., Williams, D. C., Everson, P. M., Mahoney, E. R., & Trimble, J. E. (2003). Attention-deficit hyperactivity disorder (AD/HD) and fluctuating asymmetry (FA) in a college sample: An exploratory study. *American Journal of Human Biology*, *15*, 601–619. http://doi.org/10.1002/ajhb.10179

Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioral and Brain Sciences*, *12*, 1–49. http://doi.org/10.1017/S0140525X00023992

Buss, D. M. (1995). Evolutionary psychology: A new paradigm for psychological science. *Psychological Inquiry*, *6*, 1–30.

Buss, D. M. (1998). Sexual strategies theory: Historical origins and current status. *The Journal of Sex Research*, *35*, 19–31. http://doi.org/10.1080/00224499809551914

Buss, D. M. (2009). How can evolutionary psychology successfully explain personality and individual differences? *Perspectives on Psychological Science*, *4*, 359–366. http://doi.org/10.1111/j.1745-6924.2009.01138.x

Buss, D. M. (2016). *The evolution of desire*. New York, NY: Basic Books.

Buss, D. M., Abbott, M., Angleitner, A., Asherian, A., Biaggio, A., Blanco-Villasenor, A., … Yang, K.-S. (1990). International preferences in selecting mates: A study of 37 cultures. *Journal of Cross-Cultural Psychology*. http://doi.org/10.1177/0022022190211001

Buss, D. M., & Barnes, M. (1986). Preferences in human mate selection. *Journal of Personality and Social Psychology*, *50*, 559–570. http://doi.org/10.1037/0022-3514.50.3.559

Buss, D. M., & Duntley, J. D. (2008). Adaptations for exploitation. *Group Dynamics: Theory, Research, and Practice*, *12*, 53–62. http://doi.org/10.1037/1089-2699.12.1.53

Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review*, *100*, 204–232.

Cale, E. M., & Lilienfeld, S. O. (2002). Sex differences in psychopathy and antisocial personality disorder: A review and integration. *Clinical Psychology Review*, *22*, 1179–1207. http://doi.org/10.1016/S0272-7358(01)00125-8

Chamberlin, T. C. (1965). The method of multiple working hypotheses. *Science*, *148*, 754–759. http://doi.org/10.1086/629752

Cleckley, H. (1950/2015). *The mask of sanity: An attempt to clarify some issues about the so-called psychopathic personality* (2nd ed.). Mansfield Centre, CT: Martino Publishing.

Coid, J., & Yang, M. (2008). The distribution of psychopathy among a household population: Categorical or dimensional? *Social Psychiatry and Psychiatric Epidemiology*, *43*, 773–781. http://doi.org/10.1007/s00127-008-0363-8

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, *78*, 98–104. http://doi.org/10.1037/0021-9010.78.1.98

Crossley, L., Woodworth, M., Black, P. J., & Hare, R. (2016). The dark side of negotiation: Examining the outcomes of face-to-face and computer-mediated negotiations among dark personalities. *Personality and Individual Differences*, *91*, 47–51. http://doi.org/10.1016/j.paid.2015.11.052

Cummins, D. (2005). Dominance, status, and social hierarchies. In D. M. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 676–697). Hoboken, NJ: John Wiley & Sons.

Darwin, C. (1859/2008). *The origin of species*. New York, NY: Bantam Classics.

Dawkins, R. (1976). *The selfish gene*. New York, NY: Oxford University Press.

Dawkins, R. (1982). *The extended phenotype: The long reach of the gene*. New York, NY: Oxford University Press.

Dawson, G., Meltzoff, A. N., Osterling, J., Rinaldi, J., & Brown, E. (1998). Children with autism fail to orient to naturally occuring social stimuli. *Journal of Autism and Developmental Disorders*, *28*, 479–485. http://doi.org/10.1023/A:1026043926488

Deck, E. (2017). *Manipulation tactics: The role of love bombing and gas-lighting in psychopathic intimate relationships*. (Unpublished honours thesis). Carleton University: Ottawa, Ontario.

Dutton, K. (2013). *The wisdom of psychopaths*. New York, NY: Scientific American.

de Bruyn, E. H., Cillessen, A. H. N., & Wissink, I. B. (2009). Associations of peer acceptance and perceived popularity with bullying and victimization in early adolescence. *The Journal of Early Adolescence*, *30*, 543–566. http://doi.org/10.1177/0272431609340517

de Waal, F. B. M. (2006). *Primates and philosophers*. Princeton, NJ: Princeton University Press.

Ellis, B. J., Del Giudice, M., Dishion, T. J., Figueredo, A. J., Gray, P., Griskevicius, V., … Wilson, D. S. (2012). The evolutionary basis of risky adolescent behavior: Implications for science, policy, and practice. *Developmental Psychology*, *48*, 598–623. http://doi.org/10.1037/a0026220

Ellis, B. J., Figueredo, A. J., Brumbach, B. H., & Schlomer, G. L. (2009). Fundamental dimensions of environmental risk: The impact of harsh versus unpredictable environments on the evolution and development of life history strategies. *Human Nature*, *20*, 204–268. http://doi.org/10.1007/s12110-009-9063-7

Ermer, E., Cope, L. M., Nyalakanti, P. K., Calhoun, V. D., & Kiehl, K. A. (2012). Aberrant paralimbic gray matter in criminal psychopathy. *Journal of Abnormal Psychology*, *121*, 649–58. http://doi.org/10.1037/a0026371

Ermer, E., Cope, L. M., Nyalakanti, P. K., Calhoun, V. D., & Kiehl, K. A. (2013). Aberrant paralimbic gray matter in incarcerated male adolescents with psychopathic traits. *Journal of the American Academy of Child and Adolescent Psychiatry*, *52*, 94–103. http://doi.org/10.1016/j.jaac.2012.10.013

Feinberg, D. R., DeBruine, L. M., Jones, B. C., & Perrett, D. I. (2008). The role of femininity and averageness of voice pitch in aesthetic judgments of women's voices. *Perception*, *37*, 615–623. http://doi.org/10.1068/p5514

Fisher, R. A. (1935). The evolution of sexual preference. *Eugenics Review*, *7*, 184–192.

Fraccaro, P. J., Jones, B. C., Vukovic, J., Smith, F. G., Watkins, C. D., Feinberg, D. R., … Debruine, L. M. (2011). Experimental evidence that women speak in a higher voice pitch to men they find attractive. *Journal of Evolutionary Psychology*, *9*, 57–67. http://doi.org/10.1556/JEP.9.2011.33.1

Frank, R. H. (1988). *Passions within reason*. New York, NY: Norton.

Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science*, *18*, 233–239. http://doi.org/10.1111/j.1467-9280.2007.01882.x

Geary, D. C., Vigil, J., & Byrd-Craven, J. (2004). Evolution of human mate choice. *The Journal of Sex Research*, *41*, 27–42.

Gervais, M. M., Kline, M., Ludmer, M., George, R., & Manson, J. H. (2013). The strategy of psychopathy: Primary psychopathic traits predict defection on low-value relationships. *Proceedings of the Royal Society - Biological Sciences*, *280*, 20122773. http://doi.org/10.1098/rspb.2012.2773

Glenn, A. L., Efferson, L. M., Iyer, R., & Graham, J. (2017). Values, goals, and motivations associated with psychopathy. *Journal of Social and Clinical Psychology*, *36*, 108–125. http://doi.org/10.1521/jscp.2017.36.2.108

Glenn, A. L., Kurzban, R., & Raine, A. (2011). Evolutionary theory and psychopathy. *Aggression and Violent Behavior*, *16*, 371–380. http://doi.org/10.1016/j.avb.2011.03.009

Gordts, S., Uzieblo, K., Neumann, C. S., Van den Bussche, E., & Rossi, G. (2017). Validity of the Self-Report Psychopathy Scales (SRP-III full and short versions) in a community sample. *Assessment*, *24*, 308–325. http://doi.org/10.1177/1073191115606205

Gottschall, J. (2015). *The professor in the cage*. New York, NY: Penguin.

Graham, J. H., Raz, S., Hel-Or, H., & Nevo, E. (2010). Fluctuating asymmetry: Methods, theory, and applications. *Symmetry*, *2*, 466–540. http://doi.org/10.3390/sym2020466

Grant, P. R., & Grant, B. R. (2006). Evolution of character displacement in Darwin's finches. *Science*, *313*, 224–226. http://doi.org/10.1126/science.1128374

Grieve, R., & Mahar, D. (2013). Can social intelligence be measured? Psychometric properties of the Tromsø Social Intelligence Scale – English Version. *The Irish Journal of Psychology*, *34*, 1–12. http://doi.org/10.1080/03033910.2012.737758

Griskevicius, V., Tybur, J. M., Delton, A. W., & Robertson, T. E. (2011). The influence of mortality and socioeconomic status on risk and delayed rewards: A life history theory approach. *Journal of Personality and Social Psychology*, *100*, 1015–1026. http://doi.org/10.1037/a0022403

Harari, Y. N. (2014). *Sapiens: A brief history of humankind*. Toronto, ON: Signal Books.

Harasymchuk, C., & Fehr, B. (2013). A prototype analysis of relational boredom. *Journal of Social and Personal Relationships*, *30*, 627–646. http://doi.org/10.1177/0265407512464483

Hare, R. D. (1991). *Manual for the Hare Psychopathy Checklist–Revised*. Toronto, ON: Multi-Health Systems.

Hare, R. D. (1993). *Without conscience: The disturbing world of the psychopaths among us*. New York, NY: Guilford Press.

Hare, R. D. (2003). *The Hare Psychopathy Checklist–Revised, 2nd Edition*. Toronto, ON: Multi-Health Systems.

Hare, R. D., & McPherson, L. M. (1984). Psychopathy and perceptual asymmetry during verbal dichotic listening. *Journal of Abnormal Psychology*, *93*, 141–149. http://doi.org/10.1037/0021-843X.93.2.141

Harpending, H. C., & Sobus, J. (1987). Sociopathy as an adaptation. *Ethology and Sociobiology*, *8*, 63S–72S.

Harpur, T. J., & Hare, R. D. (1991). Psychopathy and attention. In J. Enns (Ed.), *The development of attention: Research and theory* (pp. 429–444). Amsterdam: North-Holland.

Harrington, A. (1972). *Psychopaths...* New York, NY: Simon and Schuster.

Harris, G. T., Rice, M. E., Hilton, N. Z., Lalumiere, M. L., & Quinsey, V. L. (2007). Coercive and precocious sexuality as a fundamental aspect of psychopathy. *Journal of Personality Disorders*, *21*, 1–27. http://doi.org/10.1521/pedi.2007.21.1.1

Hepp, J., Hilbig, B. E., Moshagen, M., Zettler, I., Schmahl, C., & Niedtfeld, I. (2014). Active versus reactive cooperativeness in Borderline Psychopathology: A dissection based on the HEXACO model of personality. *Personality and Individual Differences*, *56*, 19–23. http://doi.org/10.1016/j.paid.2013.08.013

Hill, S., DelPriore, D. J., Ellis, B. J., & Proffit-Leyva, R. P. (2017, June). *The effects of paternal disengagement on women's perceptions of male mating intent*. Talk presented at 29th annual Human Behavior and Evolution Society conference, Boise, Idaho.

Holtzman, N. S., & Strube, M. J. (2012). People with dark personalities tend to create a physically attractive veneer. *Social Psychological and Personality Science*, *4*, 461–467. http://doi.org/10.1177/1948550612461284

Hrdy, S. B. (1999). *Mother nature*. New York, NY: Ballantine Books.

Humeny, C. (2016). *Somatic marker functioning during recovery from a romantic relationship with a psychopathic abuser: An examination of mental health, resilience, and post-traumatic growth in social decision making*. (Unpublished doctoral dissertation). Carleton University: Ottawa, Ontario.

Jennions, M. D., & Møller, A. P. (2002). Relationships fade with time: A meta-analysis of temporal trends in publication in ecology and evolution. *Proceedings of the Royal Society of London B: Biological Sciences*, *269*, 43–48. http://doi.org/10.1098/rspb.2001.1832

Jonason, P. K., Koenig, B. L., & Tost, J. (2010). Living a fast life: The Dark Triad and life history theory. *Human Nature*, *21*, 428–442. http://doi.org/10.1007/s12110-010-9102-4

Jonason, P. K., Li, N. P., & Buss, D. M. (2010). The costs and benefits of the Dark Triad: Implications for mate poaching and mate retention tactics. *Personality and Individual Differences*, *48*, 373–378. http://doi.org/10.1016/j.paid.2009.11.003

Jonason, P. K., Li, N. P., Webster, G. D., & Schmitt, D. P. (2009). The Dark Triad: Facilitating a short-term mating strategy in men. *European Journal of Personality*, *23*, 5–18. http://doi.org/10.1002/per.698

Jones, A. G., Walker, D., Kvarnemo, C., Lindström, K., & Avise, J. C. (2001). How cuckoldry can decrease the opportunity for sexual selection: Data and theory from a genetic parentage analysis of the sand goby, Pomatoschistus minutus. *Proceedings of the National Academy of Sciences of the USA*, *98*, 9151–9156. http://doi.org/10.1073/pnas.171310198

Jones, D. N. (2014). Predatory personalities as behavioral mimics and parasites: Mimicry-deception theory. *Perspectives on Psychological Science*, *9*, 445–451. http://doi.org/10.1177/1745691614535936

Jones, D. N., & de Roos, M. S. (2016). Validating the four components of Mimicry Deception Theory from the victim's perspective. *Personality and Individual Differences*, *95*, 37–39. http://doi.org/10.1016/j.paid.2016.02.019

Jones, D., & Paulhus, D. (2010). Different provocations trigger aggression in narcissists and psychopaths. *Social Psychological and Personality Science*, *1*, 12–18. http://doi.org/10.1177/1948550609347591

Kaplan, H. S., & Gangestad, S. W. (2005). Life History Theory and evolutionary psychology. In D. M. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 68–95). Hoboken, NJ: John Wiley & Sons.

Ketelaar, T., & Ellis, B. J. (2000). Are evolutionary explanations unfalsifiable? Evolutionary psychology and the Lakatosian philosophy of science. *Psychological Inquiry*, *11*, 1–21. http://doi.org/10.1207/S15327965PLI1101

Kiehl, K. A. (2006). A cognitive neuroscience perspective on psychopathy: Evidence for paralimbic system dysfunction. *Psychiatry Research*, *142*, 107–128. http://doi.org/10.1016/j.psychres.2005.09.013

Kiehl K. A. (2014). *The psychopath whisperer: The science of those without conscience*. New York, NY: Crown Publishers.

Kirkman, C. A. (2005). From soap opera to science: Towards gaining access to the psychopaths who live amongst us. *Psychology and Psychotherapy: Theory, Research and Practice*, *78*, 379–396. http://doi.org/10.1348/147608305X26666

Kirkpatrick, M. (1982). Sexual selection and the evolution of female choice. *International Journal of Organic Evolution*, *36*, 1–12.

Krupp, D. B., Sewall, L. A., Lalumière, M. L., Sheriff, C., & Harris, G. T. (2012). Nepotistic patterns of violent psychopathy: Evidence for adaptation? *Frontiers in Psychology*, *3*, 1–8. http://doi.org/10.3389/fpsyg.2012.00305

Lalumière, M. L., Harris, G. T., Quinsey, V. L., & Rice, M. E. (2005). *The causes of rape*. Washington, DC: American Psychological Association.

Lalumiere, M. L., Harris, G. T., & Rice, M. E. (2001). Psychopathy and developmental instability. *Evolution and Human Behavior*, *22*, 75–92. http://doi.org/10.1016/S1090-5138(00)00064-7

Lande, R. (1981). Models of speciation by sexual selection on polygenic traits. *Proceedings of the National Academy of Sciences of the United States of America*, *78*, 3721–3725. http://doi.org/10.1073/pnas.78.6.3721

Lee, K., & Ashton, M. C. (2005). Psychopathy, Machiavellianism, and Narcissism in the Five-Factor Model and the HEXACO model of personality structure. *Personality and Individual Differences*, *38*, 1571–1582. http://doi.org/10.1016/j.paid.2004.09.016

Lee, K., & Ashton, M. C. (2008). The HEXACO personality factors in the indigenous personality lexicons of English and 11 other languages. *Journal of Personality*, *76*, 1001–1054. http://doi.org/10.1111/j.1467-6494.2008.00512.x

Lee, K., & Ashton, M. C. (in press). Psychometric properties of the HEXACO-100. *Assessment*.

Lilienfeld, S. O., & Hess, T. H. (2001). Psychopathic personality traits and somatization : Sex differences and the mediating role of negative emotionality. *Psychopathology*, *23*, 11–24. Retrieved from http://www.springerlink.com/index/m10mx27mj8k55022.pdf

Lynam, D. R., & Derefinko, K. J. (2006). Psychopathy and personality. In C. J. Patrick (Ed.), *Handbook of psychopathy* (pp. 133–155). New York, NY: Guilford.

MacMillan, J., & Kofoed, L. (1984). Sociobiology and antisocial personality: An alternative perspective. *The Journal of Nervous and Mental Disease*, *172*, 701–706.

Manning, J. T., & Wood, D. (1998). Fluctuating asymmetry and aggression in boys. *Human Nature*, *9*, 53–65. http://doi.org/10.1007/s12110-998-1011-4

Maynard Smith, J., & Price, G. R. (1973). The logic of animal conflict. *Nature*, *246*, 15–18. http://doi.org/10.1038/254463b0

Mayr, E. (1983). How to carry out the adaptationist paradigm? *The American Naturalist*, *121*, 324. http://doi.org/10.1086/284064

Mayr, E. (1961). Cause and effect in biology. *Science*, *134*, 1501–1506.

Mealey, L. (1995). The sociobiology of sociopathy: An integrated evolutionary model. *Behavioral and Brain Sciences*, *18*, 523–599.

Mokros, A., Hare, R. D., Neumann, C. S., & Nitschke, J. (2015). Variants of psychopathy in adult male offenders: A latent profile analysis. *Journal of Abnormal Psychology*, *124*, 372–386. http://doi.org/10.1037/abn0000042

Møller, A. P., & Swaddle, J. P. (1997). *Asymmetry, developmental instability, and evolution*. Oxford: Oxford University Press.

Moore, M. M. (2010). Human nonverbal courtship behaviour: A brief historical review. *Journal of Sex Research*, *47*, 171–180. http://doi.org/10.1080/00224490903402520

Mundy, P., & Neal, R. A. (2001). Neural plasticity, joint attention, and a transactional social-orienting model of autism. In L. M. Glidden (Ed.), *International review of research in mental retardation: Autism* (pp. 139–168). San Diego, CA: Academic Press.

Muñoz, L. C., Khan, R., & Cordwell, L. (2011). Sexually coercive tactics used by university students: A clear role for primary psychopathy. *Journal of Personality Disorders*, *25*, 28–40. http://doi.org/10.1521/pedi.2011.25.1.28

Murray, A. A., Wood, J. M., & Lilienfeld, S. O. (2012). Psychopathic personality traits and cognitive dissonance: Individual differences in attitude change. *Journal of Research in Personality*, *46*, 525–536. http://doi.org/10.1016/j.jrp.2012.05.011

Nathanson, C., Paulhus, D. L., & Williams, K. M. (2003, May). Body modification as an indicator of personality. In D. L. Paulhus (Chair), *Less than zero acquaintance: Perceptions of personality based on minimal information*. Symposium conducted at the 83rd annual meeting of the Western Psychological Association, Vancouver, Canada.

Neumann, C. S., & Hare, R. D. (2006). The PCL-R assessment of psychopathy: Development, structural properties, and new directions. In C. J. Patrick (Ed.), *Handbook of psychopathy* (pp. 58–88). New York, NY: Guilford.

Neumann, C. S., Hare, R. D., & Pardini, D. A. (2015). Antisociality and the construct of psychopathy: Data from across the globe. *Journal of Personality*, *83*, 678–692. http://doi.org/10.1111/jopy.12127

Neumann, C. S., Schmitt, D. S., Carter, R., Embley, I., & Hare, R. D. (2012). Psychopathic traits in females and males across the globe. *Behavioral Sciences & the Law*, *30*, 557–574. http://doi.org/10.1002/bsl.2038

Newman, J. P., & Wallace, J. (1993). Psychopathy and cognition. In K. S. Dobson & P. C. Kendall (Eds.), *Psychopathology and cognition* (pp. 293–349). San Diego, CA: Academic Press.

Palmer, A. R., & Strobeck, C. (1986). Fluctuating asymmetry: Measurement, analysis, patterns. *Annual Review of Ecology and Systematics*, *17*, 391–421.

Palmer, R. (1999). Detecting publication bias in meta-analysis: A case study of fluctuating asymmetry and sexual selection. *The American Naturalist*, *154*, 220–233.

Patterson, C. M., & Newman, J. P. (1993). Reflectivity and learning from aversive events: Toward a psychological mechanism for the syndromes of disinhibition. *Psychological Review*, *100*, 716–736. http://doi.org/10.1037/0033-295X.100.4.716

Paulhus, D. L., Neumann, C. S., Hare, R. D. (2016). *Self-Report Psychopathy Scale 4th Edition Technical Manual*. Toronto, ON: Multi-Health Systems.

Peace, K. A., Porter, S., & Almon, D. F. (2011). Sidetracked by emotion: Observers' ability to discriminate genuine and fabricated sexual assault allegations. *Legal and Criminological Psychology*, *17*, 322–335. http://doi.org/10.1111/j.2044-8333.2011.02013.x

Pemment, J. (2013). Psychopathy versus sociopathy: Why the distinction has become crucial. *Aggression and Violent Behavior*, *18*, 458–461. http://doi.org/10.1016/j.avb.2013.07.001

Penke, L., & Asendorpf, J. B. (2008). Beyond global sociosexual orientations: A more differentiated look at sociosexuality and its effects on courtship and romantic relationships. *Journal of Personality and Social Psychology*, *95*, 1113–1135. http://doi.org/10.1037/0022-3514.95.5.1113

Platt, J. R. (1964). Strong inference. *Science*, *146*, 347–353.

Popper, K. (2002). *The logic of scientific discovery*. New York, NY: Routledge. (Original work published 1935).

Porter, S., ten Brinke, L., Baker, A., & Wallace, B. (2011). Would I lie to you? “leakage” in deceptive facial expressions relates to psychopathy and emotional intelligence. *Personality and Individual Differences*, *51*, 133–137. http://doi.org/10.1016/j.paid.2011.03.031

Poythress, N. G., & Skeem, J. L. (2006). Disaggregating psychopathy: Where and how to look for subtypes. In C. J. Patrick (Ed.), *Handbook of psychopathy* (pp. 172–192). New York: Guilford.

Proulx, J. (2016, February). *Pathways to sexual aggression*. The Don Andrews Memorial Lecture, Department of Psychology Colloquium Series. Carleton University, Ottawa, Ontario.

Prum, R. O. (2017*). The evolution of beauty: How Darwin's forgotten theory of mate choice shapes the animal world--and us*. New York, NY: Doubleday.

Regan, P. C., & Berscheid, E. (1997). Gender differences in characteristics desired in a potential sexual and marriage partner. *Journal of Psychology & Human Sexuality*, *9*, 25–37. http://doi.org/10.1300/J056v09n01_02

Renninger, L. A., Wade, T. J., & Grammer, K. (2004). Getting that female glance: Patterns and consequences of male nonverbal behavior in courtship contexts. *Evolution and Human Behavior*, *25*, 416–431. http://doi.org/10.1016/j.evolhumbehav.2004.08.006

Ribeiro da Silva, D., Rijo, D., & Salekin, R. T. (2015). The evolutionary roots of psychopathy. *Aggression and Violent Behavior*, *21*, 85–96. http://doi.org/10.1016/j.avb.2015.01.006

Rilling, J. K., Glenn, A. L., Jairam, M. R., Pagnoni, G., Goldsmith, D. R., Elfenbein, H. A., & Lilienfeld, S. O. (2007). Neural correlates of social cooperation and non-cooperation as a function of psychopathy. *Biological Psychiatry*, *61*, 1260–1271. http://doi.org/10.1016/j.biopsych.2006.07.021

Rutherford, M. D. (2007). Beyond nature and nurture: A systems approach to autism. In P. C. Carlisle (Ed.), *Progress in autism research* (pp. 167–186). New York, NY: Nova Science Publishers.

Rutherford, M. D. (2011). *Child development*. Oxford: Oxford University Press.

Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment*, *8*, 350–353. http://doi.org/10.1037/1040-3590.8.4.350

Seto, M. C., Khattar, N. A., Lalumiere, M. L., & Quinsey, V. L. (1997). Deception and sexual strategy in psychopathy. *Personality and Individual Differences*, *22*, 301–307. http://doi.org/10.1016/S0191-8869(96)00212-7

Silvera, D. H., Martinussen, M., & Dahl, T. I. (2001). The Tromsø Social Intelligence Scale, a self-report measure of social intelligence. *Scandinavian Journal of Psychology*, *42*, 313–319.

Simmons, R. E. (1988). Food and the deceptive acquisition of mates by polygynous male harriers. *Behavioral Ecology and Sociobiology*, *23*, 83–92. http://doi.org/10.1007/BF00299891

Simms, L. J. (2008). Classical and modern methods of psychological scale construction. *Social and Personality Psychology Compass*, *2*, 414–433. http://doi.org/10.1111/j.1751-9004.2007.00044.x

Simpson, J., & Campbell, L. (2005). Methods of evolutionary sciences. In D. M. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 119–144). Hoboken, NJ: John Wiley & Sons.

Smith, S. S., & Newman, J. P. (1990). Alcohol and drug abuse-dependence disorders in psychopathic and nonpsychopathic criminal offenders. *Journal of Abnormal Psychology*, *99*, 430–439. http://doi.org/10.1037/0021-843X.99.4.430

Smuts, B. B., & Smuts, R. W. (1993). Male aggression and sexual coercion of females in nonhuman primates and other mammals: Evidence and theoretical implications. *Advances in the Study of Behavior*, *22*, 1–63.

Souza, A. L., Conroy-Beam, D., & Buss, D. M. (2016). Mate preferences in Brazil: Evolved desires and cultural evolution over three decades. *Personality and Individual Differences*, *95*, 45–49. http://doi.org/10.1016/j.paid.2016.01.053

Stearns, S. C. (1992). *The evolution of life histories*. *Oxford: Oxford University Press*.

Symons, D. (1979). *The evolution of human sexuality*. New York, NY: Oxford University Press.

Taborsky, M. (1994). Sneakers, satellites, and helpers: Parasitic and cooperative behavior in fish reproduction. *Advances in the Study of Behavior*, *23*, 1–100. http://doi.org/10.1016/S0065-3454(08)60351-4

Taubes, G. (2011). *Why we get fat*. New York, NY: Anchor Books.

Theodoridou, A., Rowe, A. C., Penton-Voak, I. S., & Rogers, P. J. (2009). Oxytocin and social perception: Oxytocin increases perceived facial trustworthiness and attractiveness. *Hormones and Behavior*, *56*, 128–132. http://doi.org/10.1016/j.yhbeh.2009.03.019

Thornhill, R., & Møller, A. P. (1997). Developmental stability, disease and medicine. *Biological Reviews of the Cambridge Philosophical Society*, *72*, 497–548. http://doi.org/10.1017/S0006323197005082

Tinbergen, N. (1963). On aims and methods of ethology. *Ethology and Sociobiology*, *20*, 410–433.

Tooby, J., & Cosmides, L. (1990). The past explains the present: Emotional adaptations and the structure of ancestral environments. *Ethology and Sociobiology*, *11*, 375–424. http://doi.org/10.1016/0162-3095(90)90017-Z

Tooby, J., & Cosmides, L. (1992). The psychological foundations of culture. In J. H. Barkow, J. Tooby, & L. Cosmides (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 19–136). New York, NY: Oxford University Press.

Tooby, J., & Cosmides, L. (2005). Conceptual foundations of evolutionary psychology. In D. M. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 5–67). Hoboken, NJ: John Wiley & Sons.

Tooke, W., & Camire, L. (1991). Patterns of deception in intersexual and intrasexual mating strategies. *Ethology and Sociobiology*, *12*, 345–364.

Trivers, R. L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual selection and the descent of man 1871–1971* (pp. 136–179). Chicago, IL: Aldine.

Visser, B. A., DeBow, V., Pozzebon, J. A., Bogaert, A. F., & Book, A. (2015). Psychopathic sexuality: The thin line between fantasy and reality. *Journal of Personality*, *83*, 376–388. http://doi.org/10.1111/jopy.12110

Wakefield, J. C. (1992). The concept of mental disorder: On the boundary between biological facts and social values. *American Psychologist*, *47*, 373–388. http://doi.org/10.1037/0003-066X.47.3.373

Wakefield, J. C. (2005). Biological function and dysfunction. In D. M. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 878–902). Hoboken, NJ: John Wiley & Sons.

Walker, L. (1979). *The battered woman*. New York, NY: Harper Perennial.

Wheeler, S., Book, A., & Costello, K. (2009). Psychopathic traits and perceptions of victim vulnerability. *Criminal Justice and Behavior*, *36*, 635–648. http://doi.org/10.1177/0093854809333958

Williams, G. C. (1966). *Adaptation and natural selection: A critique of some current evolutionary thought*. Princeton, NJ: Princeton University Press.

Williams, K. M., Nathanson, C., & Paulhus, D. L. (2010). Identifying and profiling scholastic cheaters: Their personality, cognitive ability, and motivation. *Journal of Experimental Psychology: Applied*, *16*, 293–307. http://doi.org/10.1037/a0020773

Williams, K. M., Paulhus, D. L., & Hare, R. D. (2007). Capturing the four-factor structure of psychopathy in college students via self-report. *Journal of Personality Assessment*, *88*, 205–219. http://doi.org/10.1080/00223890701268074

Wilson, M., & Daly, M. (1985). Competitiveness, risk taking, and violence: The young male syndrome. *Ethology and Sociobiology*, *6*, 59–73.

Wright, L. (1973). Functions. *Philosophical Review*, *82*, 139–168.

Wright, R. (1995). *The moral animal*. New York, NY: Vintage Books.

Zuckerman, M. (1971). Physiological measures of sexual arousal in the human. *Psychological Bulletin*, *75*, 297–329.

Appendix A

Body Symmetry Measurement Form

Participant no.: _____

Researcher: _____

Left side of body measurements:	Right side of body measurements:
L. ear width: _____	R. ear width: _____
L. ear height: _____	R. ear height: _____
L. elbow width: _____	R. elbow width: _____
L. wrist width: _____	R. wrist width: _____
L. hand width: _____	R. hand width: _____
L. 3rd finger length: _____	R. 3rd finger length: _____
L. 4th finger length: _____	R. 4th finger length: _____
L. 5th finger length: _____	R. 5th finger length: _____
L. knee width: _____	R. knee width: _____
L. ankle width: _____	R. ankle width: _____

Appendix B

HEXACO–60 (Ashton & Lee, 2009)

On the following pages you will find a series of statements about you. Please read each statement and decide how much you agree or disagree with that statement. Then select the response using the following scale:

5 = strongly agree
4 = agree
3 = neutral (neither agree nor disagree
2 = disagree
1 = strongly disagree

1 _____ I would be quite bored by a visit to an art gallery.
2 _____ I plan ahead and organize things, to avoid scrambling at the last minute.
3 _____ I rarely hold a grudge, even against people who have badly wronged me.
4 _____ I feel reasonably satisfied with myself overall.
5 _____ I would feel afraid if I had to travel in bad weather conditions.
6 _____ I wouldn't use flattery to get a raise or promotion at work, even if I thought it would succeed.
7 _____ I'm interested in learning about the history and politics of other countries.
8 _____ I often push myself very hard when trying to achieve a goal.
9 _____ People sometimes tell me that I am too critical of others.
10 _____ I rarely express my opinions in group meetings.
11 _____ I sometimes can't help worrying about little things.
12 _____ If I knew that I could never get caught, I would be willing to steal a million dollars.
13 _____ I would enjoy creating a work of art, such as a novel, a song, or a painting.
14 _____ When working on something, I don't pay much attention to small details.
15 _____ People sometimes tell me that I'm too stubborn.
16 _____ I prefer jobs that involve active social interaction to those that involve working alone.
17 _____ When I suffer from a painful experience, I need someone to make me feel comfortable.
18 _____ Having a lot of money is not especially important to me.
19 _____ I think that paying attention to radical ideas is a waste of time.
20 _____ I make decisions based on the feeling of the moment rather than on careful thought.
21 _____ People think of me as someone who has a quick temper.
22 _____ On most days, I feel cheerful and optimistic.

23 _____ I feel like crying when I see other people crying.
24 _____ I think that I am entitled to more respect than the average person is.
25 _____ If I had the opportunity, I would like to attend a classical music concert.
26 _____ When working, I sometimes have difficulties due to being disorganized.
27 _____ My attitude toward people who have treated me badly is “forgive and forget”.
28 _____ I feel that I am an unpopular person.
29 _____ When it comes to physical danger, I am very fearful.
30 _____ If I want something from someone, I will laugh at that person’s worst jokes.

31 _____ I’ve never really enjoyed looking through an encyclopedia.
32 _____ I do only the minimum amount of work needed to get by.
33 _____ I tend to be lenient in judging other people.
34 _____ In social situations, I’m usually the one who makes the first move.
35 _____ I worry a lot less than most people do.
36 _____ I would never accept a bribe, even if it were very large.
37 _____ People have often told me that I have a good imagination.
38 _____ I always try to be accurate in my work, even at the expense of time.
39 _____ I am usually quite flexible in my opinions when people disagree with me.
40 _____ The first thing that I always do in a new place is to make friends.
41 _____ I can handle difficult situations without needing emotional support from anyone else.
42 _____ I would get a lot of pleasure from owning expensive luxury goods.
43 _____ I like people who have unconventional views.
44 _____ I make a lot of mistakes because I don’t think before I act.
45 _____ Most people tend to get angry more quickly than I do.
46 _____ Most people are more upbeat and dynamic than I generally am.
47 _____ I feel strong emotions when someone close to me is going away for a long time.
48 _____ I want people to know that I am an important person of high status.
49 _____ I don’t think of myself as the artistic or creative type.
50 _____ People often call me a perfectionist.
51 _____ Even when people make a lot of mistakes, I rarely say anything negative.
52 _____ I sometimes feel that I am a worthless person.
53 _____ Even in an emergency I wouldn’t feel like panicking.

54 _____ I wouldn't pretend to like someone just to get that person to do favors for me.

55 _____ I find it boring to discuss philosophy.

56 _____ I prefer to do whatever comes to mind, rather than stick to a plan.

57 _____ When people tell me that I'm wrong, my first reaction is to argue with them.

58 _____ When I'm in a group of people, I'm often the one who speaks on behalf of the group.

59 _____ I remain unemotional even in situations where most people get very sentimental.

60 _____ I'd be tempted to use counterfeit money, if I were sure I could get away with it.

Appendix C

Tromsø Social Intelligence Scale (TSIS; Silvera et al., 2001)

For each item, indicate how well it describes you on a scale from 1 (*describes me extremely poorly*) to 7 (*describes me extremely well*).

Item:

1. I can predict other peoples' behavior.
2. I often feel that it is difficult to understand others' choices.
3. I know how my actions will make others feel.
4. I often feel uncertain around new people who I don't know.
5. People often surprise me with the things they do.
6. I understand other peoples' feelings.
7. I fit in easily in social situations.
8. Other people become angry with me without me being able to explain why.
9. I understand others' wishes.
10. I am good at entering new situations and meeting people for the first time.
11. It seems as though people are often angry or irritated with me when I say what I think.
12. I have a hard time getting along with other people.
13. I find people unpredictable.
14. I can often understand what others are trying to accomplish without the need for them to say anything.
15. It takes a long time for me to get to know others well.
16. I have often hurt others without realizing it.
17. I can predict how others will react to my behavior.
18. I am good at getting on good terms with new people.
19. I can often understand what others really mean through their expression, body language, etc.
20. I frequently have problems finding good conversation topics.
21. I am often surprised by others' reactions to what I do.

Appendix D

Modified version[13] of the Revised Sociosexual Orientation Inventory (SOI–R; Penke & Asendorpf, 2008)

Please respond honestly to the following questions.

0. At what age in years did you first have sexual intercourse?

_____ years
Note: indicate "N" if you have not had sexual intercourse.

1. With how many different partners have you had sex within the past 12 months?

◻	◻	◻	◻	◻	◻	◻	◻	◻
0	1	2	3	4	5–6	7–9	10–19	20 or more

2. With how many different partners have you had sexual intercourse on *one and only one* occasion?

◻	◻	◻	◻	◻	◻	◻	◻	◻
0	1	2	3	4	5–6	7–9	10–19	20 or more

3. With how many different partners have you had sexual intercourse without having an interest in a long-term committed relationship with this person?

◻	◻	◻	◻	◻	◻	◻	◻	◻
0	1	2	3	4	5–6	7–9	10–19	20 or more

4. Sex without love is OK.

◻	◻	◻	◻	◻	◻	◻	◻	◻
1	2	3	4	5	6	7	8	9

Strongly disagree Strongly agree

5. I can imagine myself being comfortable and enjoying "casual" sex with different partners

◻	◻	◻	◻	◻	◻	◻	◻	◻
1	2	3	4	5	6	7	8	9

Strongly disagree Strongly agree

6. I do not want to have sex with a person until I am sure that we will have a long-term, serious relationship.

◻	◻	◻	◻	◻	◻	◻	◻	◻
1	2	3	4	5	6	7	8	9

Strongly disagree Strongly agree

[13] Modified version included the addition of 1 item, which was defined in this scale as item "0."

7. How often do you have fantasies about having sex with someone with whom you do not have a committed romantic relationship?
▫ 1 – never
▫ 2 – very seldom
▫ 3 – about once every two or three months
▫ 4 – about once a month
▫ 5 – about once every two weeks
▫ 6 – about once a week
▫ 7 – several times per week
▫ 8 – nearly every day
▫ 9 – at least once a day

8. How often do you experience sexual arousal when you are in contact with someone with whom you do not have a committed romantic relationship?
▫ 1 – never
▫ 2 – very seldom
▫ 3 – about once every two or three months
▫ 4 – about once a month
▫ 5 – about once every two weeks
▫ 6 – about once a week
▫ 7 – several times per week
▫ 8 – nearly every day
▫ 9 – at least once a day

9. In everyday life, how often do you have spontaneous fantasies about having sex with someone you have just met?
▫ 1 – never
▫ 2 – very seldom
▫ 3 – about once every two or three months
▫ 4 – about once a month
▫ 5 – about once every two weeks
▫ 6 – about once a week
▫ 7 – several times per week
▫ 8 – nearly every day
▫ 9 – at least once a day

Appendix E

Recruitment Email Invitation: Study 1

Subject:
Invitation to participate for 1.0 credit or $20 in a psychology research project on personality traits, body symmetry, and social interactions

Body:

Hello,

My name is Kristopher Brazil, I am a graduate student in the Psychology Department at Carleton University. I am working on a research project under the supervision of Dr. Adelle Forth. You are being contacted for participation in this study because you took part in mass testing at Carleton University in Fall 2016 and provided this email address.

I am inviting you to participate in a study titled "**What makes a desirable intimate partner?**" that is currently available on SONA. This study aims to identify if certain personality traits are associated with body symmetry and if certain personality traits make men more of a desirable dating partner in specific contexts like dating and emotionally-meaningful contexts.

What you will get for participating:

For participating, you will get the **choice of either 1.0 course percentage or $20 for your participation**. In addition, **two $50 prizes** will be given to participants who receive the two highest scores on their story-telling scenario from the ratings of other participants in the follow-up study (read more about this below!). Winners will be notified by email and the prize transferred to their Carleton Campus Card after the follow-up study is complete (approximately May, 2017).

How to sign up:

To look for available timeslots and sign up, follow this link to the SONA sign-up sheet. You will need an invitation code to sign up, which is **24681357**. You can also find the study on the list of SONA studies if you do not trust using links from emails**.**
https://carleton.sona-systems.com/default.aspx?p_return_experiment_id=1835
If there are currently no timeslots that work for you, you can return to this link at any time in the future to look for new timeslots or you can email me directly with times you might prefer. New timeslots will open up regularly until the end of February 2017.

What you will do when you participate:

This study will take place at a private and secure location at Carleton University in Loeb A401 (the 4th floor of the A-tower of the Loeb Building). The study has five brief components. First, there will be a pretend dating scenario (involving you and a female research volunteer) and second, a story-telling scenario (involving you telling me a story), each lasting approximately 2

minutes. With your consent, these scenarios will be audio-video recorded. The purpose of the scenarios is to capture your interpersonal style (1) in a dating context and (2) while telling a story involving emotional content. Third, one photograph of you from the waist up will be taken. Fourth, measurements of the width and/or length of your left and right ears, elbows, wrists, hands, three fingers, knees, and ankles will be taken using a digital caliper, taking approximately 10 minutes. Lastly, self-report questionnaires will be completed on Qualtrics, taking approximately 30 minutes. In total, the study should take less than **one hour** to complete.

Why are we taking recordings?

The recorded data you provide will be used in a follow-up study taking place in February 2017, which will involve other participants rating the dating scenarios (e.g., how appealing they are) and story-telling scenarios (e.g., how convincing they are). Agreement to this, however, is not necessary to participate in this study. You are still welcome to participate in this study.

For your information and ethical concerns:

This study carries a mild risk of experiencing psychological distress. For instance, the study will ask you to recall a moment in your life where you have insulted or hurt another person in some way (i.e., during the story-telling scenario), to interact with a volunteer in a dating scenario where you may disclose some information about yourself, and will ask you about your sexual experiences and attitudes (i.e., one of the self-report questionnaires), which may cause you psychological distress. While this risk is expected to be minimal, if you feel distress, you may bring this to the researcher's attention at any time before, during, or after the study. If at any other time during the study procedure you come to feel psychological distress, you may also indicate this to the researcher. The videos, photographs, measurement data, and questionnaire responses will be kept anonymous, secured, and only used for data analysis purposes.

You will have the right to end your participation in the study at any time, for any reason, without consequence. If you agree to have your data used for the follow-up study, you will have the right to end your participation up until February 24, 2017, when the follow-up study is scheduled to begin. If you choose to withdraw before this date, all the information you have provided will be destroyed.

All research data you provide will be stored on a password-protected and encrypted computer accessible only to the researcher (myself) and on an encrypted USB key and stored in a locked office at Carleton University. Research data will only be accessible to the researcher and research supervisor (Dr. Forth). Any other use will require your signed written consent, which you will be able to provide if you wish.

Ethics approval for this research:

The ethics protocol for this project was reviewed by the Carleton University Research Ethics Board (Ethics protocol clearance ID: 105623), which provided clearance to carry out the research. (Clearance expires on: November 30, 2017). Should you have questions or concerns

related to your involvement in this research, please contact the REB Chair, Professor Andy Adler at ethics@carleton.ca or at 613-520-2600 ext. 4085.

If you would like to participate in this research project, or have any questions, please contact me at 613-520-2600 ext. 2351 or kristopher.brazil@carleton.ca.

Sincerely,

Kristopher Brazil
MA candidate
Department of Psychology
Carleton University
kristopherbrazil@cmail.carleton.ca
613-520-2600 ext. 2351

Appendix F

Consent Form: Study 1

Title: What Makes a Desirable Intimate Partner?

Date of ethics clearance: November 16, 2016

Ethics Clearance for the Collection of Data Expires: November 30, 2017

I _____, choose to participate in a study on personality traits, body symmetry, and desirable dating partners. This study aims to identify if psychopathic personality traits (some of which include attenuated empathy and guilt, interpersonal manipulation, and impulsivity) are associated with body symmetry and ability to behave as a desirable dating partner. **The researcher for this study is Kristopher Brazil in the Psychology Department.** He is working under the supervision of Dr. Adelle Forth in the Psychology Department.

This study has five components. **First**, there will be a pretend dating scenario (involving you and a female research volunteer) lasting one and a half minutes and, **second**, a story-telling scenario (involving you telling me a story), lasting approximately 2 minutes. With your consent, these scenarios will be audiovideo-recorded. These will be recorded and then used, with your permission, in a follow-up study that will involve other participants rating the videos, with the dating scenario being rated for attractiveness and confidence and the story-telling scenario rated on how convincing the story was. **Third**, one photograph of you from the waist up will be taken. Photographs will then be rated on a number of factors (e.g., attractiveness, perceived status) by psychology graduate volunteers who will not have access to any other component of your data from this study. The reason for collecting these ratings is to match you with other participants on potentially confounding variables. **Fourth**, measurements of the width and/or length of your left and right ears, elbows, wrists, hands, three fingers, knees, and ankles will be taken using a non-invasive digital caliper by placing the device on the areas described, taking approximately 10 minutes. This will be to measure body symmetry and assess its relationship with personality traits. **Lastly**, you will be asked to complete five short self-report questionnaires on Qualtrics, taking approximately 20 minutes. In total, the study will take less than an hour to complete.

As a token of appreciation, you may choose to receive **either 1.0 course percentage or $20**. If you agree to have your data used in the follow-up study, you will have the chance to receive **one of two $50 prizes**. These prizes will be given to the two participants who receive the highest ratings on the story-telling scenario based on ratings given by university student participants in the follow-up study. Winners will be notified by email at the conclusion of the follow-up study (approximately May, 2017) and the $50 prize will be transferred to your Carleton Campus Card.

This project will ask you to recall a moment in your life where you have insulted or hurt another person in some way, to interact with a volunteer in a dating scenario where you may disclose some information about yourself, and to ask you about some of your sexual experiences and attitudes, which may cause you psychological distress. While this risk is expected to be minimal,

if you feel distress, you may bring this to the researcher's attention. If at any other time during the study procedure you come to feel psychological distress, you may also indicate this to the researcher. Any information shared by you that indicates you have participated in child abuse will be reported to Child Protection Services. During the dating scenario, you will be interacting with a female Project Assistant volunteer. This scenario is not a real dating situation and you are expected to treat the Project Assistant respectfully. Any inappropriate comments or advances will not be tolerated and will result in the session being terminated.

Audio-video recordings and photographs of you will be taken if you agree to participate in this study. Measures to protect your identity and privacy will be implemented. This will be done by keeping all data anonymous and not traceable to your name, email address, or any other identifier.

You have the right to end your participation in the study at any time, for any reason. A follow-up study will be conducted starting in February 2017 that will use the audio-video recorded data from this study. If you agree, your data will also be used in this follow-up study and your right to end participation in the study will then expire on February 24, 2017. You can withdraw by phoning or emailing the researcher or the research supervisor. If you withdraw from the study, all information you have provided will be immediately destroyed.

All research data you provide will be stored on a password-protected and encrypted computer accessible only to the researcher and transferred to an encrypted USB key, which will be stored in a locked office at Carleton University. Research data will only be accessible to the researcher and research supervisor. If you agree to have your data used in future research projects, the data will only be made available to the researchers involved in those projects and will be provided to them by the research supervisor. Lastly, the anonymous data you provide on Qualtrics will be subject to the United States Patriot Act.

Once the project is completed, all research data will be destroyed from the computer and will remain stored on the encrypted USB key and stored in a locked office at Carleton University. If you do not agree to have your data used for future research projects, then the research data you provide will be destroyed after the follow-up study. If you do not agree to have your data used for the follow-up study, your data will be destroyed after this research project.

If you would like a copy of the finished research project, you are invited to contact the researcher to request an electronic copy which will be provided to you.

The ethics protocol for this project was reviewed by the Carleton University Research Ethics Board, which provided clearance to carry out the research. Should you have questions or concerns related to your involvement in this research, please contact:

Do you agree to be audio-video recorded during the dating scenario?

___Yes ___No

Do you agree to be audio-video recorded during the story-telling scenario?

___Yes ___No

Do you agree to have your photograph taken?

___Yes ___No

Do you agree to be measured for body symmetry as described in this form?

___Yes ___No

_____ _____
Signature of participant Date

_____ _____
Signature of researcher Date

Do you agree to have your audio-video recorded data used in a follow-up study that will be conducted at Carleton University starting in February 2017?

___Yes ___No

Do you agree to have your data used in future research projects conducted under the supervision of the research supervisor?

___Yes ___No

_____ _____
Signature of participant Date

_____ _____
Signature of researcher Date

REB contact information:
Professor Andy Adler, Chair
Research Ethics Board
Carleton University
511 Tory
1125 Colonel By Drive
Ottawa, ON K1S 5B6
Tel: 613-520-2600 ext. 4085
ethics@carleton.ca

Researcher contact information:
Kristopher Brazil
Department of Psychology
Carleton University
Tel: 613-520-2600 ext. 2351
Email: kristopher.brazil@carleton.ca

Supervisor contact information:
Adelle Forth
Department of Psychology
Carleton University
Tel: 613-520-2600 ext. 1267
Email: adelle.forth@carleton.ca

Appendix G

Dating Scenario Instructions and Protocol: Study 1

Principal Investigator: "[Project Assistant] is a volunteer for this study. You will be interacting with them during this dating scenario for about one and a half minutes. Treat this scenario as if you are on a date with [Project Assistant] where the goal is getting to know each other more. You are not expected to give particular answers as this is meant to be as natural and real as possible. I will indicate when the time is up. When the recording begins, [Project Assistant] will start off the scenario. Let me know when you are ready and I will begin the recording.

Audio-video recording begins.

Project Assistant will begin the scenario by asking ***either*** *Q1* ***or*** *Q2, each being balanced for the number of participants in the study.*

Q1. Project Assistant: "What do you like to do on a first date?"

Q2. Project Assistant: "What do you think is most important in a relationship?"

An additional question (Q3) will be prepared in case the dating scenario conversation has stifled before the 1.5-minute mark has ended

Q3. Project Assistant: "So tell me more about yourself and what you like to do."

If the participant asks the Project Assistant Q1, they will reply with:
"I like to talk over dinner and get to know each other more. It's important to feel a connection on the first date, you know?"

If the participant asks the Project Assistant Q2, they will reply with:
"I think trust is the most important. What do you think?"

If the participant asks the Project Assistant Q3, they will give short answers about what they like to do and then ask the participant their opinion. Examples might include:
"Well, I try to volunteer in the community as much as I can. Do you volunteer?"
"I was at Parliament Hill last weekend and thought it was interesting. Have you been?"

The goal is to emulate a natural conversation and thus too much exact scripting may prevent a natural flowing conversation between the participant and the Project Assistant and become too contrived. However, the Project Assistant will be told ***not*** *to disclose sensitive personal information or identifying information about themselves (such as their address) during this scenario. Q1 and Q2 represent questions that are balanced for whether they might appeal to a short-term sexual strategy (Q1) and a long-term sexual strategy (Q2) (see Buss & Schmitt, 1993 for description of these different strategies).*

Appendix H

Feigned Remorse Story Instructions and Protocol: Study 1

Principal Investigator (PI): "I want you to think about a time in your life where you did something or said something that hurt another person but you didn't feel bad about it. I will give you a few minutes to think about this on your own. Let me know when you have a story."

If participant has difficulty thinking of a story, the following will be said to them:

PI: "It doesn't have to be something very hurtful and it doesn't have to be something you did deliberately."

When the participant identifies having a story, the following script will be said:

PI: "Now we are going to audio-video record you telling me the story for approximately 2 minutes, but I want you to tell the story *as if you did* feel bad about hurting that other person. We want you to be as convincing as you can about feeling bad about hurting this person's feelings. These audio-video recorded stories will be replayed for participants in the follow-up study and the two participants from this study who are rated as telling the most convincing stories will receive $50. You can rehearse the story with me a few times until you feel comfortable and ready to tell the story while being video-recorded."

The participant, if they choose, will then rehearse the story with the PI and when they are satisfied, the PI will indicate they will start the audio-video recording.

Appendix I

Symmetry Measurement Instructions (adapted from Lalumière et al., 2001)

Please tie your hair back (if necessary).

Roll up your pant legs to just above your kneecap, and roll up your sleeves to above the elbow.

Ear length

Please sit up straight and look to the horizon.

Elbow width

Please place your elbows in an L shape, with the palm of your hand facing your face.

Wrist width

Please place your hand on the table in front of you, with your palm flat, and with your fingers in a relaxed, natural position.

Hand width

Please place your hand on the table in front of you, with your palm facing the ceiling, and with your fingers in a relaxed, natural position.

Finger length

Please place your hand on the table in front of you with your palm down, and your fingers spread naturally.

Knee width

Please place your feet flat on the floor while seated, and extend your knee so that it makes a right angle between your leg and thigh.

Ankle width

Please place your feet flat on the floor while sitting in the chair, about shoulder length apart.

Appendix J

Debriefing Form: Study 1

What are we trying to learn in this research?

This research seeks to understand the relationship between personality traits—specifically psychopathic personality traits such as attenuated empathy and guilt, interpersonal manipulation, and impulsivity—and body symmetry. The measurements you provided and the questionnaires you completed today will help assess this relationship. This research also is a part of a larger study that explores the relationship between psychopathic personality traits and the ability to show competence during interpersonal situations, especially potential romantic situations. We are interested in identifying whether psychopathic personality traits enable individuals to present themselves as more attractive potential partners in interpersonal and romantic situations.

Why is this important to scientists or the general public?

Previous research using evolutionary theory has suggested that psychopathic personality traits may represent an alternative way to successfully reproduce in a population of individuals who tend to cooperate. In light of this, psychopathy should not be considered a mental disorder, but instead an alternative strategy to reproduce that has identifiable goals and motivations. Assessing the relationship between body symmetry and psychopathic traits will help inform this perspective and assessing the relationship between interpersonal abilities and psychopathic traits also has this as its goal. Evolutionary perspectives on psychopathy provides scientists with an alternative model for understanding psychopathy and thus may provide an alternative way to find solutions that might improve on interventions for individuals with psychopathic traits in the criminal justice system.

What are our hypotheses and predictions?

We use a multiple competing hypothesis model for making predictions that does not favour any specific hypothesis or predictions. Evolutionary hypotheses predict that psychopathic personality traits will not be related to body symmetry whereas disorder hypotheses predict that psychopathic personality traits will be negatively related to body symmetry (i.e., less body symmetry when higher psychopathic traits). Evolutionary hypotheses also predict that psychopathic personality traits are associated with higher ratings of attractiveness and trust when viewed in interpersonal situations such as dating scenarios and telling stories with emotional content. Disorder hypotheses predict that there will be no such relationship.

Where can I learn more?

If you are interested in learning more about evolutionary psychology and/or the research from this study, take a look at the following references:

Book, A., Methot, T., Gauthier, N., Hosker-Field, A., Forth, A., Quinsey, V., & Molnar, D. (2015). The mask of sanity revisited: Psychopathic traits and affective mimicry. *Evolutionary Psychological Science*, *1*, 91–102.

Wright, R. (1994). *The moral animal: Why we are the way we are: The new science of evolutionary psychology*. New York: Vintage Books.

What if I have questions later?

If you have any remaining concerns, questions, or comments about the experiment, please feel free to contact Kristopher Brazil (Principal Investigator), at: kristopher.brazil@carleton.ca (613-520-2600, ext. 2351) or Dr. Adelle Forth (Faculty Sponsor), at: adelle.forth@carleton.ca (613-520-2600, ext. 1267).

Should you have any ethical concerns about this research, please contact:

Dr. Andy Adler, Chair
CUREB-B
Research Compliance Office
511 Tory, Carleton University
613-520-2600 ext. 4085
ethics@carleton.ca

Can I still withdraw my participation from this study?

Yes, you have the right to withdraw your participation from this study at any time up until the follow-up study is set to begin (February 1, 2017). This study had you participate in a dating and story-telling scenario where you may have shared potentially embarrassing information. Although your data will be anonymized, since these scenarios will be viewed by other participants in the follow-up study, this may make you uncomfortable. If you decide later that you want to withdraw from the study, contact Kristopher Brazil (Principal Investigator), at: kristopher.brazil@carleton.ca (613-520-2600, ext. 2351).

What can I do if I experience discomfort or distress after participating in this study?
If you find that after participating in this study you feel any sort of emotional, mental, or physical stress or anxiety, please contact Carleton University Health and Counseling Services at 613-520-6674. If you live in the Ottawa area you can also contact the Distress Centre of Ottawa and Region at 613-238-3311. If you are not located in the Ottawa area the telephone number for your local Crisis Line can be found at the front of most phone books.

Thank you for participating in this research!

Appendix K

Post-Study Consent Form: Study 1

Full-Disclosure of the Dating Scenario.
The volunteer Project Assistant was aware of the protocol during the dating scenario. They were given a specific script for starting the conversation and for directing the conversation back to you so that you would do most of the talking. The specific details, however, of their input during the scenario were not scripted. Any information you shared with the Project Assistant will be kept strictly confidential and the recorded conversation will only be used for research purposes.

Anonymity/Confidentiality
The data collected in this study are kept anonymous and confidential. The consent forms are kept separate from your responses.

Right to withdraw data
You have the right to indicate that you do not wish your data to be used in this study. If you indicate this is your choice, then all measures you have provided will be destroyed.

Signatures:
I have read the above disclosure. My signature indicates that I agree to allow the data I have provided to be used for research and teaching purposes.

Full Name (Print): _____

Participant Signature: _____

Date: _____

Researcher Signature: _____

Date: _____

Appendix L

Photo Rating Questionnaire

Thank you for taking the time to help me out with this part of my study. I have 46 photos of university males in the following questionnaire, which will be presented in a random order. Please provide your opinion/impression of the following characteristics for each male in the photo: facial attractiveness, body attractiveness, masculinity, sense of style, grooming, facial symmetry, and social status.

Completing the whole questionnaire should take **approximately 15-20 minutes**.

1. Rate the person's **facial attractiveness** and **body attractiveness** from (1) very unattractive to (7) very attractive.

2. What is your impression of the person's **masculinity** features from (1) not very masculine to (7) very masculine?

3. What is your impression of the person's **sense of style** from (1) very poor sense of style to (7) very good sense of style?

4. Rate the person's **grooming** from (1) very poorly groomed to (7) very well groomed.

5. What is your impression of the person's **facial symmetry** from (1) very asymmetrical to (7) very symmetrical?

6. What is your impression of the person's **social status** (e.g., access to wealth, popularity, power) from (1) very low status to (7) very high status?

The midpoint of the scale was labelled "neither X nor Y" where X actually stood for the lower end of the scale and Y stands for the higher end of the scale.

Appendix M

Remorse Story Questionnaire (RSQ)

Definition of remorse shown to participants: Deep regret or guilt for something wrong you have done.

Thinking about the story ***and*** *the person telling the story in the video you just saw, indicate the extent to which you agree with the following statements from 1 (strongly disagree) to 7 (strongly agree):*

1. They seemed genuinely remorseful.

1	2	3	4	5	6	7
strongly disagree						strongly agree

2. Their body language was consistent with feeling remorse.

1	2	3	4	5	6	7
strongly disagree						strongly agree

3. Their emotional facial expressions were ***not*** remorseful.

1	2	3	4	5	6	7
strongly disagree						strongly agree

4. I would be interested in hanging out with this person if they asked.

1	2	3	4	5	6	7
strongly disagree						strongly agree

5. I could see myself forming a friendship with this person if I got to know them.

1	2	3	4	5	6	7
strongly disagree						strongly agree

6. I would be comfortable confiding in this person.

1	2	3	4	5	6	7
strongly disagree						strongly agree

7. The story was true.

1	2	3	4	5	6	7
strongly disagree						strongly agree

Appendix N

Dating Scenario Questionnaire (DSQ)

Consider the person you just saw in the video and answer honestly how much you agree with the following statements from 1 (strongly disagree) to 7 (strongly agree).

1. He was attractive.

1	2	3	4	5	6	7
strongly disagree						strongly agree

2. He was confident.

1	2	3	4	5	6	7
strongly disagree						strongly agree

3. I find him sexually attractive.

1	2	3	4	5	6	7
strongly disagree						strongly agree

4. If single, I would go on a date with him.

1	2	3	4	5	6	7
strongly disagree						strongly agree

5. I would be receptive if he showed sexual interest in me.

1	2	3	4	5	6	7
strongly disagree						strongly agree

Appendix O

Consent Form: Study 2 Male Participants

Title: What makes a trustworthy friend or partner?

Date of ethics clearance: February 23, 2017

Ethics Clearance for the Collection of Data Expires: February 28, 2018

Ethics Clearance Number: 106406

I _____, choose to participate in a study on trustworthiness and personality traits. This study aims to identify if personality traits are associated with differences in perceived trustworthiness by gender and if some personality traits make us more trusting than others.

Research Personnel:

Kristopher Brazil (Master's student, Lead researcher, Department of Psychology, Carleton University)

Adelle Forth (Faculty member, Thesis supervisor, Department of Psychology, Carleton University).

Purpose and Study Requirements: The purpose of this study is to explore the relationship between personality traits, gender, and acquiring and feeling trust of others. This study takes place on Qualtrics and has two components. **First**, you will be viewing ten short videos of men telling stories describing a time where they felt remorse for something they did or said to someone else. After viewing each video, there will be seven questions for you to answer about their story and your impressions of the person. The videos range in length from approximately 1 to 3.5 minutes. This whole component should take approximately 25 minutes. **Second**, you will complete four self-report questionnaires, which should take approximately 15 minutes. These questionnaires include a questionnaire on personality traits such as extraversion and openness, one on perspectives of social experiences and encounters, one on sexual attitudes and experiences, and, lastly, a demographic questionnaire. In total, this study should take approximately 45 minutes to complete.

Compensation: You will receive **1.0% grade increase** toward your PSYC 1001, 1002, 2001 or 2002 final grade for participating.

Potential Risk or Discomfort: This project will have you listen to a variety of stories that describe having wronged or insulted someone else in some way. Some stories may be more distressing than others and some stories may influence you to recall something distressing from your past. If this happens and you feel distress, you may bring this to the attention of the researcher. Additionally, one of the questionnaires asks about your sexual attitudes and

experiences, which may be uncomfortable or distressing for some people as well. We ensure that all your responses will be kept confidential and anonymous.

Right to Withdraw: You have the right to end your participation in the study at any time, for any reason until June 16, 2017. You can withdraw by phoning or emailing the researcher or the research supervisor (contact information can be found on the debrief form). If you withdraw from the study, all information you have provided will be immediately and permanently destroyed.

Anonymity/Confidentiality: All research data you provide will be stored on a password-protected and encrypted computer accessible only to the researcher and transferred to an encrypted USB key, which will be stored in a locked office at Carleton University. Research data will only be accessible to the researcher and research supervisor. The anonymous data you provide on Qualtrics will be subject to the United States Patriot Act. Once the project is completed, all research data will be destroyed from the computer and will remain stored on the encrypted USB key and stored in a locked office at Carleton University. Only anonymized and aggregated data will be used for publications, presentations, or future research projects conducted from this research.

Contact in case of concern: The ethics protocol for this project was reviewed by the Carleton University Research Ethics Board, which provided clearance to carry out the research. Should you have any ethical concerns related to your involvement in this research, please contact:

REB contact information:
Professor Andy Adler, Chair
Research Ethics Board
Carleton University
511 Tory
1125 Colonel By Drive
Ottawa, ON K1S 5B6
Tel: 613-520-2600 ext. 4085
ethics@carleton.ca

Do you agree to participate in this research?

___Yes ___No

_____ _____
Signature of participant Date

_____ _____
Signature of researcher Date

Researcher contact information:
Kristopher Brazil
Department of Psychology
Carleton University
Tel: 613-520-2600 ext. 2351
Email: kristopher.brazil@carleton.ca

Supervisor contact information:
Adelle Forth
Department of Psychology
Carleton University
Tel: 613-520-2600 ext. 1267
Email: adelle.forth@carleton.ca

Appendix P

Consent Form: Study 2 Female Participants

Title: What makes a trustworthy friend or partner?

Date of ethics clearance: February 23, 2017

Ethics Clearance for the Collection of Data Expires: February 28, 2018

Ethics Clearance Number: 106406

I _____, choose to participate in a study on trustworthiness, personality traits, and what makes a desirable dating partner. This study aims to identify if personality traits are associated with differences in perceived trustworthiness by gender and if some personality traits make us more trusting than others.

Research Personnel:

Kristopher Brazil (Master's student, Lead researcher, Department of Psychology, Carleton University)

Adelle Forth (Faculty member, Thesis supervisor, Department of Psychology, Carleton University).

Purpose and Study Requirements: The purpose of this study is to explore the relationship between personality traits, gender, and acquiring and feeling trust of others. It also has the purpose of exploring if certain personality traits in men make them more attractive in dating contexts. This study will take place on Qualtrics and will have **three** main components. **First**, you will be viewing ten short videos of men telling stories describing a time where they felt remorse for something they did or said to someone else. After viewing each video, there will be seven questions for you to answer about their story and your impressions of the person. The videos range in length from approximately 1 to 3.5 minutes. This whole component should take approximately 25 minutes. **Second**, you will complete four self-report questionnaires, assessing personality, social perceptions, sexual attitudes, and demographics, which should take approximately 15 minutes. **Third**, you will view two brief videos that show men in a dating context. You will then answer six questions about the man in each of the two videos. You will then be asked to provide a brief voicemail message directed at those men using a script that we have provided for you to read after you view each of the two videos. With your permission, these voicemail messages will be audio-recorded. In total, the study should take approximately **one hour** to complete.

Compensation: You will receive **1.0% grade increase** toward your PSYC 1001, 1002, 2001 or 2002 final grade for participating.

Potential Risk or Discomfort: This project will have you listen to a variety of stories that describe having wronged or insulted someone else in some way. Some stories may be more

distressing than others and some stories may influence you to recall something distressing from your own past. If this happens and you feel distress, you may bring this to the attention of the researcher. One of the questionnaires asks about your sexual attitudes and experiences, which may be uncomfortable or distressing for some people as well. All your responses will be kept confidential and anonymous. If you are not comfortable with disclosing this personal information, however, you may indicate this to the lead researcher. Some of the questions regarding the dating scenario videos are direct questions that may involve thinking romantically about another individual. Depending on your current relationship status, sexual orientation, etc., this may cause you to feel distress with these questions. If you feel distress with these questions or any other aspect of the dating scenario videos, you may bring this to the attention of the lead researcher and, if decided, this part of the study does not need to be completed.

Right to Withdraw: You have the right to end your participation in the study at any time, for any reason until June 16, 2017. You can withdraw by phoning or emailing the researcher or the research supervisor (contact information can be found on the debrief form). If you withdraw from the study, all information you have provided will be immediately and permanently destroyed.

Anonymity/Confidentiality: All research data you provide will be stored on a password-protected and encrypted computer accessible only to the researcher and transferred to an encrypted USB key, which will be stored in a locked office at Carleton University. The audio-recorded data you provide will be kept anonymous and only used for research purposes. Audio-recorded data will be analyzed using Praat software, which will be downloaded and stored on the password-protected and encrypted computer. Research data will only be accessible to the researcher and research supervisor. The anonymous data you provide on Qualtrics will be subject to the United States Patriot Act. Once the project is completed, all research data will be destroyed from the computer and will remain stored on the encrypted USB key and stored in a locked office at Carleton University. Only anonymized and aggregated data will be used for publications, presentations, or future research projects conducted from this research.

Contact in case of concern: The ethics protocol for this project was reviewed by the Carleton University Research Ethics Board, which provided clearance to carry out the research. Should you have concerns related to your involvement in this research, please contact:

REB contact information:
Professor Andy Adler, Chair
Research Ethics Board
Carleton University
511 Tory
1125 Colonel By Drive
Ottawa, ON K1S 5B6
Tel: 613-520-2600 ext. 4085
ethics@carleton.ca

Do you agree to participate in this research?

___Yes ___No

Do you agree to be audio-recorded reading a script twice during this study? (You may still participate in the rest of the study even if you decline to participate in this part.)

___Yes ___No

_____ _____
Signature of participant Date

_____ _____
Signature of researcher Date

Researcher contact information:
Kristopher Brazil
Department of Psychology
Carleton University
Tel: 613-520-2600 ext. 2351
Email: kristopher.brazil@carleton.ca

Supervisor contact information:
Adelle Forth
Department of Psychology
Carleton University
Tel: 613-520-2600 ext. 1267
Email: adelle.forth@carleton.ca

Appendix Q

Voicemail Message Information and Script: Study 2

You will be shown the following information after viewing each dating scenario video:

"Imagine the guy in this video has indicated that he is interested in meeting up with you. You just saw his dating video and decide to call him, but he's not home. Read the text below to leave a voicemail."

You will then be asked to read aloud into the microphone the message that says:

"Hi there, I saw your dating video. I'm just calling to see if you want to meet up sometime. Call me back."

Appendix R

Post-Study Consent Form: Study 2

Full-Disclosure of the Remorse Stories.
The remorse stories that you viewed today were true stories that happened to the individuals in the videos. However, these individuals were asked to feign or contrive the remorse they felt while telling the story. The reason for not informing you of this during the initial consent is to maintain the integrity of assessing the research question that investigates if psychopathic personality traits in men permit them to feign emotions more convincingly. It was important that you believed (to some extent, at minimum) that these stories were as true as possible and that the emotion was genuine to maintain this integrity.

Anonymity/Confidentiality
The data collected in this study are kept anonymous and confidential. The consent forms are kept separate from your responses.

Right to withdraw data
You have the right to indicate that you do not wish your data to be used in this study. If you indicate this is your choice, then all measures you have provided will be destroyed.

Signatures:
I have read the above disclosure. My signature indicates that I agree to allow the data I have provided to be used for research and teaching purposes.

Full Name (Print): _____

Participant Signature: _____

Date: _____

If you would like a copy of the completed research project, which should be available by August 2017, please provide your email address and the lead researcher will email you a copy of the manuscript upon its completion. Thank you for participating!

Email: _____

Researcher Signature: _____

Date: _____

Control: _____

Appendix S

Debriefing Form: Study 2 Male Participants

What are we trying to learn in this research?

This research is a part of a larger study that explores the relationship between psychopathic personality traits—such as manipulation, attenuated empathy and guilt, impulsivity and sensation-seeking tendencies—and the ability to show competence during interpersonal situations. The individuals in the videos you viewed today were assessed for their level of psychopathic traits. We are interested in identifying whether psychopathic personality traits enable individuals to present themselves as more trustworthy and attractive in interpersonal situations. We are also interested in seeing if gender, personality traits, and social intelligence influences this tendency towards trusting those who are higher in psychopathic traits. The questionnaires you completed and the responses to the videos that you viewed today will help us learn about this.

Why is this important to scientists or the general public?

Psychopathic personality traits are socially undesirable and disruptive and often produce a conflictual and unsupportive relationship environment. Despite this, evolutionary biology and psychology tells us that something does not need to be socially desirable to be functional. This research is exploring the possibility that psychopathy may be a naturally-occurring personality style in humans. This research is important because the conventional approach in personality and clinical psychology is that psychopathy is a disorder due to improperly functioning brain mechanisms. Current treatments based on this model, however, have not been effective. An evolutionary understanding of psychopathy may inform the purposes and functions of psychopathy, which can guide the formation of more effective and realistic treatment approaches. This research can also help identify if psychopathic personality traits are uniquely targeting or influencing specific types of people based on gender, personality, or social intelligence, which has implications for victimization research and treatment as well as relationship counselling services.

What are our hypotheses and predictions?

We use a multiple competing hypothesis model for making predictions that does not favour any specific hypothesis or prediction. Evolutionary hypotheses predict that psychopathic personality traits may be associated with being able to tell more convincing stories when asked to feign remorse and that they may gain more interest in forming relationships from others because of this skill. Disorder hypotheses do not predict these relationships and would predict that those with higher levels of psychopathy should not influence trust.

Where can I learn more?

If you are interested in learning more about evolutionary psychology and/or the research from this study, take a look at the following references:

Book, A., Methot, T., Gauthier, N., Hosker-Field, A., Forth, A., Quinsey, V., & Molnar, D. (2015). The mask of sanity revisited: Psychopathic traits and affective mimicry. *Evolutionary Psychological Science*, *1*, 91–102.

Wright, R. (1994). *The moral animal: Why we are the way we are: The new science of evolutionary psychology*. New York: Vintage Books.

What if I have questions later?

If you have any remaining concerns, questions, or comments about the experiment, please feel free to contact Kristopher Brazil (Lead Researcher), at: kristopher.brazil@carleton.ca (613-520-2600, ext. 2351) or Dr. Adelle Forth (Faculty Sponsor), at: adelle.forth@carleton.ca (613-520-2600, ext. 1267). The research ethics clearance number for this study is #106406.

Should you have any ethical concerns about this research, please contact:

Dr. Andy Adler, Chair
CUREB-B
Research Compliance Office
511 Tory, Carleton University
613-520-2600 ext. 4085
ethics@carleton.ca

Can I still withdraw my participation from this study?

Yes, you have the right to withdraw your participation from this study at any time until June 16, 2017. This study had you leave scripted voicemail messages for guys from the dating videos you viewed. Although your data will be anonymized and used only for research purposes, this may make you uncomfortable after leaving today. If you decide later that you want to withdraw from the study, contact Kristopher Brazil (Lead Researcher), at: kristopher.brazil@carleton.ca (613-520-2600, ext. 2351) by June 16, 2017 to have your data removed from the study and deleted.

What can I do if I experience discomfort or distress after participating in this study?
If you find that after participating in this study you feel any sort of emotional, mental, or physical stress or anxiety, please contact Carleton University Health and Counseling Services at 613-520-6674. If you live in the Ottawa area you can also contact the Distress Centre of Ottawa and Region at 613-238-3311.

Thank you for participating in this research!

Appendix T

Debriefing Form: Study 2 Female Participants

What are we trying to learn in this research?

This research is a part of a larger study that explores the relationship between psychopathic personality traits—such as manipulation, attenuated empathy and guilt, impulsivity and sensation-seeking tendencies—and the ability to show competence during interpersonal and romantic situations. The individuals in the videos you viewed today were assessed for their level of psychopathic traits. We are interested in identifying whether psychopathic personality traits enable individuals to present themselves as more trustworthy and attractive potential partners in interpersonal situations and to appear as more attractive and interesting in dating contexts. Although you provided an indication of how much you were attracted to each person in the dating scenarios with the question form, we also had you leave voicemail messages for these men. The reason for this is that women tend to speak in a higher voice pitch to men they find attractive, and the voicemail messages you left will provide corroborating evidence to the ratings you gave for each individual. We are also interested in seeing if gender, personality traits, and social intelligence influences this tendency towards trusting and/or liking those who are higher in psychopathic traits. The questionnaires you completed and the responses to the videos that you viewed today will help us learn about this.

Why is this important to scientists or the general public?

Psychopathic personality traits are socially undesirable and disruptive and often produce a conflictual and unsupportive relationship environment. Despite this, evolutionary biology and psychology tells us that something does not need to be socially desirable to be functional. This research is exploring the possibility that psychopathy may be a naturally-occurring personality style in humans. This research is important because the conventional approach in personality and clinical psychology is that psychopathy is a disorder due to improperly functioning brain mechanisms. Current treatments based on this model, however, have not been effective. An evolutionary understanding of psychopathy may inform the purposes and functions of psychopathy, which can guide the formation of more effective and realistic treatment approaches. This research can also help identify if psychopathic personality traits are uniquely targeting or influencing specific types of people based on gender, personality, or social intelligence, which has implications for victimization research and treatment as well as relationship counselling services.

What are our hypotheses and predictions?

We use a multiple competing hypothesis model for making predictions that does not favour any specific hypothesis or prediction. Evolutionary hypotheses predict that psychopathic personality traits may be associated with being able to tell more convincing stories when asked to feign remorse and that they may gain more interest in forming relationships from others because of this skill. Another prediction is that women will rate those with higher psychopathic traits as more attractive, indicate more interest in them as potential dating partners, and speak in a higher

voice pitch to them when leaving a voicemail message. Disorder hypotheses do not predict any of these relationships and would predict that those with higher levels of psychopathy should not influence trust, liking, or romantic interest.

Where can I learn more?

If you are interested in learning more about evolutionary psychology and/or the research from this study, take a look at the following references:

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Thank you for participating in this research!

Appendix U

Demographic Questionnaire: Study 1 and Study 2

*Note: Study 1 did not include question 4.

Please provide the following demographic information about yourself:

1. Age (in years): _____

2. Are you:

    a. Male
    b. Female
    c. Other: _____

3. Your sexual orientation is:

    a. Heterosexual
    b. Homosexual
    c. Bisexual
    d. Other: _____

4. What best describes your relationship status?

    a. In a serious relationship
    b. In a new relationship
    c. Single
    d. Married
    e. Not sure right now

5. Please indicate which options best represent your ethnic background: (Select all that apply)

    □ Caucasian/European descent
    □ Aboriginal/Indigenous Canadian (North American Indian, Métis or Inuit)
    □ Arab (e.g., Saudi, Egyptian, Iraqi, Lebanese, Palestinian, Syrian etc.)
    □ Black (e.g., African, African American, African Canadian, Caribbean)
    □ East Asian (e.g., Chinese, Japanese, Korean, Polynesian)
    □ Latin American
    □ South Asian (e.g. Indian, Pakistani, Sri Lankan, Bangladeshi)
    □ Southeast Asian (e.g. Burmese, Cambodian, Filipino, Indonesian, Laotian, Malaysian, Thai, Vietnamese)
    □ West Asian (Afghan, Armenian, Iranian, Israeli, Turks etc.)
    □ Other: _____
    □ Prefer not to answer