Does Parental Investment affect Emotional Concern and Psychopathy in Grown-up Children?

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Master's Thesis in Psychology

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FAKULTETEN FÖR HUMANIORA, PSYKOLOGI OCH TEOLOGI ÅBO AKADEMI

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Parental investment is an important cue for children to determine whether the environment is safe and predictable or risky and chaotic. An unpredictable environment may justify a risky lifestyle with early reproduction and little investment into offspring, while a predictable environment allows a cautious lifestyle and more parental care. Empathic concern and psychopathy can represent there two different life history strategies. We investigated the relationship between parental investment, empathic concern and psychopathy and hypothesized the amount of parental investment to positively influence emotional concern and negatively influence psychopathy. We also explored whether maternal and paternal investment would affect emotional concern or psychopathy differently for men and women. The sample consisted of 1291 participants' self-reports. Parental investment was assessed with a self-constructed measure, emotional concern was assessed with Interpersonal Reactivity Index questionnaire items and psychopathy was assessed with the Self-Report Psychopathy III form. Using a Structural Equation Model (SEM), we found a positive relationship between maternal investment and emphatic concern ($\beta = 0.15$), and a negative relationship between both maternal investment ($\beta = -0.09$) and paternal investment ($\beta = -0.08$) and psychopathy. Interestingly, maternal investment contributed to their daughters' empathic concern and paternal investment positively influenced their sons' emphatic concern. Similarly, maternal investment negatively affected their sons' psychopathy scores, and paternal investment negatively affected their daughters' psychopathy scores. The results generally supported the theoretical predictions showing that offspring of more caring parents had higher emotional concern and lower psychopathy scores which reflect a slower, cautious lifestyle.
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Föräldrainvesteringar är en viktig ledtråd för barn för att avgöra om miljön är trygg och förutsägbar eller riskabel och kaotisk. En oförutsägbar miljö kan motivera en riskabel livsstil med tidig reproduktion och små investeringar i avkommor, medan en förutsägbar miljö möjliggör en försiktig livsstil och mer föräldraomsorg. Empatisk oro och psykopati kan representera tecken på två olika life hitstory strategier för att hantera andra människor. Vi undersökte förhållandet mellan föräldrainvestering, empatisk oro och psykopati och antog att den föräldrainvestering försökspersonerna själva fått under barndomen skulle öka empatisk oro och minska påverka psykopati. Vi undersökte också om moder- och faderinvesteringar skulle påverka empatisk oro eller psykopati på olika sätt för män och kvinnor. Urvalet bestod av 1291 deltagarens svar på ett självrapportfrågeformulär. Föräldrainvesteringar utvärderades med ett självkonstruerat mått, empatisk oro bedömdes med Interpersonal Reactivity Index frågeformulär och psykopati utvärderades med formuläret Self-Report Psychopathy III. Med hjälp av en strukturell ekvationsmodell (SEM) hittade vi ett positivt samband mellan moderinvestering och empatisk oro ($\beta = 0.15$) och ett negativt samband mellan moderlig ($\beta = -0,09$) och faderlig investering ($\beta = -0.08$) och psykopati. Dessutom visade resultaten att moderlig investering bidrog till döttrars empatiska oro och faderliga investeringar bidrog till söners empatisk oro. På samma sätt minskade moderns investering sönernas psykopatiska poäng och faderliga investering minskade döttrarnas psykopati. Generellt stödde resultaten de teoretiska förutsägelserna och visade att avkommor till mer vårdande föräldrar hade högre empatisk oro och lägre psykopatiska poäng som återspeglar en långsammare, försiktig livsstil.
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Does Parental Investment affect Emotional Concern and Psychopathy in Grown-up Children?

That parents influence their children in myriad ways is widespread idea in psychology and has been studied from different perspectives. The field of evolutionary psychology and especially Life History Theory (LHS), which connects behavior of individuals with the demands and possibilities of their respective living environments, allows for exploration of parental investment (PI) in their offspring from a new angle. In the current study, we investigated the impact of PI on children's emphatic concern and psychopathic tendencies in the light of LHS. The hypothesized associations were based on the assumption, that the amount of PI sends an implicit message to the offspring about the volatility and stability of the living environment, and that this impacts the offspring's behavioral tendencies.

Parental Investment and Attachment

Compared to other species, humans spend relatively much time and energy raising their offspring who are dependent on the caregivers a long time after birth. PI includes both supplying the physical resources (e.g., food and shelter) as well as attention, care, and education or fostering (Trivers, 1972). There is an inherent parent-offspring conflict over PI because of the different biological fitness optima of children and their caregivers (Trivers, 2015). To ensure safe and prosperous development, a child benefits from receiving more PI than the parent is willing to provide. Parents have an interest in their child's successful maturation, but also benefit from devoting time and energy to searching for new mating opportunities or raising other offspring. The amount of PI depends on several contextual factors. Cross-culturally, research indicates that PI tends to be lower in step-relationships (Antfolk, Karlsson, Söderlund, & Szala, 2017), and when paternity is uncertain (Bianchi & Jacobs, 2016). A father who knows or suspects that the child comes from another man has less motivation to invest into the offspring as it is not favoring the survival of his genes. Parents' psychological health and well-being (Belsky & Jaffee, 2015), higher social class (Gauthier, 2015), higher quality of marital or romantic relations (Krishnakumar & Buehler, 2000) and increased social support (Andresen & Telleen, 1993) are also associated with higher PI.

The quantity and quality of PI influences the child's development in a number of ways. Attachment theory stipulates that human babies are born with a biological predisposition of perceiving behavioral patterns their caregivers exhibit to form a special bond with them (Bowlby, 1969). If the parents are physically and emotionally available (a form of high PI), their children form a secure attachment which allows them to confidently explore the surroundings. In families with low or unstable PI, an unsecure attachment is likely to be formed between the child and its caregivers (Bowlby, 1969). In this case, the child may develop a negative interaction

pattern with its parents and, possibly, be less successful in exploring the surroundings. Early social interactions prepare children for social environments that they are likely to encounter during their life (Belsky, Steinberg, & Draper, 1991). Parents' availability and attention provide children with an example of social interactions and allow them to make assumptions about the social environment and form expectations about other humans behavior. The bond with the caregiver thus affects how the child will develop, explore the surroundings, and consider social contexts.

In most instances, the influence of the child's maternal and paternal attachment on the overall well-being and happiness (Amato, 1994) or on development of internalizing symptoms (Brumariu & Kerns, 2010) is comparable. In other areas, maternal and paternal attachment have unique influences. A study found that the child's maternal but not paternal attachment was associated with how the child reacted to bullying situations (Nickerson, Mele, & Princiotta, 2008). In particular, children who had better attachment to mothers were more likely to act like defenders, rather than outsiders, in bullying situations. The importance of the father's contribution to the development of the offspring can also be understood by considering the effects of father absence on children. A literature review concluded that father absence appears to be related to a set of negative consequences in children and adolescents including low self-esteem, poor academic performance, substance abuse, earlier sex debut and teenage pregnancies as well as poorer mental health, but highlighted that poverty is often a contributing factor (East, Jackson, & O'Brien, 2006). Furthermore, a meta-analysis investigating the impact of father absence on earlier age of menarche in girls showed that girls from homes with an absent father tend to have earlier menarche onset compared to their peers from full families (Webster, Graber, Gesselman, Crosier, & Schember, 2014). Thus, father absence could be considered an environmental cue that, along with other factors, suggests an unstable and insecure environment and primes the children to take more risks and prefer behavior that promises short term outcomes.

The various forms and amount of PI the child receives from its parents influences how the child will consider and interact with others. A child of emphatic and supporting parents may assume that its environment is safe and stable and that others can be trusted to have good intentions. The assumptions made by a child that receives less support may be the opposite: The environment can seem unstable and insecure, and other humans might not appear equally trustworthy (Simpson & Belsky, 2008). Hence, depending on these cues, children might modulate their own social development to adapt to the environment they perceive.

Life History Theory

Life history theory is an integrative framework within evolutionary psychology connecting previously segregated areas of research, which postulates that organisms have a limited amount of resources (e.g., time, energy) and need to optimally use them considering the circumstances (e.g., environment, climate, food availability) and competition with other individuals (Del Giudice, et al., 2015). Different life-history strategies (LHS) are best regarded as ranging from slow to fast. A more unstable and insecure environment drives the organism to adopt a fast LHS and mature early, with the aim to leave more offspring behind, but without investing heavily into each of their development. In this case, early sexual maturation and sexual reproduction is balanced against the increased risk of early death. In such circumstances, it is also relatively likely that some offspring will perish before reproduction, negatively affecting the fitness value of the PI directed towards them. In this case, it is more beneficial to have many descendants and devote relatively less resources into their upbringing (Del Giudice et al., 2015). At the other end of the spectrum, a slow LHS is characterized by a prolonged period of maturation and delayed sexual reproduction, which can result in having less offspring but providing relatively more PI to each of them (Del Giudice et al., 2015). In other words, individual LHS will vary depending on environmental factors and facilitate behaviors congruent with the perceived conditions.

The key cues that humans use to modulate their LHS are believed to be the harshness and unpredictability (vs. security and stability) of the childhood environment (Belsky, Schlomer, & Ellis, 2012). Children are most sensitive to environmental cues during the first five years of life (Belsky et al., 1991; Draper & Harpending, 1982; Ellis, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1999). Children also make inferences about the environment based on PI, such as parental availability and the ability to cater to the emotional and physiological needs of the child (Simpson & Belsky, 2008). Moreover, there is evidence that the childhood environment influences how individuals consider future uncertainty. In particular, early childhood environment influences the sense of control that the individual experiences during stressful or unpredictable events later in life (Mittal & Griskevicius, 2014). Individuals with a slower LHS, who tend to have had a less adverse childhood, are more likely to believe they can master these uncertain and insecure situations, and, thus, avoid unnecessary risk-taking in their aim for long-term goals. Individuals with faster LHS, who relatively often have had a troublesome childhood, are more likely to be unsure about their capacity to control uncertain and insecure situations and might, therefore, be tempted to aim for immediate rewards, short term goals, and be more prone to risk-taking (Mittal & Griskevicius, 2014).

Hence, perceived sense of control over uncertain situations seem to reflect individual LHS, which, in turn, is connected to childhood experiences.

Empathy, Empathic Concern, and Psychopathy

Empathy is understood as an emotional response to another individual's affective state, which allows humans to understand others and experience similar feelings while acknowledging that the emotion stems from the other individual (Cuff, Brown, Taylor, & Howat, 2014). Empathy is an essential social skill and is associated, inter alia, with increased marital satisfaction (Acevedo, Aron, Fisher, & Brown, 2012; Paleari, Regalia, & Fincham, 2005), more supportive friend relationships (Conigrave et al., 2016), increased personal well-being (Shanafelt et al., 2005).

There is evidence showing that adult empathy skills are influenced by early childhood experiences, such as the attachment style. Secure attachment is associated with higher levels of empathy, whereas insecure attachment is associated with lower levels of empathy (Britton & Fuendeling, 2005; Khodabakhsh, 2012a). In a study of bullying among children, Nickerson and colleagues (2008) found a positive correlation between secure attachment and empathic behavior such as defending bullying victims. Childhood experiences, mirrored in the attachment style, might influence individuals' levels of empathy and the extent they are willing to cooperate with others (Khodabakhsh, 2012b). The amount of PI children receive from their caregivers might, therefore, affect how they later behave towards others and this could be expressed as varying empathy skills. A slower LHS may be associated with higher levels of interest and empathy in other individuals' feelings as there is time to invest in social relations. Prosocial behavior can also be motivated by expectations of reciprocity (Trivers, 1971), and empathy can be one of the mediating factors in this process (Pelligra, 2011).

A specific subcomponent of empathy is emphatic concern (EC) that takes into account feelings of sympathy and compassion towards other people who are unfortunate. Previous research has shown that reduced levels of EC are associated with utilitarian or pragmatic choices in decision making simulations where individuals choose to sacrifice a few peoples life's for a greater good (Takamatsu, 2018). It is possible that lower levels of empathy and particularly EC may be indicative of a faster LHS.

A faster LHS might involve less EC and compassion expressed towards others because the individual has a shorter planning horizon and prioritizes behavior that secures his own survival and reproduction. One extreme version of this could be psychopathy. This disorder is characterized by callousness, shallow affect, lack of guilt, antisocial behavior, and impulsivity (Lockwood, 2015) and

psychopathic individuals often display exploitative, immoral, and opportunistic behavior. Previous studies show that psychopathy is associated with more impulsivity (Jonason & Tost, 2010), anti-social behavior (Leistico, Salekin, DeCoster, & Rogers, 2008) and substance abuse (Smith & Newman, 1990).

Together with narcissism and machiavellism, psychopathy is part of the so-called "dark triad" and linked to a fast LHS (Jonason et al., 2017; McDonald, Donnellan, & Navarrete, 2012). Psychopathy can be harmful as it increases risky behavior and norm-breaking, but it may still be a beneficial and adaptive trait. Exploitative and daring behavior could a strategy for survival and reproduction in an unpredictable and insecure environment. Factors like shortage of food, contagious diseases, uncooperative individuals, few suitable mating partners and high competition could contribute to conditions when long-term planning, maintenance of social ties and altruism might not promote one's chances of surviving well enough. However, callous, manipulative, and aggressive behavior would likely yield short-term benefits. Psychopathic individuals would, thus, be acting to benefit themselves in what they perceive as an unpredictable environment with a short planning horizon (Buss, 2009; Daly & Wilson, 2005).

Previous findings suggest that individuals with psychopathic traits have abnormal reactions to negative emotional stimuli (Ali, Amorim, & Chamorro-Premuzic, 2009; Blair, 2005), are not compelled to feel compassion (Jones, Happé, Gilbert, Burnett, & Viding, 2010) and help those in distress. Consequently, psychopathy might represent an extraordinary outcome of a fast LHS characterized by selfish, socially risky and manipulative behavior as individuals partially lack emphatic skills that would stop them from acting in socially questionable way.

The Current Study

The aim of this study was to investigate whether the levels of PI received during childhood could predict EC or psychopathic traits in adulthood. Based on theoretical assumptions and previous studies, we formulated the following hypotheses:

We expected that the amount of PI would be positively associated with EC and negatively associated with psychopathy (H1).

In line with previous research findings that highlight attachment to mothers (Nickerson et al., 2008), we expected participants with higher maternal PI to get higher scores on EC and lower scores on psychopathy measures compared with participants with higher paternal PI (H2). This prediction is not based on LHT but rather on the child-rearing practices in the 1980-90s.

We also expected a stronger relationship between PI and EC and psychopathy in men compared to women, as the previous research indicates that psychopathy is more prevalent in men (H3).

We were also interested in whether maternal PI and paternal PI would have specific, possibly different, impacts on the EC or psychopathy for men and for women. As the previous research does not provide clear suggestions, we did not have a specific hypothesis in this area and kept an explorative stance to this question.

Method

Ethical statement

The current study was based on data collected for the Albrecht et al. (2014) study, which has obtained an approval from the Ethical Board of the Department of Psychology and Logopedics of Åbo Akademi University in February 2012.

Participants

The current study analyzed observations from 1291 respondents, comprising of responses to a self-report questionnaire from 944 women and 347 men. The participants' average age was 29.4 (*SD* = 8.52) for women and 29.7 (*SD* = 8.45) for men. The Finn-Kin data set (Albrecht et al., 2014), a randomized population based sample of Finnish adults, was used to obtain the observations for the current study. The online questionnaire from the abovementioned study was aimed at individuals between the ages of 18 and 49. This original data set consisted of replies to questions about relationships, sexual behavior, criminogenic traits and family background information. More women than men took part in the original study as the result of different response rates. For additional information on the data collection, see Albrecht et al. (2014). The current research used only participants data with replies to all relevant items (*N* = 1291) out of 3362 participants who completed the questionnaire.

Measures

Parental investment. We measured PI with the help of five items for maternal and five items for paternal investment. This measure is self-constructed and has been previously used in a study by Antfolk, J., & Sjölund, A. (2018). The questions included were assessing how the respondents considered their mother's and father's involvement during the childhood of the respondents: how much they 1) talked to them, 2) praised them, as well as how 3) emotionally close, 4) physically affectionate, and 5) aware about their children's friends and activities they were. Each item was presented with a visual slider that allowed the respondent to reply on a continuous scale from 0 ("Very seldom"/ "Not at all") to 100 ("Very often"/ "Very aware"/ "Very much"). Exact formulations of the questions can be found in Table 1. Higher scores indicate a bigger PI, while lower scores indicate a smaller PI.

Emotional concern. EC was measured with the help of two items from the Interpersonal Reactivity Index (IRI; Davis, 1980) that rated respondents' compassion or worry towards unfortunate others. The IRI questionnaire has been shown to correlate well with other measures on empathy (Davis, 1983). Each item was presented with a visual slider that allowed the respondent to reply on a continuous scale from 0 ("Very seldom"/ "Not at all") to 100 ("Very often"/ "Very aware"/ "Very much"). Exact formulations of the questions can be found in Table 1. Higher scores indicate a stronger EC, while lower scores mean a weaker EC.

Psychopathy. We measured psychopathy with 12 items taken from the Self-Report Psychopathy III (SPR III; Paulhus, et al, in press) questionnaire. Each of 4 subscales was represented with 3 items. Responses were given on a five-point Likert-scale with the anchors (1) "strongly disagree" and (5) "strongly agree". Lower scores represented lower tendency to psychopathic behavior, while higher scores represented higher tendency. According to previous research, the SRP III can be considered to have good validity and reliability (Chronbach's $\alpha = .86$) in non-forensic and non-clinical samples (Mahmut, Menictas, Stevenson, & Homewood, 2011).

Statistical analyses

We employed a Structural Regression within a Structural Equation Model (SEM) in order to account for measurement error in the analysis. The software R (R Core team, 2018) was used for the statistical analyses, in particular the *lavaan* package 0.6-5 and the *corrplot* package were employed. Our analyses also included descriptive statistics and correlations for the relevant variables.

Results

Descriptive Results

The separate items were used as indicators for latent variables. Descriptive information on the variables used to measure maternal and paternal PI, EC and psychopathy is provided in Table 1.

Table 1.Latent variables, indicators, means, standard deviation and range for indicators

Latent variable	Indicator	Formulation	M	SD	Range
Maternal PI	M_close	How emotionally close are you and your mother?	65.99	25.73	1-100
	M_talk	How often did your mother talk with you when you were a child?	81.15	21.23	1-100
	M_praise	How often did your mother praise you when you did something good as a child?	68.56	25.57	1-100

	M_affect	How much physical affection [i.e., hugs, kisses, caressing] did your mother show you as a child?	63.24	27.15	1-100
	M_aware	How aware was your mother of where you spent your time and what you did with your friends when you were a child?	73.87	23.85	1-100
Paternal PI	F_close	How emotionally close are you and your father?	54.49	28.12	1-100
	F_talk	How often did your father talk with you when you were a child?	62.89	27.65	1-100
	F_praise	How often did your father praise you when you did something good as a child?	57.78	28.14	1-100
	F_affect	How much physical affection [i.e., hugs, kisses, caressing] did your father show you as a child?	46.86	27.83	1-100
	F_aware	How aware was your father of where you spent your time and what you did with your friends when you were a child?	55.64	30.33	1-100
EC	IRI_concern	I often have tender, concerned feelings for people less fortunate than me.	72.45	21.79	1-100
	IRI_misfortune	Other people's misfortunes do not usually disturb me a great deal.	64.61	22.92	1-100
Psychopathy	SPR_thrill	I've often done something dangerous just for the thrill of it.	2.52	1.33	1-5
	SPR_tricked	It's amusing to see other people get tricked.	1.80	1.04	1-5
	SPR_paying	Avoided paying for things, such as movies, bus or train rides and food	2.06	1.34	1-5
	SPR_hurt	It bothers me to hurt other people's feelings	1.95	1.23	1-5
	SPR_rebel	I am a rebellious person	2.73	1.15	1-5
	SPR_push	It's fun to see how far you can push people before they get upset	2.03	1.18	1-5
	SPR_shoplift	I have shoplifted.	2.19	1.57	1-5
	SPR_rude	I am often rude to people	1.65	0.89	1-5
	SPR_risks	I enjoy taking risks.	2.54	1.16	1-5
	SPR_manipulate	I find it easy to manipulate people	2.42	1.17	1-5
	SPR_brokenin	Broken into a building or vehicle in order to steal something or to vandalize.	1.18	0.68	1-5
	SPR_kind	On average, my friends would probably say I am a kind person.	1.60	0.77	1-5
	Age	Respondent age	29.56	8.50	18-89

Note: The following abbreviations were used: Maternal PI = Maternal Parental Investment, Paternal PI = Paternal Parental Investment, EC = Emphatic Concern, IRI = Interpersonal Reactivity Index, SPR = Self-Report Psychopathy III questionnaire.

Correlations

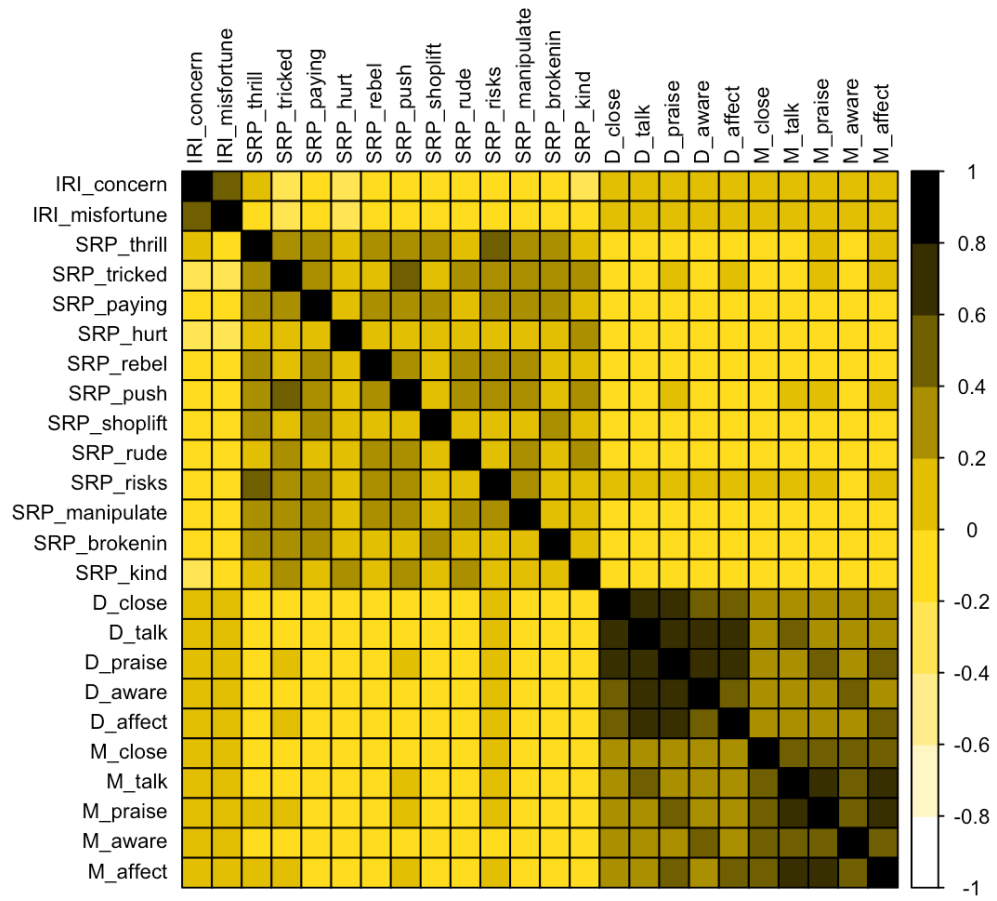
For the analyses, we calculated, plotted, and investigated the zero-order correlations between all the indicators that assessed maternal and paternal PI, EC, and psychopathy. Spearman correlations were chosen for the analyses as data was ordinal. A graphic representation of correlations between the studied variables is provided in the correlation matrix in Figure 1.

We found that the items measuring the same latent varible, for instance maternal PI, had positive correlations of moderate to high strengh between each other. At the same time, positive correlations between maternal and paternal PI items were found to be from small to moderate strength. The two items measuring EC taken from the IRI questionnaire displayed a moderate correlation as well (r = .41). The SPR III items that were used to measure psychopathic tendencies in respondents showed varition in the correlations. Some of the indicators from the same subscales, for instance, SPR_tricked and SPR_pushed (r = .43), as well as SPR_risks and SPR_thrill (r = .56) had moderate positive assosications.

As expected, the EC items tended to be negatively correlated with the SPR III items. At the same time, the EC items showed weak positive correlations with the items measuring paternal and maternal PI. Another pattern we observed was the small negative assosiations between maternal or paternal PI and SPR items measuring psychopathy.

Figure 1

Correlation matrix



Note: Correlation plot for zero-order correlations between the indicators. The color shading represents the strength and direction of the correlations. Darker shades indicate stronger, positive correlations and lighter shades indicate stronger, negative correlations. Yellow indicates correlations close to zero. The following abbreviations were used: M = Maternal Parental Investment, D = Paternal Parental Investment, IRI = Interpersonal Reactivity Index, SPR = Self-Report Psychopathy III questionnaire.

Results from the initial structural equation model

Our initial SEM model was based on four latent variables: maternal PI (five indicators), paternal PI (five indicators), EC (two indicators), and psychopathy (12 indicators). We assumed that maternal and paternal investment would be positively associated with EC and negatively associated with psychopathy. We explored potential differences in the influence that maternal versus paternal PI

could have on EC and psychopathy. Thus, we specifically looked into regressions between the independent variable maternal PI and dependent variables EC and psychopathy as well as independent variable paternal PI and dependent variables EC and psychopathy.

In the first phase, we were interested in how well the model fitted the data and concluded that that it provided a suboptimal fit (*CFI* = .963, *TLI* = .958, *RMSEA* = .084 [.081, .087], *SMRS* = .076). For this reason, we adjusted the model by adding several residual correlations with the modification indices (MI) cut-off value of 60. This meant that the model's fit improved if residuals of the items that had a MI value higher than 60 are allowed to correlate. We only allowed residual correlations between the dependent variables (i.e., between EC and psychopathy) as well as between the independent varaibles (i.e., between maternal PI and paternal PI) *SE* = 0.032, *Z* = 4.150, $p < 0.001$). The link between paternal PI and EC proved to be positive and non-significant, *b* = -.025, β = 0.029, *SE* = 0.035, *Z* = 0.849, *p* = .390. The connection between maternal PI and psychopathy was negative and significant, *b* = -0.063, β = -0.093, *SE* = 0.027, *Z* = -2.348, *p* = 0.019. At the same time paternal PI and psychopathy displayed a significant negative relationship, *b* = -0.051, β = -0.083, *SE* = 0.025, *Z* = -2.016, *p* = 0.044. In other words, we found significant but weak effects suggesting that, in general, higher PI predicted higher EC, but the connection was significant only in the case of maternal PI. At the same time, we found that higher PI predicted lower psychopathy scores.

Gender-Specific models

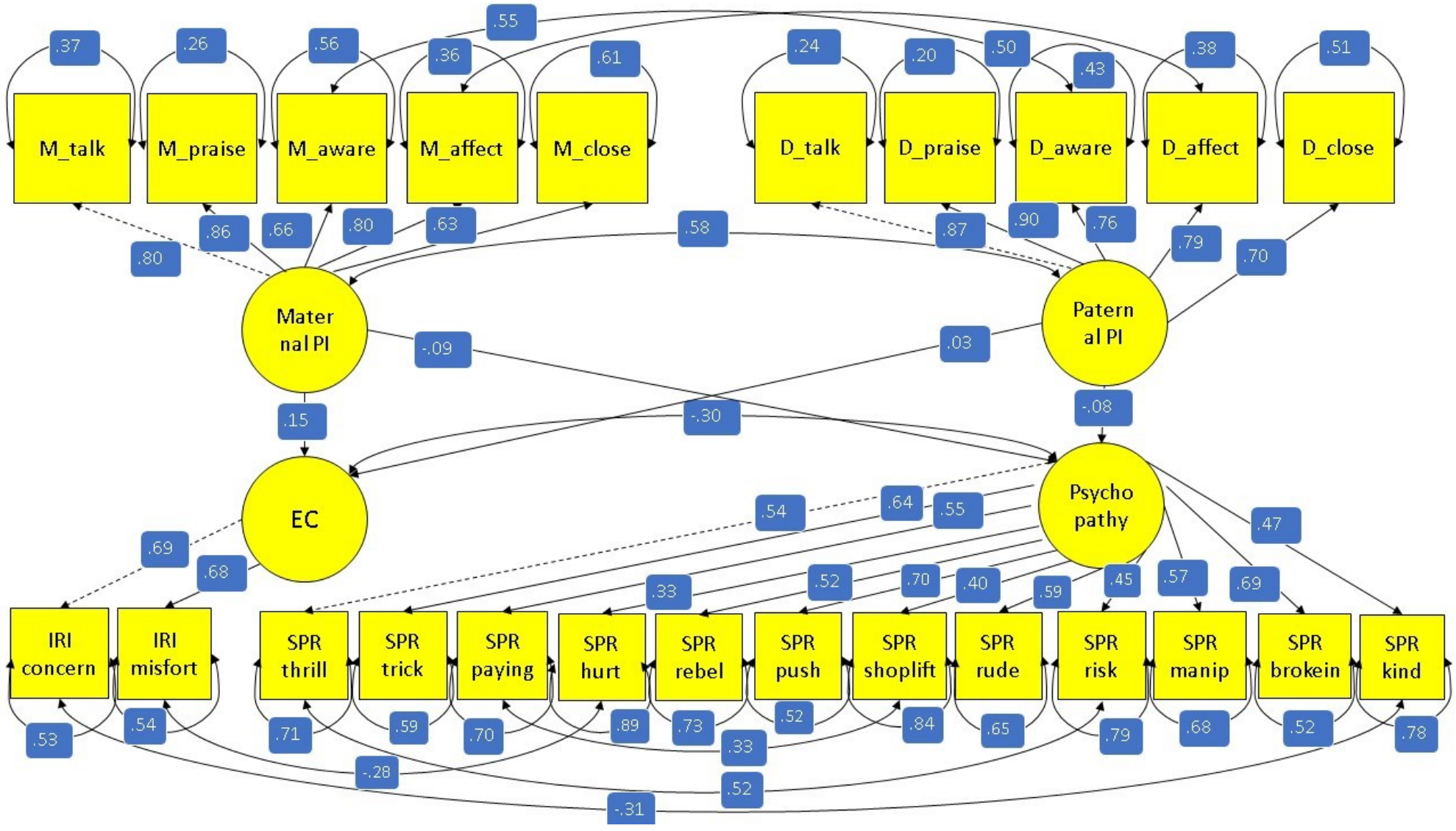
Our exploratory analyses concerning the specific influence of maternal versus paternal PI on male and female participants yielded the following results. Maternal PI was positively and significantly connected with EC of female participants, β = 0.165, *SE* = 0.035, *Z* = 4.013, $p < 0.001$. Another finding was a significant negative relationship between paternal PI and psychopathy in female participants, β = -0.101, *SE* = 0.027, *Z* = -2.21, *p* = 0.027. The associations between paternal PI and EC as well as maternal PI and psychopathy proved to be non-significant for the female participants.

The opposite was observed in case of male participants. We found that paternal PI had a significant positive relationship with EC for male participants, *b* = 0.122, β = 0.178, *SE* = 0.044, *Z* = 2.776, *p* = 0.006. At the same time, maternal PI seemed to be negatively correlated with psychopathy scores for male participants, *b* = -0.127, β = -0.185, *SE* = 0.057, *Z* = -2.211, *p* = 0.027. In this part of analysis, the relationhip between maternal PI and EC as well as between paternal PI psychopathy turned out to be non-significant.

The results for the gender models suggested, thus, the following pattern: Maternal PI was positively associated with EC in women and negatively associated with psychopathy in men. Paternal PI was positively associated with EC in men and negatively associated with psychopathy in women.

Figure 2.

SEM visualisation



Note: Rectangular boxes represent observed variables (items), circles represent latent variables, regular arrows represent linear (directed) relationships and dotted arrows represent items used as a reference for respective latent variables during the analysis, double headed arrows represent correlations . The following abbreviations were used: Maternal PI = Maternal Parental Investment, Paternal PI= Paternal Parental Investment, EC = Emphatic Concern, IRI = Interpersonal Reactivity Index, SPR = Self-Report Psychopathy III questionnaire

Discussion

The aim of the current study was to explore the relationship between parental investment (PI) and emotional concern (EC) and psychopathy. According to the Life History Theory (LHT), every organisms LHS is affected by the environment it lives it. Depending on the safety and predictability of the childhood environment, it has been argued that individuals can adopt a faster LHS if the conditions are tough or have a slower LHS in case the environment seems safe. According to our understanding, PI can be considered an important factor for the child to estimate if the world is a safe and predictable place and if others could be trusted. We investigated if the amount of PI would correlate in a meaningful way with crucial elements of LHS such as EC and psychopathy.

Our first hypothesis was that the amount of PI would be positively associated with EC and negatively associated with psychopathy. Our results partly confirmed the first prediction: both maternal and paternal PI had a positive relationship with EC, even though the effect sizes were small and only maternal PI had a significant effect. Another part of our first prediction— the negative association between PI and psychopathy— was confirmed by the statistical analyses: both maternal and paternal PI had weak but significant negative relationships with the psychopathy variable. Thus, in general, the more parents invested into their children, the lower the chances of them developing psychopathic traits in adulthood. Our results thus were basically supporting the theoretical connections between LHS and PI by showing that the offspring of more caring parents (a sign of a safe and predictable environment) had higher EC scores and lower psychopathy scores which corresponded to the slower LHS.

Our second hypothesis, closely related to the first one, was highlighting the expectation that maternal PI would have a stronger effect than paternal PI on both EC and psychopathy. The first part of this prediction was confirmed. Maternal PI had a slightly stronger influence on EC than paternal PI and was also statistically significant as opposed to paternal PI that proved to be non-significant in our analyses. This finding fitted well with the previous results (Nickerson et al., 2008) that highlighted the importance of maternal engagement and attachment to the child's empathic abilities.

Since we used retrospective self-report data of parental investment and the mean age of the participants was close to 30 years, with standard deviation value around 9 years, most childhoods we looked at happened in the 1980-90s. All the items measuring maternal PI in our study had on average 23% higher scores than paternal PI items scores and that was indicative of the child rearing practices in the period mentioned. We can speculate that the results could be different for parenting in 2020 when fathers are spending more time with their children and paternity leave is

being introduced in more and more countries. In fact, in the recent OECD report “The pursuit of gender equality”, Finland has been mentioned as a country where fathers spend on average more time with their children compared to mothers (OECD, 2017) . We can speculate that there is a good chance that if the PI measures would be applied to current parents, they would likely display a smaller disparity in the PI values.

The second part of our second hypothesis, namely that maternal PI would have stronger effect on minimizing risks for psychopathy compared to parental PI, did not hold the test. It turned out that both parents’ efforts contributed roughly equally to protecting their children’s from developing psychopathic traits in adulthood. The picture was different, however, once we looked more specifically how women versus men are impacted by their respective mother’s or father’s involvement. This issue will be covered in the following paragraph.

Our third hypothesis was that there would be a stronger link between PI and psychopathy particularly in men as psychopathy is more prevalent among men. At the same time, we were interested in exploring how specifically women and men are affected by the respective maternal or paternal PI. The results were quite intriguing. It seemed that maternal and paternal PI had opposite influence patterns depending on the sex of the child in question. Maternal PI had a positive influence on EC in women while the same was true regarding paternal PI and EC for men. The opposite pattern was obvious in the case of psychopathy: here, fathers’ PI had a specifically protective effect on daughters, while mothers’ PI had a protective effect on sons. These results could be interpreted as follows: the EC in boys is influenced stronger by their relationship with the father while for girls EC affected more under the influence of their mothers. Children might identify with and implicitly learn more from the same-gender parent. EC could be one of many other things that children “pick up” from their respective same-gender parent. In particular, boys can learn gender-appropriate ways to express empathy and emphatic concern from their fathers while girls use their mother as models (Lippa, 2007).

Another possible explanation is that parents treat children of different sex differently and both verbally and implicitly communicate certain gender-specific stereotypes (Gelman, Taylor, Nguyen, 2004; Friedman, Leaper, Bigler, 2007) that, among others, give children hints on how boys versus girls are expected to express compassion and treat others. For instance, previous research has investigated how mothers could transfer own gender attitudes to their children while reading, commenting and discussing a gender-related story, but found no or negligible connection (Friedman, Leaper, Bigler,2007). Most evidence exist concerning parental encouragement of sex typed toy play and parental gender policing when children engage in cross-sex activities (Lippa, 2007). Another area where differences are documented is assignment of work or household chores:

girls often get household chores and taking care of smaller children while boys receive tasks in moving heavy objects and house maintenance (Lippa, 2007).

Limitations and Future Research

It is important to inform the reader on some of the limitations of the current study. As we mentioned earlier, the data used in the present study has been collected during another project (Albrecht et al., 2014). This meant that during the planning and execution of this study, we were bound by the variables and items used in the previous project. Another limitation was imposed by the design of the retrospective self-measure questionnaires. We could not be certain that the participants' estimates of their parents' involvement based on long term memories were close enough to the actual PI. The effect sizes that we found were mostly small and that meant that the chosen independent variables explained only partly the variation in the dependent variables. In other words, there might have been other important factors impacting the EC and psychopathy that we did not investigated, like, for instance, mental disorders (Donkersgoed et al., 2019) and traumatic brain injuries (de Sousa, McDonald, & Rushby, 2012).

There are some strengths to the current study as well. This research was the first of its kind to look at the relationship between PI and EC and psychopathy. Additionally, a big data set was collected to ensure enough statistical power. Furthermore, the use of a SEM model allowed us to control for measurement error while working with latent constructs. All the above-mentioned features combined could be considered as a good statistical standard.

As for the future, it might be interesting to investigate how the situation with PI and EC, psychopathy has changed in the modern industrialized world when the discrepancies between genders are getting more balanced. Another area of improvement would be extending EC to a broader concept of empathy that would allow us to see if the other facets of empathy are influenced by PI as well. In order to allow for generalization of our findings, they need to be replicated on different types of samples from different countries as there might exist meaningful variations depending on the culture, family politics and other country-unique factors.

Conclusions

Our study found that both maternal and paternal PI had a positive relationship with EC and a negative relationship with psychopathy. In general, this means that a stronger involvement of parents into their children's lives and upbringing fosters better emotional concern in children and

has a protective effect from psychopathic tendencies in the future. The theoretical prediction that a higher PI is indicative of a slower LHS thus was generally confirmed by the results. Furthermore, we found a sex-specific pattern. Mothers had a specific positive influence on emotional concern in daughters while the same was true regarding fathers and their sons emphatic concern. The opposite pattern was discovered in the case of psychopathy: fathers paternal investment had a specifically protective effect on dotters, while mother's paternal investment had a protective effect on sons. All the effects that we found were relatively small which indicates that, except for PI, there exist other factors that could contribute to explanation of EC and psychopathy levels.

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