ADOLESCENT DEVIANT BEHAVIOR

EXAMINED FROM AN EVOLUTIONARY PERSPECTIVE

by

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Abstract

Researchers have been trying to understand the causes of deviant behaviors for decades. While there is a solid foundation in the past work done in the fields of psychology and criminology, there is also significant work being done in the area of evolutionary behavior to try and explain why deviant behaviors occur. The past research done in the area of evolutionary behavior theory was fairly thorough, so replications were used in this study to further clarify previously unclear results. An additional exploratory analysis was used to expand on the previous findings related to the Big Five Personality Traits and Life History Strategies in regards to their influence of deviant behaviors and low self-control.

The current study used a convenience sample of around 900 college-age youth to examine the relationship between life history strategies and parental bonding, life history strategies and deviant behaviors, and life history strategies and low self-control. This study also considered how the Big 5 personality constructs and life history strategies impact both deviant behaviors and low self-control behaviors.

The results showed that parental bonding was a significant predictor of life history strategy (total sample, male late adolescents, and female late adolescents). They also showed that for the total sample, life history strategy was a significant predictor of deviant behaviors. However, this was not the case for the male participants and female participants, where only a statistical trend was observed. Mating effort was a significant predictor of low self-control in the total sample, but also for both male and female youth. Findings also showed that the Big 5 personality traits were each significant predictors of life history strategy, deviance, and low self-control. An exploratory analysis was also performed to determine whether life history strategies could explain variance above and beyond what was explained by the Big 5 in deviance and in

low self-control. These results indicated that life history strategies do not explain a significant level of variance when it comes to deviant behaviors. The results did show, however, that life history strategies could significantly predict low self-control once the effects by the Big 5 were controlled.

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Introduction

According to the United States Department of Justice (2009) violent crimes (murder, forcible rape, robbery, and aggravated assault) have been decreasing since 2006 and property crimes (burglary, larceny-theft, motor vehicle theft, and arson) have been decreasing since 2004. Nevertheless, there were still 1,382,012 violent crimes and 9,767,915 property crimes in the United States reported in 2008. Of the 1,382,012 violent crimes, 16,277 were murders of which 3,527 were committed by persons under the age of 22. Unfortunately, the age of offenders for other violent crimes or property crimes was not provided by the United States Department of Justice. Given the prevalence of crimes in our society, it seems paramount to gain a better understanding of how deviant and criminal behaviors develop. More specifically, what are some of the etiological risk factors or developmental precursors of deviance? Most previous work done to address this issue has been framed by psychological or criminological explanations and approaches. Although a comprehensive review of all major theories is beyond the scope of this current thesis, examples of perhaps the most prominent theories will be briefly provided, along with some discussion about empirical work completed on each.

Problem Behavior Theory

One of the most widely known and tested psychological approaches is Problem Behavior Theory (PBT) (Jessor, 1987). PBT is made up of three psychosocial influences, which are broken down into the personality system (values, expectations, and attitudes), perceived environment system (support, influence, and models), and behavioral system. Each influence is made of up variables that are either a risk factors (instigators) or protective factors (controls) of engaging in deviant behaviors. These instigators and controls result in proneness, which means how likely an adolescent is to engage in

deviant behaviors (Costa, 2008). The belief is that some psychosocial aspects are stronger predictors of deviant behavior, such as friends who engage in deviant behaviors, while others do not have as strong of an influence, like self-esteem and depression. The larger idea of the theory is an interaction model where the personality system and perceived environment system interact to influence the behavioral system (Jessor, 1987).

Most recently, Jessor (2006) reconceptualized his theory as containing a series of risk and protective factors, some of which are consistent with and map onto his original theoretical work. These factors include the personality system, which is a person's ability to control their deviant behavior, and the perceived social system, where people model more prosocial behaviors such as having peers who do volunteer work and closeness of the family. The third system consists of behavioral protective factors; these actually involve the adolescent in doing things that encourage positive behaviors such as going to religious services and taking part in volunteer work. He also listed risk factors that increased the chances that an adolescent will engage in deviant and criminal behaviors. These risk factors are also part of the personality system (low self-esteem), perceived social system (other people modeling deviant and criminal behaviors and having access to engage in these behaviors), and behavioral system. Behavioral risk factors are behaviors that encourage and provide more opportunities to engage in worse behaviors. Jessor (2006) provides the example of an adolescent that smokes is probably given encouragement to engage in heavy drinking. He found that once he controlled for sociodemographic factors, protective and risk factors accounted for over 20% of the variance in his study on heavy drinking behaviors, for instance.

Self-Control Theory

One of the most prominent criminological theories on crime and deviance is Self-Control Theory (Gottfredson & Hirschi, 1990). Self-Control Theory starts with the idea that deviant behavior occurs for the same reasons that non-deviant behavior occurs, which is to maximize pleasure while avoiding pain. However, individuals with low self-control are more prone to engage in deviant behaviors that have or are perceived to have immediate rewards as opposed to engaging in behaviors that are more acceptable, but that have delayed gratification. According to the theory, the basis of self-control is formed early in life in a child, largely as a result of the positive interactions between the child and the caregiver. This level of attachment is correlated with deviant behaviors, so those that have poorer attachment with their parents are more likely to engage in deviant behaviors than those who have a stronger attachment. Since these bonds occur early in life, self-control is established early in life, during the 1st decade. Those around the child who have a vested interest in the child's long term development guide the child to make decisions that are in everyone's best interest and to pay attention to the long term consequences of their actions, or in other words, socialize the child. Through socialization, the child learns self-control and if the child is not properly socialized then they are more likely to have poor self-control and focus on immediate gratification, a risk factor for deviance (Gottfredson, 2007).

Hay and Forest (2006) examined how stable self-control is over time along with the link between parental socialization and self-control, based on 3,793 participants from the Child and Young Adult Supplement of the National Longitudinal Study of Youth. They proposed that that self-control should remain stable across time and after age 10,

parental socialization will have little impact on the child's self-control. Their findings showed that self-control is stable in the short-term, but the correlation with long-term is not significant. They found an association of r = .64 between ages 7 and 9, but when age 7 scores are compared to age 15 scores, the correlation decreases to r = .43. They also found that for some children self-control can actually decrease over time. Hay and Forest (2006) went on to show that parental socialization still plays a role past the age of 10 and that the changes in self-control over time are linked to parental socialization.

Self-Control Theory has been supported by numerous additional empirical studies over the past two decades. Welch, Tittle, Yonkoski, Meidinger, and Grasmick (2008) conducted a study with 395 representative adults from the state of Oklahoma. They found that self-control had a significant negative correlation with deviant behaviors (r = -.44), showing that those who have greater self-control are less likely to engage in deviant behaviors. Evans and Rosenbaum (2008) also found that in their sample of 97 middle school children, adolescents who lived in poverty tended to have lower self-control, which also implicated that the environment impacts both self-control, and thus, deviance. Romer, Duckworth, Sznitman, and Park (2010) had several findings related to self-control in their sample of 900 adolescents from the National Annenberg Survey of Youth. First, they found that if an adolescent is able to delay gratification, thus showing self-control, they would be less likely to engage in risk taking behaviors. They also reported that those who do engage in risk taking behaviors learn from their experiences and thus gain self-control. One of the major weaknesses with this theory is that it only focuses on immediate gains. It also fails to adequately explain behaviors that are beneficial to a larger group (Gottfredson, 2007).

Social Learning Theory

Social Learning Theory is another major theory on deviant behavior in criminology and psychology and is based around the idea that most behavior is learned. According to social learning theory, the environment a child is in will expose that child to different "values, norms, beliefs, and technical knowledge (i.e., how to do things, including crime)" (Jensen, 2007, p. 639). The environment also contains socializing influences and the structure of opportunities, which can allow for or prevent deviant behaviors from occurring (Jensen, 2007). Social Learning Theory is composed of four processes: differential association, definitions, differential reinforcement, and imitation. Differential association is observing how other people act. Definitional learning is when one person tries to teach another person attitudes, values, and norms associated with a particular role. Differential reinforcement is how others respond to a behavior. This response either reinforces the behaviors or discourages the behaviors for occurring in the future. Finally, imitation is when someone copies a behavior because they observed another person being rewarded for that behavior. Therefore, if someone is instilled with values that encourage deviant behaviors and sees deviant behaviors being rewarded, they will be more likely to engage in those deviant behaviors (Jensen, 2007).

A number of empirical studies have been conducted that support Social Learning Theory. Jensen (2007) summarizes some of the research by stating that numerous empirical studies have shown that those who witness violence are more likely to become violent in the future. Based on a sample of 747 college students, Payne and Salotti (2007) found significant correlations between measures of social learning and criminal behaviors. They reported that those who have peers that use drugs, support drug use and

criminal behaviors, and parents that support criminal behaviors are more likely to engage in both criminal behaviors and drug use. Further findings by Durkin, Blackston, Dowd, Franz, and Eagle (2009) support the relationship between Social Learning Theory and the alcohol-related findings. They used a sample of 1,459 undergraduate students at four different universities and measured Greek affiliation, gender, differential peer associations, peer norm qualities, friends' reactions, rewards, costs, definitions which are the attitudes and meanings a person attaches to behaviors and are made of specific definition (e.g. "There is nothing wrong with having several drinks in a sitting"), and general definitions (e.g. "I am always completely honest in my dealings with other people") as risk factors and found that they explained 40% of the variance. Though Social Learning Theory is empirically supported, it fails to understand the initial catalyst for deviant behaviors. Even though Payne and Salotti (2007) found that adolescents who have friends that use drugs are more likely to use drugs themselves, they are unable to fully explain all the possible rewards an adolescent might gain by using drugs.

Why Evolutionary Theory

Both psychological and criminological theories of deviant behaviors address the proximal mechanisms of "how," in comparison to the larger question of "why" posed by evolutionary theory. What sets evolutionary theory apart from more traditional views is that under evolutionary theory most behaviors are seen as normal, while the more traditional theories view some behaviors as problematic (Paciotti, 2005). Under the framework of evolutionary theory deviant behaviors occur, not because something went wrong in the raising of the child, but rather as a response to competition for resources. This competition for resources is determined by the availability of potential mates, so that

those who come from an environment where the number of mates is low will tend to act in more deviant ways. Though most deviant behavior decreases with age, those who continue to engage in deviant behaviors mostly do so because they are at a considerable disadvantage when it comes to finding a mate. Evolutionary theory does acknowledge that there is a genetic influence that affects some offenders and that those who engage in the most severe behaviors due so probably because of a genetic characteristic. Even though evolutionary theory acknowledges the role of genes in some situations, the overarching view on deviant behaviors is that they are a response to competition for resources and mates (Quinsey, 2002).

Through evolutionary approaches to trying to understand deviance incorporates a number of the similar variables as found in proximal criminological and psychological approaches, such as the surrounding environment and parental bonding, these constructs are examined to develop an understanding of "why" deviant behaviors occur rather than simply asking how as is the case in the study of more proximal mechanisms, characteristic of most empirical efforts. Evolutionary theory examines the impact the surrounding environment has on behavior and how that environment influences life history traits (e.g. mating behaviors and parental investment in their offspring). The environments are examined in terms of harshness and predictability and how harsh and how predictable the environment is dictates the types of life history strategies that will be developed and displayed. Unlike being socialized to make decisions based on what is acceptable behavior, based on evolutionary theory, adolescents make decisions that support their overall fitness (chances of reproducing and surviving) based on conditions in their environment. These decisions are based on an implicit cost-benefit analysis. So if

an environment is harsh it would behoove a person to mature quickly and mate earlier and more often since they may not have the opportunity to do so at a later point. One of the biggest differences between the evolutionary perspectives and proximal explanations is that if the environment changes, adolescents are forced to change in how decisions are made to obtain the resources important for survival and mating success. The role of parents in the evolutionary perspective is not so much as socializers, but rather a source of information or an indicator of the level of harshness in their environment. If the parental bonds are weak or the adolescent observes abuse or is abused or neglected, they interpret these as cues as indicators of a harsh environment. When this is the case, they will likely develop and mature more rapidly, adopt faster life history traits, and thus mature sexually more quickly, engage in sex more frequently and at a younger age as well as other behaviors that they believe will increase their ability to survive and reproduce (Ellis, Figueredo, Brumbach, & Schlomer, 2009).

The goal of the current study is to determine whether there exists a link between aspects of evolutionary theory (life history strategies and mating effort) and deviant behaviors. This information is important because if we are able to understand the underlying causes of deviant behavior, the "why" question, then we might be better able to address appropriate solutions to this problem. The following will provide a more in-depth examination of evolutionary theory and the role it plays on deviant behaviors.

Evolutionary psychology is defined as "the scientific project of mapping our evolved psychological mechanisms" and these mechanisms "make predictions about psychological, behavioral, and social phenonomena" (Tooby & Cosmides, 2005, p. 6). Evolutionary psychology explains how our brains and minds have evolved to solve the

problems we had to face thousands of years ago and how those evolved mechanisms influence our behavior today (Tooby & Cosmides, 2005). This study will examine just two aspects of the very broad field of evolutionary psychology, life history theory and mating effort.

Understanding aggression is key when examining deviant behaviors, because many times it is used to gain resources or status (Campbell, 2005). Aggression lends itself to the evolutionary perspective because obtaining resources and status is a survival and reproductive mechanism. In fact, aggressive behaviors are part of reproductive strategies and thus related to an individual's mating effort. Many types of aggression are also illegal and/or dangerous, which lends themselves to being considered deviant, so understanding how aggression works and the role it plays is important. According to Campbell (2005) aggression is viewed as a response to competition for resources. This competition includes things like food, water, shelter, mates, status, and the survival of one's self and their children. Aggression is sensitive to the rewards (gaining resources) and costs (injury or death) of aggressive behavior and its use is dependent on circumstances. If resources are scarce then it might benefit someone to be more aggressive in order to gain access to these resources. However, if someone is always aggressive then they probably will not survive for very long because there will always be someone or a group of people who will stop them (Campbell, 2005).

Previous research has shown there are marked differences between men and women when it comes to aggressive behaviors. According to Evolutionary Theory, male-on-male aggression is mostly seen when someone's status is threatened, because status is seen as having dominance and reproductive success. This male-on-male

aggression is usually expressed through physical violence. Men may also be more prone to violence and risk taking behaviors when there is more competition for mates. They may engage in violence in order to try and reduce another male's ability to reproduce and increase their own chances of reproducing. They may also engage in more risky behaviors in an effort to impress females and attract potential mates. However, once a male secures a mate these behaviors tend to decrease, because the costs (getting injured or arrested) outweigh the benefits (finding more mates) (Paciotti, 2005). Females, on the other hand, may engage in indirect aggression (e.g. attempts to damage relationships or social status) or compete with each other through physical appearance and reputations, according to evolutionary theory. Unlike males, females may also be less likely to engage in risk taking behaviors, because there is a high chance of physical harm, fear, and anxiety. This fear is related to self-control in that those with higher fearfulness have more self-control (Campbell, 2005), where people with more self-control have higher fearfulness. Those individuals who are more prone to impulsive behaviors do so, in part, because of an "underactive inhibition mechanism" in the brain (Campbell, 2005, p. 641). The reason for this difference between males and females may be because females tend to invest more time, energy, and resources in raising their offspring. According to evolutionary theory, since females invest more in their children, they need to be more selective about whom they reproduce with to maximize security for their children and themselves (Paciotti, 2005).

The surrounding environment also impacts aggressive behaviors. Those who live in areas where resources are scare will be more aggressive. This is because these areas are usually poor and more aggressive. A person's lack of aggressiveness in these areas

could result in a high number of losses. This is also seen in children who witness partner violence. These children will be more aggressive than their peers who do not witness partner violence (Campbell, 2005). The child's temperament itself can impact the relationship the child has with his or her caregivers, with difficult children having poorer bonds (Sampson & Laub, 1994). The interaction model of deviant behaviors says that passive parenting, harsh disciple, and deviant peer choices are all influenced by a gene-environment interaction (Moffit, 1993). Also, children who see positive gains from aggressive behavior will be more likely to be aggressive themselves (Campbell, 2005). This will be discussed in greater detail on how the parent-child bond impacts behaviors in a later section in the literature review.

Literature Review

Life History Theory

Life History Theory has its basis in Darwin's evolutionary theory and examines individual differences between people's life history strategies (Brumbach, Figueredo, & Ellis, 2009). These life history strategies are composed of developmental and behavioral patterns that have an impact on health, relationships, and economic success (Brumbach et al., 2009). In order to analyze Life History Theory, you have to first understand life history traits (Roff, 2002; Stearns, 1992). These life history traits are individual characteristics that establish the timing and speed of reproduction and related "patterns of growth, aging, and parental investment" (Brumbach et al., 2009, p. 26). From this, Life History Theory tries to explain variations in these traits by studying the "adaptive trade-offs in distribution of resources to competing life functions: maintenance, growth, and reproduction" (Brumbach et al., 2009, p. 26).

There are two types of life history strategies: slow (K-selection) and fast (r-selection) (Ellis, 1988). Slow life strategies are characterized by slower reproduction rates. People who follow the slower life strategies have fewer children and put more effort into raising them; along with this they also live longer. These people tend to plan for the future rather than immediate gratification which leads them to have long-term relationships, follow closely to social norms, and have better health, which leads to a longer life. People who have fast-life history strategies tend to have more children, engage in immediate gratification behaviors, and use short-term mating strategies. Though humans as a species are on the slow end of the strategies, we also have the ability to speed it up depending on the conditions surrounding a person. An easy way to

understand slow-fast life strategies is to think of it as a continuum. One continuum is based on species where humans are at the slower end since we depend on our parents for longer periods of time than other species and don't reproduce as fast. The second continuum is for humans alone and if a person is on the slow or fast end is greatly dependent on environmental conditions (Brumbach et al., 2009). This second continuum is not because humans are so different from all other organisms, but because humans differ so much within our own species. As a species, all humans are on the slow end of the life history continuum, so in order to see the differences between individual life history strategies we must examine humans on a smaller scale. If we tried to observe these individual differences on the larger scale we would be unable to observe much variation among different life history strategies among humans. For example, most organisms having a child at 16 years of age is "late," and on the larger continuum, this would be evidence of a slow life history strategy. However, for humans, this is considered quite young and would therefore indicate a fast life history strategy. Thus, in order to effectively study life history strategies among humans, the scale of study needs to be adjusted in effect to match the range observed among them and to allow observed differences to be meaningful.

There are three main life history traits in humans: biological, behavioral, and cultural. The behavioral and biological traits are found in all organisms, but in humans they are on the slow end of the continuum. Biologically humans mature sexually later, have healthier offspring, and live longer. Behaviorally humans differ from other species in that they plan for the long-term and invest more in their young; however, humans can differ behaviorally within their species too. The cultural traits are what set human life

history strategy apart from most other organisms. These cultural traits have a great influence on if a person is going to be on the slow or fast end of the continuum. Building on this, there is research that assesses the differences between individuals on this continuum and it is examined through the psychosocial dimensions of personal (using past experience to plan for the future), familial (closeness in relationships with family), and social (how a person's relationship with friends is). Using factor analysis they found that 70% of the variance between humans on the slow-fast continuum could be explained by these three psychosocial dimensions (Brumbach et al., 2009).

When studying the developmental differences in the life history strategies Brumbach, Figueredo, and Ellis (2009) chose to only examine environmental factors, though they did acknowledge that there are also genetic influences. They identified two environmental conditions that indirectly influence an animal's life history strategy. The first is how harsh an animal's environment is and the second is how unpredictable that environment is.

The physical strain exerted on an organism is how they define harshness of environments. These environmental conditions influence organisms by creating situations that increase morbidity and mortality. The other aspect of the environment is how predictable it is. If a given environment is unpredictable then the risks associated with that environment are inconsistent and therefore almost unavoidable. There are also events that can be distinguished as uncontrollable. These are events that can sometimes be predicted but are not controllable and they impact both the physical and mental health of the organisms in that environment (Brumbach et al., 2009).

In humans the impact of these harsh environments can be seen as they cause adolescents and young adults to have faster life history strategies. The environmental conditions that can cause a person to have faster life history strategies are ones that have high mortality rates for adolescents. These environmental conditions send messages that it is important to mature quickly and produce offspring at an earlier age. Conditions that cause these types of high-risk environments are when there is an unequal distribution of wealth and resources. There is also a correlation between being involved with violence and having a faster life history strategy. For their study Brumbach, Figueredo, and Ellis (2009) chose to focus on measures of environmental harshness that could lead to mortality among adolescents. They hypothesized those who lived in harsh conditions as adolescents would have faster life history strategies as adolescents and young adults (Brumbach et al., 2009).

Brumbach, Figueredo, and Ellis (2009) also hypothesized that during young adulthood the formation of a person's life history strategy would be influenced by life history traits such as health and relationship stability. They also hypothesized that the harshness and unpredictability of an environment would account for variance in the life history strategies of adolescents and young adults. And finally they hypothesized that the life history traits a person has as an adolescent would predict young adult life history strategy. For their study they used a random sampling from the Add Health data and measured their constructs using self-report questionnaires.

Brumbach, Figueredo, and Ellis's (2009) results indicated that they were able to explain a significant amount of the variance in their young adult life history factors from their environmental and adolescent life history predictors. They found that if an

adolescent lived in an unpredictable environment this had a negative impact on their health, which caused them to have a faster life history strategy. It was also found that the harshness of the environment had a direct effect on an adolescent's deviant behavior. They were able to conclude that the unpredictability and harshness a person experiences as an adolescent will have an impact on their life history strategy in young adulthood.

The environment the child grows up in also impacts males and females differently. Males in high-risk environments will probably develop a life history strategy that will include an increased sex drive and deviant behaviors. Females in high-risk environments will be more likely to mature more quickly and engage in sex with males based on their genetic qualities and not long term parenting potential. They are also more inclined to have more children and start having children at an earlier age and because of the way they select their mates, they are also more likely to be single mothers (Chisholm, 1999).

Studying life history strategies is vital in evolutionary research because life history strategies influence all areas of a developing adolescent. Taking the information life history traits provide, predictions can be made about the life history strategies an adolescent will develop and implement. From this information predictions can be made about their behavior. If we are able to make predictions about behavior from life history strategies, we then become able to identify adolescents who may develop deviant behaviors.

Mating Effort

In order for an organism to survive and reproduce it must make tradeoffs in essential life history components. For example, if a person focuses on having many

offspring, then their ability to care for and provide for each individual offspring suffers. In contrast, if someone is highly invested in his or her offspring, then they either have access to a large number of resources or have fewer offspring. This tradeoff for having more offspring, but less investment in those offspring is defined as mating effort (Gladden, Figueredo, & Jacobs, 2009). Mating effort, as defined by Rowe, Vazsonyi, and Figueredo (1997), is "the psychological effort put forth to obtain and guard short-term mates" (p. 105). Mating effort's goal is to obtain and guard a short-term mate, but has no interest in a lifelong partner. In order to secure short-term mates people may engage in deviant behaviors to gain access to resources; these individuals would be considered to be engaging in strong mating effort tactics.

On the opposite end there is parental-effort. Parental-effort is more long-term and involves raising and protecting the children. People who are high in parental effort also usually have more resources. With more long-term investments and resources people are more likely to have long-term relationships (Rowe et al., 1997).

In their study, Rowe, Vazsonyi, and Figueredo (1997) used 116 sibling pairs and measured mating-effort, mate value, delinquency, social failure, and sexual activity. Though it was not the main focus of their study they found that mating effort is strongly correlated with delinquency.

Ellis (1988) discussed the relationship between victimful criminal behaviors and the r/K spectrum. The behaviors he discussed were behaviors that impact reproductive fitness of the victim, perpetrator, or both, so it can be inferred that these behaviors belong in the realm of mating effort. He reported that a crime that has a victim usually negatively impacts their reproductive fitness and positively impacts the offender's and that these acts

are manifestations of a faster life history strategy. He also reported that as crimes become more violent, the stronger the relation with a fast life history strategy. These findings further make the connection between life history strategies and mating effort by illustrating that almost any crime against another person impacts their chances of successfully reproducing. Since many crimes take away something from the victim, the person committing the crime gains resources, which can then be used to attract a mate. Aside from gaining resources, these crimes may also diminish the victim's chances of reproducing, thus eliminating potential competition for mates.

To further examine the relationship between mating effort and delinquency, Charles and Egan (2005) conducted a study in Scotland with 519 teenagers (average age 14.1 years). They found a positive relationship between mating effort and delinquency and that mating effort predicts delinquency regardless of sex, though males' scores were higher. They also found that mating effort and delinquency increases with age. The strongest correlation was with the antisocial factor in the Self-Report Early Delinquency Instrument ($r = 0.5$). These included carrying a weapon, hurting people to maintain dominance, and taking resources away from others, all of which can be interpreted as forms of mating effort.

To expand on Charles and Egan's (2005) findings, Barlas and Egan (2006) conducted another study with 121 UK adolescents (mean age of 15.7 years). They found a strong correlation between carrying a weapon and delinquency ($r = 0.57$, $p < 0.001$) and mating effort ($r = 0.39$, $p < 0.001$). They also found prior victimization to be positively related to mating effort. So in other words, if someone is a victim of a crime that hurts their reproductive quality they will then increase their own mating effort. One surprising

finding they reported was that "positive attitudes to offensive weapon carrying was negatively correlated with mating effort ($r = -0.22$, $p < 0.001$)" (Barlas & Egan, 2006, p. 66). This was a surprising finding because they expected that adolescents carried a weapon in order to increase their status, which would be a sign of high mating effort; however, they found the opposite. Barlas and Egan (2006) also reported that adolescents who carried weapons reported that they did so not to be "cool" or to increase their status; however, their peers who did not carry weapons reported that they believed people carried weapons to look "cool" and increased their status. These results show that adolescents do not consciously carry weapons to increase their status, but those who did carry weapons did so as evidence of higher mating effort.

Though much research has been conducted in the area of mating effort and deviant behaviors showing a strong correlation between the two, the populations sampled were adolescents. It is also important to examine the relationship between mating effort and deviant behaviors in an older population. In an older population mating effort has probably been established, so it becomes important to study the relationship in this demographic to explore the rates of deviant behaviors. Most of the previous work has studied only deviant behaviors, but risk taking is also important, because adolescents and young adults might engage in more risky behaviors as a result of their mating effort. An older population will have more access to potential mates but will also face more competition for those mates. In order to stand out from the surrounding competition, a young adult might engage in risky behaviors in order to impress potential mates and increase their status in the population. Also, the types of risky behaviors that young adults might engage in could be different from those that a middle adolescent might engage in,

because there is less supervision once a child is out of the home. For example, an adolescent might drink while still in high school, but their opportunities to binge drink will increase once they go to college. Also, since binge drinking is a frequent occurrence on most college campuses (Seo & Li, 2009), binge drinking alone may not stand out, so there may be need to increase risky behaviors in order to stand out and attract a mate. For this reason it is important to examine the relationship between mating effort and low self-control.

Parental Bonds

The early stages of a child's development are sensitive to outside influences and can have a significant impact on their whole life. According to Belsky, Steinberg, and Draper (1991) people develop different life history strategies in response to the family environment. The factors in the family environment that help create these life history strategies are the general behavior of the parent or caregivers, the resources the family has access to, "and the stability of the pair bonds and the environment" (Ivan & Bereczkei, 2006, p. 267). An example of how the family environment impacts a child is that if a child grows up in a home with poor parental bonds they will mature at an earlier age and engage in sexual activity earlier than their peers. In contrast, children who have good parental bonds mature later and delay sexual activity. According to evolutionary theory adolescents behave this way as an adaptation to their family backgrounds.

Environmental influences can also be cultural and are also related to parental bonds. Quinlan and Quinlan (2007) found evidence that linked environmental influences outside the home and parental bonding. They also found that poor parental bonds, which lead to deviant behaviors (high mating effort, risk taking, etc.), could play a role in the

cultural environment of sex and deviant behaviors. This then reinforces what they call a "culture of risk".

The connection can also be made between parental bonds and mating effort. As children with poor parental bonds (mainly insecure attachment) become older they are "expected to engage in low-commitment mating and low-investment parenting" (Del Giudice, 2009, p. 10).

Ivan and Bereczkei (2006) conducted a study in Hungry with 500 late adolescents (250 males, 250 females with an average age of 18 years 8 months). They found significant correlations between parental care and direct forms of risk taking, behaviors that put the child in an immediate form of danger. They reported that those with stronger parental bonds engage in these behaviors less frequently. They also found that a mother's love plays more of a role here than father's love. However, they go on to report that mother's love only had a significant influence on girl's risk taking, but not for boys, which was unexpected. They further found that if a father is overprotective of his children, then they are more likely to engage in bullying, than those who have a loving father.

In a study of other risk taking, such as smoking, drinking, and drug use, Ivan and Bereczkei (2006) found that children with a loving mother smoked less. They also found the same results for youth with overprotective fathers. Some of their findings in regards to other forms of risk taking are not consistent with expectations based on evolutionary theory. For instance, they found that children who have a loving relationship with their mothers were actually more likely to drink. On the other hand, they found that those who have a loving relationship with their fathers are less likely to drink. Similarly, youth who

experienced or perceived more parental love used drugs more frequently than those who did not. They also found that the family SES did not play a role in direct or indirect measures of risk taking (Ivan & Bereczkei, 2006).

In conclusion of their study, Ivan and Bereczkei (2006), reported that those who receive more love from their parents were more likely to get into dangerous situations, but were less likely to get injured in those situations. They suggested that parental love during childhood was a protective factor and those who received this love were less likely to engage in indirect forms of risk taking. They further proposed that parental rejection and over protection are not significantly related to risk taking. The evolutionary perspective explains the increase in both direct and indirect risk-taking behaviors in adolescents who received less parental love by saying these adolescents "put an emphasis on mating effort with a rapid development, higher fertility, and less parental investment in order to increase the number of offspring in a restricted environment" (Ivan & Bereczkei, 2006, p. 274).

It is clear from previous work that parental bonding is a key element to a child's development and influences both the life history strategies and mating effort of the child. Replicating the previous research will further reinforce the earlier conclusions that parental bonding influences life history strategies, mating effort, and deviant behaviors. The gap in the literature in the area of parental bonds appears to be between parental bonding and risk-taking behaviors. Replicating Ivan and Bereczkei's (2006) study might further clarify relationships among variables, particularly between parental bonds and risk-taking behaviors.

Big 5

Life history theory can also be used to explain the differences in people's personalities and why personality characteristics have remained stable over time. Previous work has examined personality traits on the higher-order factors, but studying their relationship with life history strategies on the individual trait level is also important (Gladden, Figueredo, & Jacobs, 2009). One such way to do this is to examine the relationship between life history strategies and the Big 5 personality traits. The Big 5 personality traits are important constructs when studying adolescent development, because they have been so broadly applied across cultures and because they have received so much empirical support to date. However very little work has been done examining their relationship between life history strategies and the Big 5. The Big 5 consists of extraversion, agreeableness, conscientiousness, neuroticism, and openness. Extraversion can be defined as having positive emotions and actively engaging in society. Agreeableness contains traits such as honesty and altruism. Conscientiousness can be described as impulse control. Neuroticism is related to negative emotions such as sadness, nervousness, and anxiety. Finally, openness is being open to new ideas and information (John, Naumann, & Soto, 2008).

Gladden, Figueredo, and Jacobs (2009) examined the link between the Big 5 and life history strategies. Their sample was 100 undergraduate students (60 females and 40 males). To measure life history strategies they used the Arizona Life History Battery and the short version of the NEO-Five Factor Inventory developed by Costa and McCrae (1992). Gladden, Figueredo, and Jacobs (2009) reported in their results that there was a significantly positive relationship between slow life history strategies and Openness (r =

0.25, $p < 0.02$), Conscientiousness (r = 0.37, $p < 0.0001$), Extraversion (r = 0.55, $p < 0.0001$), and Agreeableness (r = 0.38, $p < 0.0001$). They also reported a significantly negative relationship between slow life history strategies and Neuroticism (r = -0.39, $p < 0.0001$).

Gladden, Figueredo, and Jacobs (2009) also examined the relationship between the Big 5 and psychopathic attitudes, which was operationalized by measuring deviance and risk taking. They found that psychopathic attitudes had a significant positive correlation with extraversion (r = .25, $p < .02$). They also found a significant negative relationship between psychopathic attitudes and agreeableness (r = -.37, $p < .0002$). They further reported that the relationships between psychopathic attitudes and openness approached a negative statistical significance (r = -.19, $p = .06$), as did the relationship with conscientiousness (r = -.17, $p = .08$).

Based on previous work completed on life history strategies, a number of gaps became apparent. For instance, Ivan and Bereczkei's (2006) results were inconsistent with predictions by evolutionary theory and thus need to be reexamined. In addition, some of the original work simply did not focus on or include self-control when considering the link between mating effort and deviance. It is quite possible that self-control and mating effort are highly associated or related, and thus need to be tested to develop a greater understanding of the relationships among these constructs. Finally, although Gladden et al.'s (2009) work did add the Big 5 to studying life history strategies and links with psychopathic attitudes, work in this area will provide additional evidence in how personality constructs are related to life history strategies and deviance measures.

Research Questions and Hypotheses

1. Is there a relationship between life history strategies, parental bonds, deviant behavior, and low self-control?
    a. It is expected that late adolescents who report higher quality parent-adolescent relationships or stronger parental bonds will be more likely to endorse a slower life history strategies (Ivan & Bereczkei, 2006).
    b. It is expected that those with slower life history strategies will engage in fewer deviant behaviors (Ivan & Bereczkei, 2006).
    c. It is expected that those who report high mating effort will have higher scores of low self-control. (Rowe et al., 1997).
2. Is there a relationship between the Big 5 personality constructs, and life history strategies, low self-control (engage in risky behaviors), and deviance?
    a. It is expected that those who are high on Openness, Conscientiousness, Extraversion, and Agreeableness and low on Neuroticism will have slower life history strategies (Gladden et al., 2009; Rowe et al., 1997).
    b. It is expected that those who are high on Openness, Conscientiousness, Extraversion, and Agreeableness and low on Neuroticism will have fewer deviant behaviors (Gladden et al., 2009; Rowe, Vazsonyi, & Figueredo, 1997).
    c. It is expected that those who are high on Openness, Conscientiousness, Extraversion, and Agreeableness and low on Neuroticism will have more self-control (Gladden et al., 2009; Rowe et al., 1997).

Hypothesis 1a and 1b are replications of Ivan and Bereczkei's (2006) work with the overarching goal of replicating and perhaps clarifying their findings which were inconsistent with expectations related to the relationships between parental bonds and deviant behaviors and risk taking. They found that adolescents who reported stronger parental bonds were more likely to drink, more likely to use drugs, and more likely to get into dangerous situations. It is unclear whether their findings were simply idiosyncratic to their sample (500 late adolescents, 250 males, 250 females, average age of 18 years 8 months) or related to a third variable not tested in their model.

Hypothesis 1c builds on the work of Rowe, Vazsonyi, and Figueredo (1997) where they predicted, "individuals with low mate value will be more likely to resort to strong mating-effort tactics (or crimes) than ones with high mate value" (p. 107). It is also a replication of work by Ellis (1988), who examined the relationship between mating effort and life history strategies based on data collected over 25 years ago. Charles and Egan (2005) again wanted to connect mating effort and life history strategy, however they focused on a relatively young sample of early adolescents (average age of 14.1 years). Thus, it is unclear to what extent evolutionary explanations were testable on individuals so temporally close to puberty. In addition, their sample was from the UK and thus it seems important to replicate this work in a US sample. Finally, Barlas and Egan's (2006) UK sample included early adolescents (average age 15.7 years) and focused primarily on weapons carrying relation to mating effort.

Hypothesis 2 integrates previous findings by Gladden, Figueredo, and Jacobs (2009), and Rowe, Vazsonyi, and Figueredo (1997) in order to gain a better understanding of the role the Big 5 plays in life history strategies, deviant behaviors, and

low self-control. Gladden, Figueredo, and Jacobs (2009) established a relationship between slow life histories and the Big 5. They found strong positive correlations between slow life history strategy and Openness, Conscientiousness, Extraversion, and Agreeableness and a negative association with Neuroticism. To further expand on the previous work, life history strategies should be explored to determine if they have an effect on deviance and low self-control above and beyond the impact of the Big 5 personality traits.

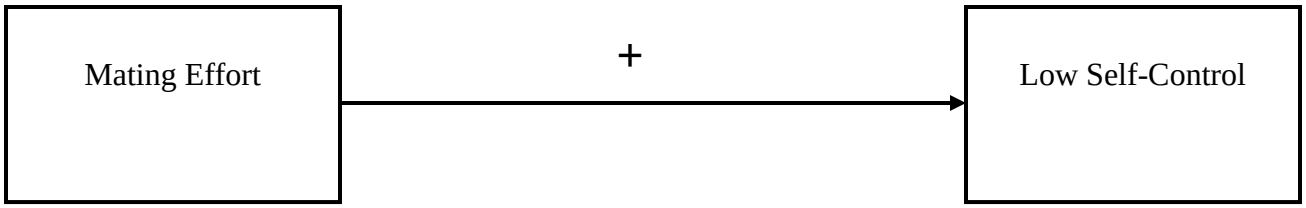
Figure 1 shows how parental bonding is hypothesized to affect life history strategies (hypothesis 1a) and then how life history strategies influence deviant behaviors (hypothesis 1b). Figure 2 shows hypothesis 1c, where mating effort is used to predict low self-control. Figure 3 is a simplified model of all parts of hypothesis 2. It illustrates how high openness, consciousness, extraversion, agreeableness, and low neuroticism predict slower life history strategies. In addition, these personality dimensions also negatively predict deviance scores as well as higher self-control scores.

Analyses were conducted with the total sample, males, and females. Analyses were conducted separately by sex to explore whether associations among parental bonding, personality, life history strategies, and deviant behaviors differ by sex.

Figure 1
Path Model for Hypotheses 1a and 1b

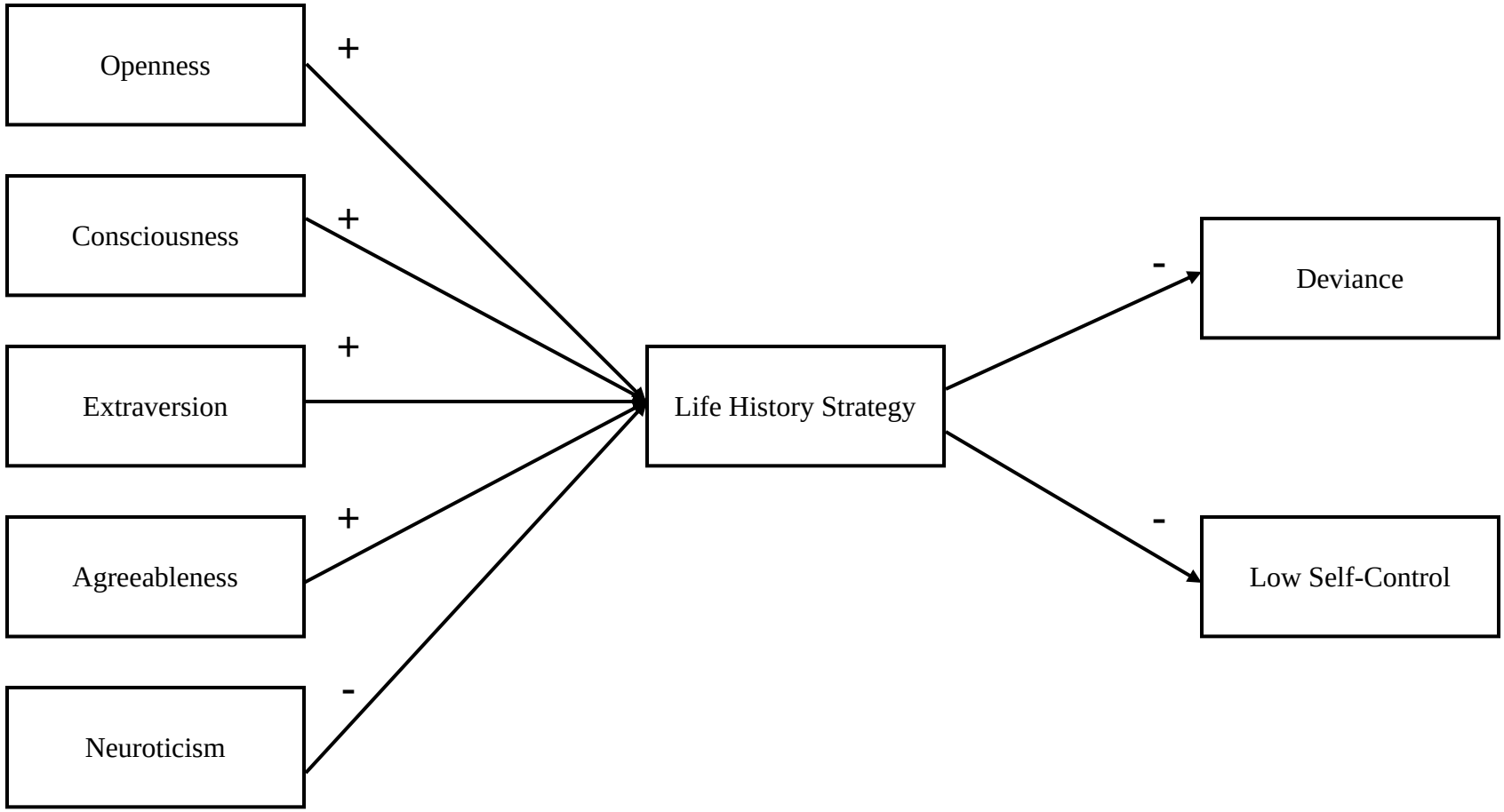
Note: "+" Indicates that as parental bonding in creases, life history strategy will be slower. "-" Indicates that as life history strategy slows, deviance scores will be lower.

Figure 2
Path Model for Hypotheses 1c



Note: "+"indicates that as mating effort scores are higher, the higher the scores on low self-control.

Figure 3
Path Model for Hypothesis 2



Method

Procedures

The data for this study were collected at a large southeastern university in the United States. Surveys were completed anonymously online through Survey Monkey, and participants were 19 or older, consistent with the State of Alabama law. The University Institutional Review Board (IRB) approved the study, which consisted of an anonymous survey, which included a brief description of the purpose of the study.

Sample

Data were collected from a convenience sample of N = 1,102 students attending a major university in the southeastern United States. A snowball sampling technique was used, where students in a social science course were invited to participate; in turn, each of these students was invited to recruit peers attending the same university for participation. Thus, a response rate cannot be computed.

Measures

The same questionnaires were given to all the participants of the study. The questionnaires consisted of general information about class standing, gender, race, age, living situation at home and socioeconomic status was gathered. Further questionnaires related to deviant behaviors, low self-control, parental bonding, mating effort, Big Five Personality traits, and life history strategies.

Age. Participants were asked to identify the month and year they were born along with the day, month, and year they completed the survey in order to determine their age at the time.

Sex. Participants were asked to identify their sex with the question: “What is your gender? A= male, B= female”.

Living situation at home. The living situation at home was assessed through the question, "Which of the following 'home situations' applies best to you (when you were still living at home)?" Answers were given as "A= biological parents", "B= biological mother only", "C= biological father only", "D= biological mother and stepfather", "E= biological father and stepmother", "F= biological parent and significant other", and "G= other".

Socioeconomic status (SES). Socioeconomic status was assessed with five questions. The first question was, "Does your father/stepfather or male caretaker work (the father figure you lived with)?" The six answers to this question were, "A= does not apply/don't know my father", "B= he does not work", "C= he is unemployed, but looking for work", "D= he has one part time job", "E= he has one full time job", "F= he has multiple jobs (amounting to more than 1 full time job". The second question was, "How much education does your father/stepfather have or male caretaker have?" Answers were: "A=does not apply", "B= he finished elementary or junior high school (through 9th grade)", "C= he finished high school", "D= he finished some college or technical school", "E= he has a college degree (4 years)", "F= he has a graduate degree (advanced degree, e.g., masters or doctorate". These two questions were then repeated with "father/stepfather or male caretaker" replaced with "mother/stepmother or female caretaker". A fifth question then asked, "Please pick one of the following choices describing your family's approximate total annual income:" The choices were: "A= $20,000 or less", "B= $20,000 to $35,000", "C= $35,000 to $60,000", "D= $60,000 to $100,000", "E= $100,000 or more".

Deviance. Lifetime deviance was measured using the original 55 question Normative Deviance Scale (NDS) (Vazsonyi et al., 2001). The items in the NDS measures vandalism (8 items), alcohol use (7 items), drug use (9 items), school misconduct (7 items), general deviance

(11 items), theft (7 items), and assault (6 items) (see Appendix A). The NDS measures how many times a person engaged in these deviant behaviors, as rated on a 5-point Likert-scale (A= *never* and E= *6 or more times*).

Low Self-Control. Low self-control was measured using the Low Self-Control Scale (Grasmick et al.1993; Vazsonyi et al., 2001). This 24-item self-report scale was rated on a 5-point Likert-scale (A= *strongly disagree* and E= *strongly agree*) and assessed impulsiveness (4 items), simple tasks (4 items), risk seeking (4 items), physical activity (4 items), self-centeredness (4 items), and temper (4 items) (see Appendix B). Higher scores on this measure refer to lower levels of self-control.

Parental Bonding. Parental bonding was measured using the Adolescent Family Process Measure (AFP) (Vazsonyi, Hibbert, & Snider, 2003). The AFP Measure is a 50-item questionnaire (25 for mother/stepmother or female caregiver and 25 for father/stepfather or male caregiver) used to measure an adolescent's relationship with his or her parents (see Appendix C). The measure assessed closeness (6 items), support (4 items), monitoring (4 items), communication (5 items), conflict (3 items), and parental peer approval (3 items). The subscales closeness, support, and monitoring were rated on a 5 point Likert-scale (A= *strongly disagree* and E= *strongly agree*), while the communication, conflict, and peer approval subscales were rated on a slightly different 5-point Likert-scale (A= *never* and E= *very often*). The direction of some of the subscales were reversed and recoded. In the current study, in order to assess parental bonding a combination of closeness and support was used, where all 10 items were averaged.

Mating Effort. Mating effort was measured using the Mating Effort Scale (Rowe, Vazsonyi, & Figueredo, 1997). It is a 10-item scale (slightly reworded for each heterosexual

males, homosexual males, heterosexual females, and homosexual females). The current study focuses on heterosexual males and females. The Matting Effort Scale (see Appendix D) was rated using the following 5-point Likert-scale (A= *strongly disagree* and E= *strongly agree*); a mating effort score was computed by averaging all 10 items.

Big Five. The Big Five personality traits were measured using the Big Five Inventory (BFI) from John (1990). The BFI (see Appendix E) is a 44-item questionnaire and measures the Big 5 personality traits on a 5-point Likert-scale (A= *strongly disagree* to E= *strongly agree*). Eight items assessed extraversion ("*I see myself as someone who is talkative"*), 9 assessed agreeableness ("*I see myself as someone who is helpful and unselfish with others*"), 9 items measured conscientiousness ("*I see myself as someone who does a thorough job"*), 8 items measured neuroticism (*"I see myself as someone who is depressed, blue"*), and 10 items assessed openness (*"I see myself as someone who is original, comes up with new ideas"*). Questions 2, 6, 8, 9, 12, 18, 21, 23, 24, 27, 31, 34, 35, 37, 41, and 43 were reversed coded.

Life History Strategy. Life history (LH) strategy was measured using the Arizona Life History Battery Mini-K (Figueredo, Vasquez, Brumbach, & Schneider, 2007). This is a 19-item questionnaire on a 5-point Likert-scale (A= *strongly disagree* and E= *strongly agree*) and brings together all the subscales from the larger inventory. The subscales that the Arizona Life History Battery measures include: insight, planning, and control, mother/father relationship quality, family social contact and support, friends social and contact support, secure romantic experiences in close relationships, altruism towards own children, altruism towards friends, altruism towards community, and religiosity (see Appendix F). Scale scores were computed which resulted in a continuum where where a lower score indicated a fast LH, while a high one indicated a slow one.

The following tables (Table 2-Table 6) present reliability estimates of scales that are comparable to those found in previous work. For example, in a study by Figueredo et al. (2007), the mother relationship quality and the father relationship quality measures had reliabilities of $\alpha = .84$ and $\alpha = .88$, respectively. In the current study, we found reliability estimates of $\alpha = .88$ and $\alpha = .89$, respectively.

Plan of Analysis

To test study hypotheses, preliminary descriptive statistics were computed, scales were computed (deviance, low self-control, parental bonding, mating effort, the Big Five, and life history strategy) and reliabilities were checked. Next, correlations were used to inspect the direction and strength of the relationships; this also included an evaluation of which background variables to use as controls in hypothesis tests. Subsequently, the study hypotheses were tested using multiple regression analysis as well as stepwise regressions in SPSS.

Results

Demographic Information

The demographic information for the sample is shown in Table 1. There were a total of 1,102 participants (377 males and 725 females). Analyses included only heterosexual youth because the current study was an effort to replicate other studies with heterosexual samples and because the subsample of sexual and gender minorities was too small for meaningful analyses. The age for the participants ranged from 19.0 years to 27.3 years (M = 21.8, SD = 1.6). The class year for the participants was divided into freshman (4.8%), sophomore (12.6%), junior (30.4%), senior (43.5), and graduate student (8.7%). The majority of the sample reported being European American (87.6%), while the second largest group was African Americans (6.4%). Family income was used to determine the socio-economic status of the participants, with 48.5% indicating that their family made $100,000 or more a year. Based on this information, it is clear that most of the participants came from upper class or upper middle class families. These sample demographics also match the demographics of the population from which it was taken. According to the National Center for Education Statistics (2011), the university is made up of 86% European Americans with 49% being female and 51% male. The undergraduate age is 96% 24 and under. These demographics are also supported by the fact that only 32% of the student population is receiving student loans.

Most findings are presented in three ways, namely for the total sample, for the male participants, and for the female participants. Deviance was measured by all items part of the Normative Deviance Scale (NDS) measure, which were averaged based on items assessing alcohol use, vandalism, drug use, school misconduct, general deviance, theft, and assault. Table 2 presents descriptive information on the NDS which includes number of participants, number of

items, reliability estimates, means, standard deviations, a measure of skew, and a corrected measure of the skew. The corrected skew was used for any subscale that had a skew over 1.00. This skew was calculated using the negative reciprocal for that subscale. The negative reciprocal was used to normalize the distribution.

Low self-control was assessed using Grasmick et al.'s (1993) Self-Control Measure. Table 3 contains the number of participants, the number of items, reliability estimates, means, standard deviation, and skew. Table 4 includes descriptive information on parental bonding, measured by subscales of the Adolescent Family Process Measure (AFP; Vazsonyi, Hibbert, & Snider, 2003); it includes the number of participants, the number of items, a measure of reliability, mean, standard deviation, and skew. The total parental bonding was calculated by finding the mean of 20 items in the Adolescent Family Process Measure (AFP) (Vazsonyi, Hibbert, & Snider, 2003). By doing this, both the maternal bonding items and paternal bonding items were combined and averaged to produce a total parental bonding score. Descriptive information on the Mating Effort Scale (Rowe, Vazsonyi, & Figueredo, 1997) is shown in Table 5 and includes information on the number of participants, the number of items, reliability estimates, mean, standard deviation, and skew. Mating effort was calculated separately for mothers and fathers and then to obtain a total score for mating effort the mean was calculated using the means for each group. Mating effort had to be calculated this way, because only heterosexuals were used for the purpose of this thesis.

The Big 5 personality traits were measured using the Big Five Inventory (John, 1990). The results produced five different scores: extraversion, agreeableness, conscientiousness, neuroticism, and openness. The results from these scores can be found in Table 6 which includes information on the number of participants, the number of items, a measure of reliability, mean,

standard deviation, and skew. The final measure was the Arizona Life History Battery (Figueredo, Vasquez, Brumbach, & Schneider, 2007). Table 7 includes the on the number of participants, the number of items, a measure of reliability, mean, standard deviation, and skew. It also contains a second skew for females only. This second skew was calculated using the square root of LHS. The square root was used to normalize the skewed data.

Table 1
Demographic Information

		N	%
Gender	Male	377	34.2
	Females	725	65.8
Age	19	90	8.2
	20	267	24.2
	21	297	27.0
	22	209	19.0
	23	85	7.7
	24	41	3.7
	25	27	2.5
	26	22	2.0
	27	8	0.7
Race	American Indian	17	1.5
	African American	71	6.4
	Asian American	13	1.2
	European American	965	87.6
	Hispanic/Latino	26	2.4
	Pacific Islander	10	0.9
Family Income	$20,000 or less	7	0.6
	$20,000 to $35,000	41	3.7
	$35,000 to $60,000	152	13.8
	$60,000 to $100,000	343	31.1
	$100,000 or more	535	48.5

Table 2
Descriptive Statistics for Normative Deviance Scale

	Variable	N	# Of Items	α	Mean	SD	Skew	Skew 2
Total	Total NDS Scale	1062	56	.96	1.71	0.62	1.33	-0.14
Males	Total NDS Scale	361	56	.96	1.94	0.68	0.75	NA
Females	Total NDS Scale	701	56	.95	1.59	0.55	1.77	0.03

Notes: Skew 2 was calculated using the negative reciprocal of the given variable. Means, standard deviation, and skew were all calculated before transformation.

Table 3
Descriptive Statistics for Self-Control Scale

	Variable	N	# of Items	α	Mean	SD	Skew
Total	Low Self-Control	1001	24	.92	2.49	0.62	0.29
Males	Low Self-Control	342	24	.92	2.67	0.61	0.13
Females	Low Self-Control	659	24	.91	2.39	0.60	0.38

Table 4
Descriptive Statistics for Parental Bonding Scale

	Variable	N	# Of Items	α	Mean	SD	Skew
Total	Maternal Bonding	974	10	.88	3.94	0.75	-0.56
	Paternal Bonding	951	10	.89	3.81	0.81	-0.37
	Total Parental Bonding	951	20	.92	3.88	0.69	-0.33
Males	Maternal Bonding	338	10	.88	3.79	0.74	-0.23
	Paternal Bonding	330	10	.88	3.54	0.79	-0.07
	Total Parental Bonding	330	20	.91	3.68	0.68	0.02
Females	Maternal Bonding	636	10	.88	4.01	0.74	-0.76
	Paternal Bonding	621	10	.89	3.95	0.78	-0.57
	Total Parental Bonding	621	20	.91	3.98	0.66	-0.53

Table 5
Descriptive Statistics for Mating Effort Scale

	Variable	N	# Of Items	α	Mean	SD	Skew
Total	Mating Effort	903	20	.98	2.49	0.68	0.75
Males	Mating Effort	306	10	.86	2.78	0.69	0.69
Females	Mating Effort	597	10	.84	2.34	0.63	0.82

Notes: Mating Effort was calculated independently for females and males. The total for Mating Effort was calculated using the questions for both groups. Since many of these are the same question with only the sex being changed, the alpha is slightly inflated.

Table 6
Descriptive Statistics for Big 5 Personality Index

	Variable	N	# Of Items	α	Mean	SD	Skew
Total	Extraversion	920	8	.85	3.44	0.70	-0.13
	Agreeableness	920	9	.78	3.80	0.58	-0.22
	Conscientiousness	920	9	.75	3.60	0.59	0.02
	Neuroticism	920	8	.76	2.80	0.64	0.07
	Openness	920	10	.77	3.42	0.55	-0.23
Males	Extraversion	316	8	.80	3.35	0.63	0.22
	Agreeableness	316	9	.78	3.63	0.61	0.04
	Conscientiousness	316	9	.69	3.47	0.55	0.30
	Neuroticism	316	8	.75	2.70	0.60	-0.22
	Openness	316	10	.72	3.40	0.53	0.12
Females	Extraversion	604	8	.97	3.49	0.73	-0.30
	Agreeableness	604	9	.77	3.90	0.55	-0.30
	Conscientiousness	604	9	.77	3.67	0.59	-0.14
	Neuroticism	604	8	.76	2.85	0.65	0.15
	Openness	604	10	.79	3.44	0.56	-0.39

Table 7

Descriptive Statistics for the Arizona Life History Battery (Figueredo, Vasquez, Brumbach, & Schneider, 2007)

	Variable	N	# Of Items	α	Mean	SD	Skew 1	Skew 2
Total	LHS	908	19	.88	3.69	0.54	-0.77	NA
Males	LHS	312	19	.88	3.54	0.55	-0.09	NA
Females	LHS	596	19	.87	3.77	0.52	-1.21	0.54

Notes: Skew 2 was calculated for females only using the square root of LHS. The mean, standard deviation, and skew 1 were calculated prior to the transformation of LHS for females.

Correlations

The first step in studying the hypotheses was to calculate the correlations between the main variables of interest. Again, this was done for the total sample, for the male sample, and for the female sample. Table 8 presents the correlations among parental bonds, life history strategies, deviant behaviors, and low self-control. Results for the total sample were consistent with expectations. For the male sample (see Table 9), there were a few unexpected correlations. No significant correlations were found between Life History Strategy and deviance, low self-control, or mating effort. Correlations for the female sample (see Table 10) again produced some unexpected results. The results showed no significant correlation between father bonding and deviance ($r = -.08$, $p = .05$). There were also no significant correlations between life history strategy and deviance ($r = -.08$, $p = .06$), along with no significant correlation between life history strategy and mating effort ($r = -.04$, $p = .36$).

Inspection of correlations among the Big 5, life history strategy, low self-control, and deviant behaviors provided evidence that the observed relationships were consistent with previous work (see Table 11; Gladden et al., 2009). Table 12 shows the results from the males, which produced similar results, with the exception of the total NDS score, which has become non-significant. When examining the correlations for females (see Table 13), the correlations mirror the results for the males, however for females, low self-control was significantly positively correlated with extraversion.

Table 8

Correlations between Parental Bonds, Life History Strategies, Deviant Behavior, and Low Self-Control (Total Sample)

Variable	1	2	3	4	5	6	7
1. Maternal Bond	1						
2. Paternal Bond	.56**	1					
3. Total Parental Bonding	.88**	.89**	1				
4. Life History Strategy	.49**	.48**	.55**	1			
5. Total NDS	-.13**	-.15**	-.16**	-.12**	1		
6. Low Self-Control	-.27**	-.22**	-.27**	-.16**	.42**	1	
7. Mating Effort	-.27**	-.26**	-.30**	-.09*	.37**	.56**	1

**p<.01, *p<.05

Note: Total NDS was the negative reciprocal of the NDS to correct for skew.

Table 9
Correlations between Parental Bonds, Life History Strategies, Deviant Behavior, and Self-Control (Males)

Variable	1	2	3	4	5	6	7
1. Maternal Bond	1						
2. Paternal Bond	.58**	1					
3. Total Parental Bonding	.88**	.89**	1				
4. Life History Strategy	.44**	.45**	.50**	1			
5. Total NDS	-.12*	-.18**	-.16**	-.05	1		
6. Low Self-Control	-.24**	-.17**	-.22**	-.03	.47**	1	
7. Mating Effort	-.27**	-.23**	-.28**	.03	.37**	.50**	1

**p<.01,*p<.05

Table 10
Correlations between Parental Bonds, Life History Strategies, Deviant Behavior, and Self-Control (Females)

Variable	1	2	3	4	5	6	7
1. Maternal Bond	1						
2. Paternal Bond	.53**	1					
3. Total Parental Bond	.87**	.88**	1				
4. Life History Strategy	.49**	.44**	.53**	1			
5. Total NDS	-.12**	-.08	-.12**	-.08	1		
6. Low Self-Control	-.25**	-.19**	-.25**	-.14**	.35**	1	
7. Mating Effort	-.21**	-.19**	-.23**	-.04	.33**	.54**	1

**p<.001, *p<.05
Note: Total NDS was the negative reciprocal of the NDS to correct for skew. LHS was calculated for females only using the square root of LHS.

Table 11
Correlations between the Big Five, Life History Strategies, Low Self-Control, and Deviant Behavior (Total Sample)

Variable	1	2	3	4	5	6	7	8
1. Extraversion	1							
2. Agreeableness	.27**	1						
3. Conscientiousness	.17**	.48**	1					
4. Neuroticism	-.28**	-.38**	-.25**	1				
5. Openness	.24**	.24**	.17**	-.11**	1			
6. Life History Strategy	.28**	.47**	.44**	-.11**	-.29**	1		
7. Low Self-Control	.04	-.41**	-.36**	.14**	-.09**	-.16**	1	
8. Total NDS	.07*	-.24**	-.22**	.12**	-.02	-.12**	.42**	1

**p<.01, *p<.05
Note: Total NDS was the negative reciprocal of the NDS to correct for skew.

Table 12
Correlations between the Big Five, Life History Strategies, Self-Control, and Deviant Behaviors (Males)

Variable	1	2	3	4	5	6	7	8
1. Extraversion	1							
2. Agreeableness	.23**	1						
3. Conscientiousness	.20**	.49**	1					
4. Neuroticism	-.28**	-.56**	-.34**	1				
5. Openness	.16**	.31**	.36**	-.18**	1			
6. Life History Strategy	.23**	.43**	.40**	-.16**	.38**	1		
7. Low Self-Control	.03	-.36**	-.30**	.29**	-.20**	-.03	1	
8. Total NDS	.09	-.31**	-.23**	.20**	-.06	-.05	.47**	1

**p<.01, *p<.05

Table 13

Correlations between the Big Five, Life History Strategies, Self-Control, and Deviant Behaviors (Females)

Variable	1	2	3	4	5	6	7	8
1. Extraversion	1							
2. Agreeableness	.26**	1						
3. Conscientiousness	.14**	.44**	1					
4. Neuroticism	-.30**	-.35**	-.25**	1				
5. Openness	.27**	.20**	.08	-.08*	1			
6. Life History Strategy	.28**	.45**	.43**	-.11**	.26**	1		
7. Low Self-Control	.08*	-.39**	-.36**	.12**	-.03	-.14**	1	
8. Total NDS	.08	-.17**	-.19**	.14**	-.01	-.08	.35**	1

**p<.01, *p<.05

Note: Total NDS was the negative reciprocal of the NDS to correct for skew. LHS was calculated for females using the square root of LHS.

Regressions Analyses

The final step involved in testing the hypotheses was to complete hierarchical regression analyses. Each regression performed examined the total sample, the males in the sample, and the females in the sample. Consistent with evidence from bivariate correlations, preliminary regression analyses provided evidence that age was not significantly associated with the dependent measures, and thus, it was not included in subsequent analyses. For hypothesis 1a, a regression was performed where parental bonding predicted life history strategies (see Table 14). In all three regressions, parental bonding was found to be a significant predictor of life history strategy: for the total sample ($\beta = .55$, $p < .001$), the male sample ($\beta = .50$, $p < .001$), and the female sample ($\beta = .53$, $p < .001$). This shows that those who have good relationships with their parents usually tend to have slower life history strategies.

Hypothesis 1b was then conducted where life history strategy predicts deviance (see Table 15). For the total sample, life history strategy was a good predictor of deviance ($\beta = -.12$, $p < .01$), but was not a significant predictor for the male sample ($\beta = -.05$, $p = .38$). For the female sample, LHS was not statistically significant, but a trend was observed ($\beta = .08$, $p = .059$). These results appear to indicate that when the sample is counted as a whole, those who have slower life history strategies tending to engage in fewer deviant behaviors, but when separated into males and females the relationship between life history strategies and deviance loses its significance.

Hypothesis 1c was also a regression where mating effort predicted low self-control (see Table 16). Here everything is statistically significant again. The total sample was found to have a significant relationship where mating effort predicts low self-control ($\beta = .56$, $p < .001$). The male ($\beta = .50$, $p < .001$) and female ($\beta = .54$, $p < .001$) samples were also found to be statistically

significant. These results indicate that the higher someone's mating effort is, the lower self-control they will have.

Hypothesis 2a was tested using a multiple regression where the Big 5 were used to predict life history strategy (see Table 17). The multiple regressions showed significance in all areas of the Big 5. Neuroticism, however, was not what was expected ($\beta = .128$, $p < .001$). Gladden, Figueredo, and Jacobs (2009) showed that this correlation should be negative. When considering the same question by sex, the male sample produced the same findings (see Table 18). The female sample results can be seen in Table 19 and also produced findings that were as expected with the exception of neuroticism ($\beta = .119$, $p < .01$).

Hypothesis 2b uses the Big 5 to predict deviance. This was again tested using a multiple regression. Table 20 shows the results for the total sample and produced results that indicated those who were higher in extraversion also had higher deviance scores ($\beta = .163$, $p < .001$). The results also showed that those who were higher in agreeableness and conscientiousness had lower deviance scores ($\beta = -.204$, $p < .001$; $\beta = -.140$, $p < .001$). When the question was examined by sex, the male sample (see Table 21) shows the same findings, where extraversion is positively related to deviance ($\beta = .185$, $p < .01$) and agreeableness and conscientiousness are both negatively related to deviance ($\beta = -.299$, $p < .001$; $\beta = -.131$, $p < .05$). Table 22 shows the results from the female sample and produced the same findings with the addition of neuroticism becoming a significant predictor of deviance ($\beta = .036$, $p < .01$). For all samples openness was not found to be a significant predictor of deviance.

Hypothesis 2c was again tested using a multiple regression, but this time the Big 5 was used to predict low self-control. When examining the total sample (see Table 23), the results showed a few surprising findings. These findings were that there was a significant positive

relationship between the Big 5 and extraversion (β = .176, $p < .001$). The results also showed no significant relationship between the Big 5 and neuroticism (β = -.003, $p = .922$) and no significant relationship between the Big 5 and openness (β = -.015, $p = .622$). When the sample was further divided into males and females, the male sample's results (see Table 24) matched the findings from the total sample with the exception of neuroticism. In the male sample neuroticism had a significant positive relationship with low self-control (β = .142, $p < .05$). When the female sample was examined neuroticism again became non-significant (β = .004, $p = .912$). The rest of the Big 5 for the female sample had similar relationships with low self-control as they did with both the male sample and total sample.

To further examine the relationships between the Big 5 personality traits and life history strategy a multiple stepwise regression was performed. A stepwise regression was chosen to determine if life history strategy has any effects on deviance and low self-control above and beyond the effect of the Big 5 personality traits. When the stepwise regression was performed to determine if life history strategy had an effect on deviance above and beyond the Big 5 for the total sample it was found that it did not (see Table 26). The results showed that when life history strategy was added to the regression the $\Delta R^2 = .000$, which shows that adding life history strategy does not explain more variance. When the sample was divided into male and female, the male sample (see Table 27) showed the same results as the total sample, where adding life history strategy did significantly increase the amount of variance explained ($\Delta R^2 = .006$). Table 28 shows the results for the female sample, which produced the same results as the total sample, where the percent of variance explained did not increase at all ($\Delta R^2 = .000$).

When stepwise regressions were performed while looking at low self-control life history strategy became significant and increased the R^2 from .228 by .006 ($p < .01$) for the total sample

(see Table 29). In the male sample (see Table 30), life history strategy again significantly increased the amount of variance explained ($\Delta R^2 = .026$, $p < .01$). Unlike the total sample and male sample, the female sample (Table 31) shows no significant relationship with life history strategy above and beyond any of the Big 5, however it did approach significance ($\Delta R^2 = .004$, $p = .071$). This is what was expected, with the exception of the female sample, as it shows that the faster a person's life history strategy is, the less self control they have.

Table 14
Hypothesis 1a: Parental Bonding predicting Life History Strategy

		b	SE	β	p-value
Total Sample	Parental Bonding	0.44	.02	.55	< .001
Males	Parental Bonding	0.41	.04	.50	< .001
Females	Parental Bonding	0.12	.01	.53	< .001

Note: The regression for the female sample used the square root of LHS to correct for skewness.

Table 15
Hypothesis 1b: Life History Strategy predicting Deviance

		b	SE	β	p-value
Total Sample	LHS	-.04	.01	-.12	< .01
Males	LHS	-.06	.07	-.05	= .38
Females	LHS	-.10	.05	-.08	= .059

Notes: The regression for the female sample used the square root of LHS and the negative reciprocal of tNDS to correct for skewness. The total sample also used the negative reciprocal of tNDS to correct for skewness.

Table 16
Hypothesis 1c: Mating Effort Predicting Low Self-control

		b	SE	β	p-value
Total Sample	Mating Effort	.50	.03	.56	< .001
Males	Mating Effort	.43	.04	.50	< .001
Females	Mating Effort	.50	.03	.54	< .001

Table 17
Hypothesis 2: The Big 5 Predicting Life History Strategy (Total Sample)

	b	SE	β	p-value
Constant	.45	.18		< .05
Extraversion	.11	.023	.14	< .001
Agreeableness	.30	.031	.317	< .001
Conscientiousness	.26	.029	.275	< .001
Neuroticism	.11	.026	.128	< .001
Openness	.149	.028	.150	< .001

Note: Total NDS used was the negative reciprocal to correct for skew.

Table 18
Hypothesis 2: The Big 5 Predicting Life History Strategy (Males)

	b	SE	β	p-value
Constant	.261	.361		= .470
Extraversion	.106	.044	.121	< .05
Agreeableness	.298	.056	.328	< .001
Conscientiousness	.191	.056	.190	< .01
Neuroticism	.136	.054	.147	< .05
Openness	.240	.054	.230	< .001

Table 19
Hypothesis 2: The Big 5 Predicting Life History Strategy (Females)

	b	SE	β	p-value
Constant	1.06	.062		< .001
Extraversion	.031	.007	.158	< .001
Agreeableness	.077	.011	.291	< .001
Conscientiousness	.072	.009	.292	< .001
Neuroticism	.027	.008	.119	< .01
Openness	.037	.009	.143	< .001

Note: The square root of LHS was used to correct for skew.

Table 20
Hypothesis 2: The Big 5 Predicting Deviance (Total Sample)

	b	SE	β	p-value
Constant	-.445	.079		< .001
Extraversion	.048	.01	.163	< .001
Agreeableness	-.071	.013	-.204	< .001
Conscientiousness	-.049	.013	-.140	< .001
Neuroticism	.017	.011	.054	= .121
Openness	.007	.012	.019	= .563

Note: The negative reciprocal of NDS was used to correct for skew.

Table 21
Hypothesis 2: The Big 5 Predicting Deviance (Males)

	b	SE	β	p-value
Constant	2.49	.499		< .001
Extraversion	.20	.06	.185	< .01
Agreeableness	-.299	.078	-.267	< .001
Conscientiousness	-.163	.078	-.131	< .05
Neuroticism	.072	.074	.063	= .333
Openness	.072	.074	.056	= .332

Table 22
Hypothesis 2: The Big 5 Predicting Deviance (Females)

	b	SE	β	p-value
Constant	-.622	.096		< .001
Extraversion	.044	.011	.168	< .001
Agreeableness	-.037	.016	-.106	< .05
Conscientiousness	-.044	.014	-.136	< .01
Neuroticism	.036	.013	.123	< .01
Openness	-.006	.014	-.018	= .658

Note: Total deviance was calculated using the negative reciprocal of NDS to correct for skew

Table 23
Hypothesis 2: The Big 5 Predicting Low Self-Control (Total Sample)

	b	SE	β	p-value
Constant	4.27	.222		< .001
Extraversion	.153	.028	.174	< .001
Agreeableness	-.363	.038	-.342	< .001
Conscientiousness	-.240	.035	-.228	< .001
Neuroticism	-.003	.031	-.003	= .922
Openness	-.017	.034	-.015	= .622

Table 24
Hypothesis 2: The Big 5 Predicting Low Self-Control (Males)

	b	SE	β	p-value
Constant	3.46	.431		< .001
Extraversion	.158	.052	.164	< .01
Agreeableness	-.222	.068	-.223	< .01
Conscientiousness	-.162	.067	-.146	< .05
Neuroticism	.142	.064	.140	< .05
Openness	-.093	.064	-.082	= .144

Table 25
Hypothesis 2: The Big 5 Predicting Low Self-Control (Females)

	b	SE	β	p-value
Constant	4.08	.273		< .001
Extraversion	.168	.032	.204	< .001
Agreeableness	-.362	.046	-.331	< .001
Conscientiousness	-.239	.041	-.237	< .001
Neuroticism	.004	.036	.004	= .912
Openness	-.002	.04	-.002	= .955

Table 26

Hypothesis 2: Stepwise Regression Predicting Deviance by Big 5 and Life History Strategy (Total Sample)

	Model 1 (R^2 = .098***)			Model 2 (ΔR^2 = .000)		
	b	SE	β	b	SE	β
(Constant)	-.438	.079		-.438	.080	
Step 1						
Extraversion	.045	.010	.154***	.045	.010	.154***
Agreeableness	-.07	.014	-.199***	-.07	.014	-.201***
Consciousness	-.051	.013	-.147***	-.052	.013	-.148***
Neuroticism	.018	.011	.056	.018	.011	.055
Openness	.008	.012	.021	.007	.013	.02
Step 2						
Life History Strategy				.001	.015	.004

*** $p < .001$

Note: The negative reciprocal of Total NDS was used to correct for skew.

Table 27

Hypothesis 2: Stepwise Regression Predicting Deviance by Big 5 and Life History Strategy (Males)

	Model 1 (R^2 = .132***)			Model 2 (ΔR^2 = .006)		
	b	SE	β	b	SE	β
(Constant)	2.55	.501		2.52	.500	
Step 1						
Extraversion	.189	.061	.175**	.176	.061	.163**
Agreeableness	-.297	.078	-.264***	-.333	.081	-.296***
Consciousness	-.165	.078	-.132*	-.188	.079	-.150*
Neuroticism	.068	.075	.059	.051	.075	.045
Openness	.062	.074	.048	.033	.077	.026
Step 2						
Life History Strategy				.120	.079	.097

*** $p < .001$, ** $p < .01$, * $p < .05$

Table 28

Hypothesis 2: Stepwise Regression Predicting Deviance by Big 5 and Life History Strategy (Females)

	Model 1 (R^2 = .078***)			Model 2 (ΔR^2 = .000)		
	b	SE	β	b	SE	β
(Constant)	-.624	.096		-.630	.117	
Step 1						
Extraversion	.042	.011	.162***	.042	.011	.161***
Agreeableness	-.034	.017	-.096*	-.034	.017	-.097*
Consciousness	-.047	.014	-.147**	-.048	.015	-.148**
Neuroticism	.038	.013	.130**	.038	.013	.0129**
Openness	-.006	.014	-.017	-.006	.014	-.017
Step 2						
Life History Strategy				.006	.062	.004

*** $p < .001$, ** $p < .01$, * $p < .05$

Note: The square root of Life History Strategy and the negative reciprocal of total NDS were used to correct for skew

Table 29

Hypothesis 2: Stepwise Regression Predicting Low Self-Control by Big 5 and Life History Strategy (Total Sample)

	Model 1 (R^2 = .228***)			Model 2 (ΔR^2 = .006**)		
	b	SE	β	b	SE	β
(Constant)	4.27	.223		4.22	.223	
Step 1						
Extraversion	.148	.028	.168***	.136	.028	.154***
Agreeableness	-.361	.038	-.339***	-.393	.040	-.370***
Consciousness	-.243	.035	-.230***	-.271	.037	-.256***
Neuroticism	-.002	.031	-.002	-.014	.032	-.014
Openness	-.012	.035	-.011	-.029	.035	-.025
Step 2						
Life History Strategy				.110	.041	.097**

*** $p < .001$, ** $p < .01$

Table 30

Hypothesis 2: Stepwise Regression Predicting Low Self-Control by Big 5 and Life History Strategy (Males)

	Model 1 (R^2 = .170***)			Model 2 (ΔR^2 = .026**)		
	b	SE	β	b	SE	β
(Constant)	3.49	.436		3.43	.430	
Step 1						
Extraversion	.150	.053	.156**	.127	.053	.132*
Agreeableness	-.223	.068	-.222**	-.287	.070	-.286***
Consciousness	-.158	.068	-.142*	-.199	.068	-.179**
Neuroticism	.132	.065	.129*	.103	.065	.100
Openness	-.089	.065	-.077	-.141	.066	-.122*
Step 2						
Life History Strategy				.216	.068	.195**

***p < .001, **p < .01, *p < .05

Table 31

Hypothesis 2: Stepwise Regression Predicting Low Self-Control by Big 5 and Life History Strategy (Females)

	Model 1 (R^2 = .230***)			Model 2 (ΔR^2 = .004)		
	b	SE	β	b	SE	β
(Constant)	4.06	.274		3.72	.334	
Step 1						
Extraversion	.164	.032	.200**	.154	.033	.188***
Agreeableness	-.359	.047	-.328**	-.384	.049	-.351***
Consciousness	-.244	.041	-.241*	-.267	.043	-.264**
Neuroticism	.009	.036	.010	.000	.037	.000
Openness	.003	.041	.003	-.009	.041	-.008
Step 2						
Life History Strategy				.327	.180	.079

***$p < .001$, **$p < .01$, *$p < .05$

Note: The square root of Life History Strategy to correct for skew.

Discussion

Evolutionary theory can be used to gain a better understanding of human behavior and more specifically, those behaviors that can be problematic in today's society. Evolutionary theory moves beyond the traditional theories of deviance, by suggesting that deviant behaviors occur, not necessarily because something went wrong, but rather as an adaptation to one's environment. The previous studies have established the link between life history strategies and deviance and low self-control, though some of the results where unclear or did not appear to be consistent with what would be expected. This study sought to replicate and expand on previously published work by clarifying some of the previous studies that appeared to be provide inconsistent findings related to predictions by theory. This study also sought to expand the literature, by including low self-control in trying to understand the correlates of deviance from an evolutionary perspective. There were several key findings in this study. It was interesting to observe the difference between the males and females in the sample. When correlations were examined, the total sample produced expected results; however, when the sample was divided into males and females, the results changed somewhat. The results indicated that in the males, life history strategy was not related to any problematic behaviors. For females also only a relationship between life history strategies and low self-control was found.

When the hypotheses were tested, several interesting results were found. As expected parental bonding was found to be a significant predictor of life history strategy. This helps further support previous works like those done by Belsky, Steinberg, and Draper (1991) and Ivan and Bereczkei (2006). The results indicated that the better the relationship a child has with his or her parents, the more likely they will be to endorse a slower life history strategy. Interesting results emerged when life history strategy was used to try and predict deviance. When the

sample was taken as a whole, the results indicated that life history strategy was a significant predictor of deviance ($\beta = -.12$, $p < .01$), which shows that those adolescents who have slower life history strategies are less likely to engage in deviant behaviors. However, when the sample was divided into males and females, the results became non-significant. It is unclear as to why this was found, though it may have something to do with which deviant behaviors are being committed by each sex. By combing the sexes in the total sample, important sex differences may be obscured in the extent of which they engage in deviant behaviors, such as males may commit more acts of vandalism while females may binge drink more. When each subscale was considered individually, the results may show that different deviant behaviors become significant depending on the sex of the participants. This is also more in line with Ivan and Bereczkei's (2006) original study, which may also help explain some of their results that did not appear to be inline with what would be expected. There might just be inherent differences between males and females and how parental bonding affects their behaviors and which deviant behaviors they choose to engage in.

Hypothesis 1c focused on the relationship between mating effort and low self-control. Numerous studies have been conducted and have a shown a very strong relationship among mating effort, life history strategies, and deviance (Rowe et al., 1997; Ellis, 1988; Charles & Egan, 2005; Barlas & Egan, 2006). Since those links have already been established many times, this study focused on the relationship between mating effort and low self-control. As was predicted, mating effort was a significant predictor of low self-control across the entire total sample, as well as both males and females. These results indicate that those with higher mating effort also tended to engage in more risky behaviors as evidenced by having low self-control.

When hypothesis 2a was examined, again there were some surprising results. All of the Big 5 subscales were significant predictors of life history strategy, but the direction for neuroticism was not as expected (β = .128). It was predicted that this relationship would have been negative, so that those who scored high on neuroticism would also tend to not endorse slower life history strategies. These results concerning neuroticism remained consistent in both the males (β = .147) and females (β = .119).

Hypothesis 2b examined the relationship between the Big 5 and deviance. Several interesting results were found. The total sample showed that those who were high in extraversion were also more likely to engage in deviant behaviors (β = .163). Neuroticism and openness were both found to be non-significant. These results remained constant for the males, but the females actually showed that those females who were high in neuroticism were also engaging in more deviant behaviors. It is unclear as to why neuroticism was non-significant in the total sample and the males and why openness is non-significant in all three.

The Big 5 personality traits were also used to predict low self-control in hypothesis 2c. These results mirrored those of hypothesis 2b, where extraversion was found to have a positive relationship (β = .174) and neuroticism and openness were both found to be non-significant. This indicates that for the total sample, the only predictor of low self-control is extraversion. Agreeableness and conscientiousness both predict more self-control. For the males, neuroticism did become a significant predictor of low self-control (β = .140, $p < .05$). Openness remained non-significant. For females, again, no significant relationships were found with neuroticism or openness, just like the total sample. Unfortunately, it is unclear why openness and neuroticism were unrelated to low self-control; interestingly previous work also provides no insight into this.

An exploratory analysis was then performed to determine whether life history strategy had an influence on deviance and low self-control above and beyond the influence of the Big 5. When the analysis was conducted for deviance, life history strategy was not significant above the influence of the Big 5. These results were consistent for the total sample, males, and females. However, when performed for low self-control, life history strategy had an effect above and beyond that of the Big 5 for the total sample ($\beta = .097$, $p < .01$). For the males, the results also showed life history strategy had an influence above and beyond that of the Big 5 ($\beta = .195$, $p < .01$), however, females did not produce the same results.

The overall results of this study were consistent with the previous work in the area of evolutionary theory explaining human behaviors. The results did appear to show some marked differences between males and females. These differences appeared to be in how the Big 5 influence behaviors and how the Big 5 and life history strategies interact to influence behaviors. Outcomes about deviance were also somewhat unexpected. It is possible that since the NDS is comprised of many subscales, individual subscales might show significant relationships with life history strategy. Ivan and Bereczkei (2006) considered different types of deviant behaviors instead of an overall deviance score; this might have made a difference in what was significantly associated. Studying a college age group was a good fit for this study. The sample consisted of college students, which is an appropriate age for a study examining behavior that develops over time. By the time someone is college age, they are more likely to have formed a bond with their parents, developed a life history strategy, and developed a mating effort. Mating effort is key to the age group, because most college students are not married, but are actively seeking partners and how they are seeking these partners is what determines their mating effort. A sample of high school students may not provide an accurate view of their mating effort or their life history

strategies due to the fact that they are still being formed. Conversely, a sample of those out of college is more likely to be married and settled down, so their mating effort scores may not be reflective of what their behavior had been.

Limitations

Though this study produced results that were consistent with expectations, there were areas in which the study could be improved. First, though the age of the sample was ideal for the study the makeup of the sample did not necessarily represent the population. Eighty-seven percent of the population was European American, 65.8% were female, 48.5% came from families making more than $100,000 per year, and 31.1% were from the homes making between $60,000 and $100,000. Thus, the sample was composed mostly of upper-middle class to upper class youth. All of these factors could affect the results of the study. Since most of the participants were from upper middle to upper class families, they are less likely to develop fast life history strategies. This is because they probably do not come from neighborhoods where developing these faster life history strategies would seem beneficial. Second, since these participants come from upper middle to upper class homes, they might engage in actual criminal behavior less than their peers from families with lower socioeconomic status. Deviance was measured using the NDS, which uses a Likert-scale ranging from 0 to 6 or more times for any given deviant act. The mean of the whole sample is 1.71, indicating that the group overall has low rates of deviance. This could have produced deviance scores that would not translate to the general population, thus not match the results found in previous studies. Third, this was a cross-sectional study, so no causal inferences can be made. Finally, the data were collected through self-report questionnaires and relied on the participants' honesty to be accurate. On the other hand, self-report questionnaires were perhaps the only way to obtain the necessary data, since

only the participants themselves know their attitudes towards mating effort and their life history strategy. Deviance could have potentially been measured by examining court records or police reports; however criminal records of juveniles are not public record and not every deviant act is documented in this way. Future research should use a sample more representative of the general population. It should also consider individual deviant behaviors, such as drug and alcohol use, vandalism, theft, and assault. This would allow studies to examine how life history strategies and mating effort affect different types of deviant behaviors. This study also used the Mini K version of the Arizona Life History Battery, which is a shorter version of the full measure. It is possible that this short version produced results that may differ from the results that would have been obtained from the full version. Additionally, the Mini K that was used focuses more on aspects of slow life history strategies and assumes that an absence of these indicates a faster life history strategy. Future research may wish to more directly measure fast life history strategies. This would need to be considered with the deviance measure so as to not overlap. This could potentially be done by measuring deviance with acts that are known to be criminal in nature. Indicators of fast life history strategies might include non-criminal aggression and risky sexual behaviors.

There is also some shared method variance in the questionnaire, especially related to parental bonding in the Adolescent Family Process Measure and the Arizona Life History Battery. Both measures have questions related to how close the participant was with his or her parents, potentially inflating the association between parental bonding and life history strategy. An example is The Adolescent Family Process Measure had multiple questions related to the closeness with mother and the Arizona Life History Battery had the statement "While growing up, I had a close and warm relationship with my biological mother." Measurement overlap could

potentially be addressed by removing the section in the Arizona Life History Battery that concerns parental relationships and analyzing the data again to see if there were any marked differences with the removal.

There are multiple contributing factors to deviance and criminal behaviors that this study does not take into consideration. There are biological factors in play that could have significant influence over these behaviors, especially in adolescents. It is also likely that these biological factors impact a person's mating effort. The adolescent brain is still not fully developed and their decision making skills are still being developed. Their hormone levels are also rising which may influence their mating effort. These biological factors could be interacting with other external variables making a person more or less prone to deviance and mating effort.

Parental bonding and support for this sample group may also be significantly different from that of groups with lower socioeconomic status. When a family lives in poverty there are likely additional stressors those parents face that many of the participants of this study did not have to contend with. Poverty may be linked to lack of transportation to better jobs, thus increasing the parent's time away from home due to travel or having to work multiple jobs. This time away could negatively impact bonding and support. Poverty could also be linked to substance abuse, mental health, or physical disability, all of which could impair a parent's ability to bond with and support their child. This is not to say that these issues do not occur in families with higher socioeconomic status; these families just have access to more resources to address potential issues and thus mitigate some of the risk.

Conclusion

The results from this study add to the current literature by reaffirming some of the findings from previous work. It was shown that there are strong links between parental bonds and life history strategies, along with strong links between mating effort and low self-control. While causality cannot be inferred, there is evidence that the bonding between a parent and their child can affect how that child will develop and behave in society. While there was no significant relationship between life history strategy and deviance, previous work has shown a relationship between parental bonding and specific types of deviant behaviors. Future studies should examine how life history strategy is related to more specific types of deviance. When considering the relationship between the Big 5 Personality Traits and life history strategy's influence on deviance and low self-control, it was found that when taken together life history strategy did not explain any significant amount of the variance for deviance. However, life history strategy did explain a significant amount of the variance in self-control in the total sample and in the males beyond what was explained by the Big 5. These findings should again be explored by the sub-categories of the deviance measure and then overlapping items should be examined with low self-control. This would help determine if they are measuring the same thing, or if there is some different underlying mechanism that might influence someone's willingness to engage in risky behaviors.

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Appendix A
Normative Deviance Scale (NDS)

Have you ever...?

Vandalism

1. Smashed bottles on the street, school grounds, or other areas?
2. Intentionally damaged or destroyed property belonging to your parents or other family members (brothers or sisters)?
3. Intentionally damaged or destroyed property belonging to a school?
4. Intentionally damaged or destroyed other property (signs, windows, mailboxes, parking meter, etc.) that did not belong to you?
5. Intentionally damaged or destroyed property belonging to your employer or at your workplace?
6. Slashed or in any way damaged seats on a bus, in a movie theater, or something at another public place?
7. Written graffiti on a bus, on school walls, on rest room walls, or on anything else in a public place?
8. Committed acts of vandalism when coming or going to a football game or other sports event?

Alcohol

9. Consumed hard liquor (e.g. tequila, whiskey, vodka, or gin) before you were 21?
10. Consumed alcoholic beverages (e.g. beer, wine, or wine coolers) before you were 21?
11. Got drunk (intentionally) just for the fun of it (at any age)?
12. Got drunk just to fit in and be part of the crowd (at any age)?
13. Lied about your age to buy alcohol before you turned 21?
14. Had an older brother/sister or friend buy alcohol for you?
15. Bought alcohol for a brother/sister or friend?

Drug use

16. Used tobacco products regularly (e.g., cigarettes, chew, snuff etc.)
17. Used "soft" drugs such as marijuana (grass, pot)?
18. Used "hard" drugs such as crack, cocaine, or heroin?
19. Gone to school when you were drunk or high on drugs?
20. Gone to work when you were drunk or high on drugs?
21. Gone to a concert when you were drunk or high on drugs?
22. Gone to a club/dance/party when you were drunk or high on drugs?
23. Gone to a club/dance/party to get drunk or high on drugs?
24. Sold any drugs such as marijuana (grass, pot), cocaine, or heroin?

School misconduct

25. Cheated on school tests (e.g., cheat sheet, copy from neighbor, etc.)?
26. Been sent out of a classroom because of "bad" behavior (inappropriate behaviors, cheating etc.)?
27. Been suspended or expelled from school?
28. Stayed away from school/classes when your parent(s) thought you were there?
29. Intentionally missed classes over a number of days for "no reason," just for fun?
30. Been in trouble at school so that your parents received a phone call about it?
31. Skipped school/work (pretending you are ill)?

General deviance

32. Intentionally disobeyed a stop sign or a red traffic light while driving a vehicle?
33. Been on someone else's property when you knew you were not supposed to be there.
34. Failed to return extra change that you knew a cashier gave you by mistake?
35. Tried to deceive a cashier to your advantage (e.g. flash a larger bill and give a smaller one)?
36. Let the air out of the tires of a car or bike?
37. Lied about your age to get into a nightclub/bar?
38. Made nuisance/obscene telephone calls?
39. Avoided paying for something (e.g. movies, bus or subway rides, food, etc.)?
40. Used fake money or other things in a candy, coke, or stamp machine?
41. Shaken/hit a parked car just to turn on the car's alarm?
42. Stayed out all night without informing your parents about your whereabouts?

Theft

43. Stolen, taken, or tried to take something from a family member or relative (personal items, money)?
44. Stolen, taken, or tried to take something worth $10 or less (newspaper, gum, money)?
45. Stolen, taken, or tried to take something worth between $10 and $100 (shirt, watch, cologne, video game, shoes, money)?
46. Stolen, taken, or tried to take something worth more than $100 (leather jacket, car stereo, bike, money)?
47. Stolen, taken, or tried to take something that belonged to "the public" (street or construction sign)?
48. Stolen or tried to steal a motor vehicle (car or motorcycle)?
49. Bought, sold, or held stolen goods or tried to do any of these things?

Assault

50. Hit or threatened to hit a person?
51. Hit or threatened to hit your parent(s)?
52. Hit or threatened to hit other students/peers or people?
53. Used force or threatened to beat someone up if they didn't give you money or something else you wanted?
54. Been involved in gang fights or other gang activities?
55. Beaten someone up so badly they required medical attention?

Appendix B

Low Self-Control Scale

Impulsiveness

1. I often act on the spur of the moment without stopping to think.
9. I often do whatever brings me pleasure here and now, even at the cost of some distant goal.
13. I'm more concerned with what happens to me in the short run than in the long run.
20. I don't devote much thought and effort to preparing for the future.

Risk seeking

3. I like to test myself every now and then by doing something a little risky.
4. Sometimes I will take a risk just for the fun of it.
6. I sometimes find it exciting to do things for which I might get into trouble.
11. Excitement and adventure are more important to me than security.

Self-centeredness

2. If things I do upset people, it's their problem not mine.
12. I try to look out for myself first, even if it means making things difficult for other people.
14. I will try to get things I want even when I know it's causing problems for other people.
17. I'm not very sympathetic to other people when they are having problems.

Temper

21. I lose my temper pretty easily.
22. Often, when I am angry at people, I feel more like hurting them than talking to them about why I am angry.
23. When I'm really angry, other people should stay away from me.
24. When I have a serious disagreement with someone, it's usually hard for me to talk calmly about it without getting upset.

Simple Tasks

5. I frequently try to avoid projects that I know will be difficult.
7. I dislike really hard tasks that stretch my ability to the limit.
15. When things get complicated, I tend to quit or withdraw.
19. The things in life that are easiest to do bring me the most pleasure.

Physical Activity

8. If I had a choice, I would almost always rather do something physical than something mental.
10. I almost always feel better when I am on the move than when I am sitting and thinking.
16. I like to get out and do things more than I like to read or contemplate ideas.
18. I seem to have more energy and a greater need for activity than most other people my age.

Appendix C

Adolescent Family Process Measure

Mother closeness

1. My mother often asks about what I am doing in school.
2. My mother gives me the right amount of affection.
3. One of the worst things that could happen to me would be to find out that I let my mother down.
4. My mother is usually proud of me when I finish something at which I've worked hard.
5. My mother trusts me.
6. I am closer to my mother than are a lot of kids my age.

Mother support

7. My mother sometimes puts me down in front of other people.
8. Sometimes my mother won't listen to me or my opinions.
9. My mother sometimes gives me the feeling that I'm not living up to her expectations.
10. My mother seems to wish I were a different type of person.

Father closeness

31. My father often asks about what I am doing in school.
32. My father gives me the right amount of affection.
33. One of the worst things that could happen to me would be to find out that I let my father down.
34. My father is usually proud of me when I finish something at which I've worked hard.
35. My father trusts me.
36. I am closer to my father than are a lot of kids my age.

Father support

37. My father sometimes puts me down in front of other people.
38. Sometimes my father won't listen to me or my opinions.
39. My father sometimes gives me the feeling that I'm not living up to his expectations.
40. My father seems to wish I were a different type of person.

Appendix D

The Matting Effort Scale

Heterosexual males

1. When I see an attractive girl with her boyfriend, I might try to get her attention.
2. I would rather date several girls at once than just one girl.
3. I think girls find me naturally attractive.
4. I like girls more for their good looks than for their companionship.
5. I would get back at someone who looked at my girlfriend in the wrong way.
6. I would start a relationship with another girl before ending one with my current girlfriend
7. My friends respect me because they know I'm a little wild and crazy
8. If other guys think I am attractive to girls, they will stay away from my girlfriend.
9. Other guys respect me because they know I have a lot of friends who would support me.
10. If other guys think I am "tough", they will stay away from my girlfriend.

Heterosexual females

21. When I see an attractive boy with his girlfriend, I might try to get his attention.
22. I would rather date several guys at once than just one boy.
23. I think guys find me naturally attractive.
24. I like guys more for their good looks than for their companionship.
25. I would get back at someone who looked at my boyfriend in the wrong way.
26. I would start a relationship with another boy before ending one with my current boyfriend
27. My friends respect me because they know I'm a little wild and crazy
28. If other girls think I am attractive to boys, they will stay away from my boyfriend.
29. Other girls respect me because they know I have a lot of friends who would support me.
30. If other girls think I am "tough", they will stay away from my boyfriend.

Appendix E

Big Five Inventory

I See Myself as Someone Who…

Extraversion

1. Is talkative
6. Is reserved
11. Is full of energy
16. Generates a lot of enthusiasm
21. Tends to be quiet
26. Has an assertive personality
31. Is sometimes shy, inhibited
36. Is outgoing, sociable

Agreeableness

2. Tends to find fault with others
7. Is helpful and unselfish with others
12. Starts quarrels with others
17. Has a forgiving nature
22. Is generally trusting
27. Can be cold and aloof
32. Is considerate and kind to almost anyone
37. Is sometimes rude to others
42. Likes to cooperate with others

Conscientiousness

3. Does a thorough job
8. Can be somewhat careless
13. Is a reliable worker
18. Tends to be disorganized
23. Tends to be lazy
28. Perseveres until the task is finished
33. Does things efficiently
38. Makes plans and follows through with them
43. Is easily distracted

Neuroticism

4. Is depressed, blue
9. Is relaxed, handles stress well
14. Can be tense
19. Worries a lot
24. Is emotionally stable, not easily upset
29. Can be moody
34. Remains calm in tense situations
39. Gets nervous easily

Openness

5. Is original, comes up with new ideas
10. Is curious about many different things
15. Is ingenious, deep thinker
20. Has an active imagination

25. Is inventive
30. Values artistic, aesthetic experiences
35. Prefers work that is routine
40. Likes to reflect, play with ideas
41. Has few artistic interests
44. Is sophisticated in arts, music, or literature

Appendix F

The Arizona Life History Battery

Insight, planning, and control

1. I can often tell how things will turn out
2. I try to understand how I got into a situation to figure out how to handle it
3. I often find the bright side to a bad situation
4. I don't give up until I solve my problems
5. I often make plans in advance
6. I avoid taking risks

Mother/father relationship quality

7. While growing up, I had a close and warm relationship with my biological mother
8. While growing up, I had a close and warm relationship with my biological father

Altruism towards own children

9. I have a close and warm relationship with my own children

Experiences in close relationships

10. I have a close and warm romantic relationship with my sexual partner
11. I would rather have one than several sexual relationships at a time
12. I have to be closely attached to someone before I am comfortable having sex with them

Family/friends contact

15. I am often in social contact with my friends
13. I am often in social contact with my blood relatives

Family/friends support

14. I often get emotional support and practical help from my blood relatives
16. I often get emotional support and practical help from my friends

Altruism towards friends

17. I often give emotional support and practical help to my friends

Altruism towards community

18. I am closely connected to and involved in my community

Religiosity

19. I am closely connected to and involved in my religion