

Comparative Analysis of Psychopath Risk-Taking Tendency: Perspective from the Evolutionary Domain-Specific Risk Scale

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Abstract:

This paper examines psychopathy as an adaptive trait, exploring the influence of the environment on the development of psychopathic traits. It considers the Adaptive Calibration Model (ACM) and the Life History Theory (LHT) to explain how harsh and threatening environments may lead to the adoption of psychopathic characteristics as a survival strategy. This paper analyzes the Psychopathy Checklist-Revised (PCLR) and the Evolutionary Domain-Specific Risk Scale (ERS) to associate psychopathy with a decreased sensitivity to stress response systems and a focus on short-term benefits in “dangerous” environments. This research delves into potential sex differences in risk-taking tendencies among psychopathic subjects, highlighting a need for consistent self-reported measures using the Balloon Analog Risk Task (BART) for future assessments.

Keywords:- psychopath, risk-taking, trait, sex difference

1. Introduction

1.1 Background

Compared to normal people, “psychopathy is a mental and personality disorder that has shallow emotions, lack of empathy, deceptiveness, grandiosity, etc” [1]. One of the possible explanations for psychopaths to happen is that humans are a species that have developmental plasticity, that is, we are able to

respond to external influence by altering our brain, anatomy, and physiology so that we can adapt to the environment [2]. The following content mentions several theories proposed by multiple scholars for the above explanation.

Alper claimed that, if people live in a harsh and threatening environment, most of them may face relatively high rates of harmful mental illnesses, such as anxiety disorder, depression, etc [3]. However, having psychopathy can decrease the sensitivity of their

stress response system, which a recently proposed model can explain, the Adaptive Calibration Model, which explains the way environmental circumstances can facilitate or foster psychopathic traits [4]. According to ACM, the autonomic nervous system and the hypothalamic pituitary adrenal axis are simultaneously responsible for calibrating an individual's stress response system, making ACM itself crucial to the development of life history-related traits, such as mating or risk-taking. [4]. "...frequent activation of the stress-response system, which can alter gene expression, which in turn affects hormone levels and behavioral outcomes". Such alternation could be harmful to individuals in benign environments, as being aggressive or excessively lacking empathy may lead to isolation and repulsion from groups. In fact, active stress response "...is beneficial in 'dangerous' environments" [5]. This offered a possible interpretation of why ACM could be beneficial for having psychopathic traits.

Another theory that can be associated with psychopathic traits is the life history theory(LHT), which explains intra-species variation in humans as a result of environmental variation and predicts trade-offs "that must be made due to limited time and energy budgets" [4].

In this theory, there are two strategies – one is called the fast life history strategy(high growth rate, offspring, and mortality), and another is called the slow life history life strategy (slow growth rate, putting off maturity to reproduce, and longer life) – most of the time normal people will tend to adapt a slow life strategy. In fact, it is beneficial to have behavioral traits associated with fast life strategies in a dangerous and unpredictable environment. Thus, following this, psychopathy tends to represent a fast life history strategy that focuses mainly on mating effort rather than parenting effort. [2].

1.2 Hypothesis

As a result, we can assume that compared to normal people psychopaths tend to take more risky behavior as evidenced by the life history theory and ACM model.

Moreover, considering risk attitudes, which is the likelihood of engaging in risk behaviors based on a subject's risk perception and expected benefits [7], females usually have higher vulnerability compared to males. Specifically, studies about Parental Investment Theory believe that females have higher parental investment, causing them to have limited ability to avoid external hazards and injuries. At the same time, pregnancy itself greatly consumes women's physical strength and energy, resulting in mobility restrictions. In contrast, possibly a man needs to provide a portion of the resources to support the woman he has sex with and the growth of his child, which allows the man to engage in more and higher risk-taking behavior.

Suppose psychopath is an adaptive trait dealing with the environment. In that case, it is reasonable that we assume: the sex difference is greatly exacerbated in situations that are more dangerous and require the use of fast-life-history strategies, and because psychopaths generally appear in more stressful environments, this should greatly limit the risk-taking tendency of female psychopaths.

2. Method

We took 100 psychopaths(diagnosed through our PCLR test) from mental hospitals, and the other 100 normal people signed up through our posters and passed through a designed questionnaire survey as volunteers. There are 50 men and 50 women in both the psychopaths and normal people groups.

Table 1 PCL-R [8]

Item	Mean item-total correlation	Factor 1	Factor 2
Glibness/superficial charm	0.5	0.86	-0.25
Grandiose sense of self-worth	0.52	0.76	-0.16
Need for stimulation	0.58	0.09	0.56
Pathological lying	0.53	0.62	0.03
Conning/manipulative	0.58	0.59	0.10
..

According to Table 1, archival information basically includes previous diagnoses of psychopathy or similar disorders. The researcher, sometimes an assistant, will give people who will be potentially diagnosed as psychopaths an interview. Contents in the interview will be noted down by examiners and recorded on the monitor, which were

then assessed on a 3-point scale(Each PCL-R is scored on a 3-point scale (0,1,2). The experimenters evaluated the scores in the form of interviews, with 0 being normal people, 1 being uncertain, and 2 being psychopaths [8]) to determine whether the participants were psychopaths. As we expected, psychopaths mostly tend to score higher

than the mean scoring on items such as the Need for Stimulation, Poor Behavioral Controls, and Impulsivity, so they are expected to have a higher risk-taking tendency. The PCLR measures by using two factors. The First is the measure of Emotional Detachment which is things including superficial charm, manipulativeness, and shallow affectivity. The other factor is the measure of antisocial Behavior such as deviance from an early age, aggression, impulsivity, etc. [1].

Through PCLR, we identify 100 subjects inclined to be psychopaths, and then ERS is adopted to identify the individual's risk-taking tendency.

The Evolutionary Domain-Specific Risk Scale(ERS) [7] can be used to test male and female psychopaths and normal people in considering risky behavior. It operates by testing an individual's tendency to engage in risky behaviors in ten evolutionary domains. Participants are asked to answer questions about different risky activities. Participants are asked to rate their likelihood ranges. In addition, they are also asked to rate how risky they perceive each situation to be.

Also, they will rate the potential benefits of each situation. ERS also considers life-history variables such as age, sex, and relationship status, which will possibly influence risk-taking propensity. As a result, ERS can test the sex difference between the two sides in risk behavior [7].

3. Discussion

3.1 Implication

We are expecting a significantly higher level of risk-taking tendency in both male psychopath subjects and female psychopath subjects, by various aspects measured in the ERS. This can be shown by multiple factors within the scale. For example, Wilke(2014) found that among risk-taking in 10 evolutionary content domains, male psychopath subjects are expected to be more risk-seeking than women in 8 of the domains, while in 2 of the 10 domains, women are more risk-prone than men [7].

We assume that this diversity between sexes should be larger among psychopath subjects compared to the outcome among normal people subjects.

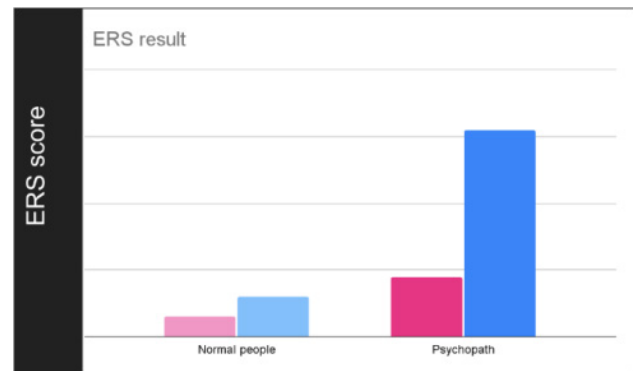


Figure 1. Expecting result of the ERS scale

There could exist the possibility that sex differences turned out to be less significant or not significant by giving both sexual groups the ERS scale, at the same time the results can show no comparison of the significance of sex differences comparing the scoring of psychopath people and normal people, which reject our hypothesis that gap in the risk-taking tendency of male and female is magnified in psychopath people. This misprediction can possibly be attributed to the (a)self-measurement bias of the self-measurement portion of the ERS scale, which states that people could report higher risk-taking tendencies while being less risk-prone under real circumstances.

Moreover, maybe psychopaths do have a higher level of risk-taking tendency, but (b)because both male psychopaths and female psychopaths have the exact same tendency to take risks, they have the same traits, which led to the same level of risk-taking in psychopath subjects. Since this test is only a proposed method, we suggest future research adopt the BART(Balloon Analogue Risk Task) assessment to ensure the consistency of self-reported risk-taking tendency with risk-taking behaviors.

In specific, the BART assessment is a computer simulation task that is intended to assess a subject's risk-taking behavior. During the task, a simulated balloon and balloon pump(or button) appear on the screen along with a reset button labeled 'Collect \$\$\$' and a permanent money-earned display labeled 'Total Earned''' [9]. They click the computer mouse to inflate the balloon to a desired level, but they are not given information about when the balloon might explode, only that it could explode at any time. Each click on the pump inflated the balloon one degree (about 0.125 inches in all directions), inflating the balloon and accruing \$0.05 in a temporary reserve. If the balloon exceeds its explosion point, it bursts, sounds an explosion, and participants lose all accrued money, with a new balloon appearing for the next trial. Participants can cash in their temporary earnings at any time, transferring the money to the permanent bank, during which the total is updated incrementally [9].

This process allows us to evaluate whether risk-taking tendencies measured by the ERS align with actual risk-taking behavior. And if the ERS result is consistent with risk-taking behavior, then we can better decide whether our hypothesis should be rejected or should be accepted. In other words, the BART experiment helps us to rule out any possible self-report bias.

3.2 Limitation

There are conditions that this method does not consider, such as (a) participants who reported not being married or in a committed relationship may score significantly higher in the domains of mate attraction and mate retention. (b) Age, reproductive goal setting, parental status, number of siblings, and birth order, which aren't considered in this method, could also affect the formation of risk thresholds, which affects the expected accuracy of the given ERS scale [7]. Additionally, questionnaires given to people may not be accurate due to factors such as self-report bias. Such limitations should be circumvented by involving specific steps in actual research to avoid affecting the accuracy and scientific nature of the results.

4. Conclusion

This paper is intended to answer the problem proposed in the introduction, that: could antisocial personality disorder (commonly referred to as psychopathy) result from an adaptation for responding to harsh environments? While from an evolutionary perspective, there are several known mechanisms of how individual differences can emerge. For instance, the Life History Theory, the ACM, and Parental Investment Theory. Our experiment is designed to testify to the diversity in risk-taking tendency in (a) psychopaths vs. normal people and (b) males vs. females. By using PCLR, our experiment diagnoses psychopath subjects, and by giving an ERS test scale, the scoring of risk-taking tendency can be shown and compared. We believe that in the future people can continue our methodology and keep improving it.

Nevertheless, the current study can include some limitations in clearly identifying the formation of risk behavior since there are a lot of factors that influence it, like goal setting and birth order, etc. As a result, future studies

should focus on improving the connection between life history variables and individual risk-taking tendencies. In addition, restricting the range to identify the level of risk-taking by enhancing the question asked by the experimenters is indispensable.

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