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Testing the General Theory of Crime with the Circumplex Model: Curvilinear Relations between Family Functioning and Self-Control

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ABSTRACT

The relation between family and low self-control is usually studied within linear hypotheses. In this study, we intended to test the familial origin of self-control under a curvilinear hypothesis. This is a cross-sectional study, with a sample of 448 adolescents and young adults. Data analysis was based on correlation and regression-based statistics. Results revealed linear associations between family functioning and juvenile deviant behavior, contrary to self-control which presented curvilinear relations with family cohesion and flexibility (i.e. both high and low extreme levels were associated with low self-control). This finding suggests a new approach to the familial origin of low self-control.

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General theory of crime

A General Theory of Crime (Gottfredson and Hirschi 1990) is one of the most influential and empirically tested criminal models (Cohn, Farrington, and Iratzoqui 2017). Gottfredson and Hirschi's Theory (1990) places low self-control as the central concept in understanding deviant behavior, thus concluding that all criminal and analogous behaviors are manifestations of low self-control. In general, Gottfredson and Hirschi (1990) argue that crime and similar behaviors are sources of excitement and gratification of immediate desires, which requires few skills or planning. In turn, people with low self-control tend to be impulsive, self-centered, unable to delay gratification, and unprepared to consider the full consequences of their actions (Gottfredson and Hirschi 1990; Hirschi 2004). Therefore, when faced to an opportunity, low self-controlled individuals are more likely to offend.

Empirical evidence supporting this statement is very well documented in the literature (e.g. Arneklev, Elis, and Medlicott 2006; Longshore, Turner, and Stein 1996; Pauwels et al. 2011; Pratt and Cullen 2000; Vazsonyi and Huang 2010). Moreover, the relationship between low self-control and juvenile deviance was found across multiple cultures (Cheung and Cheung 2008; Gomes and Gouveia-Pereira 2014; Vazsonyi et al. 2016, 2012, 2001). Pratt and Cullen (2000) published the first meta-analysis testing these relations based on 21 studies (which included 49.727 individuals), and found results supporting Gottfredson and Hirschi's claims of the relationship between low self-control and deviant behavior (effect size exceeded .20). More recently, Vazsonyi, Mikuška, and Kelley (2017) developed a similar meta-analysis focusing on the following decade (2000–2010), considering a total of 99 cross-sectional and 19 longitudinal studies (including 178.464 and 35.827 individuals, respectively). Once again, low self-control presented itself as a consistent predictor of deviant behaviors, with effect sizes reaching Mr = .415 for cross-sectional and Mr = .345 for longitudinal studies. Such results led to the conclusion that, when compared to other predictors of

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deviant behavior, "this effect size would rank self-control as one of the strongest known correlates of crime" (Pratt and Cullen 2000: 952).

On a slightly different note, de Ridder et al. (2012) developed a meta-analysis to study the relationship between low self-control and a variety of behavioral outcomes, referring to 102 studies (based on 32.648 participants). In this study, results pointed to a small to medium relationship between self-control and happiness, commitment in a relationship, and love, as well as with binge eating, alcohol use, academic success, driving behavior, and, of course, delinquent conduct. In summary, these findings provide solid empirical support for Gottfredson and Hirschi's theory, both in relation to the link between low self-control and crime and analogous behaviors.

Origin of low self-control

While the relation between low self-control and deviant behaviors is very well established, "the role of parenting in predicting self-control and deviance is less clear" (Vazsonyi et al. 2016: 67). Gottfredson and Hirschi (1990) stated that the major cause of low self-control is ineffective child rearing, in which caretakers should recognize demonstrations of low self-control and correct them, thus suppressing child's impulsive behavior. In this regard, Gottfredson and Hirschi (1990) presented four conditions that should be satisfied, they are: (1) Attachment of the parent to the child; (2) Parental supervision; (3) Recognition of deviant behavior; and (4) Punishment of those deviant acts, that should not be nor too harsh, such corporal sanctions, nor too lenient.

In response to these claims about familial origins of self-control, empirical research has shown that effective parenting (i.e. parental attachment and parental supervision) strongly impact individual's self-control (e.g. Gibson et al. 2010; Hay 2001; Meldrum 2008; Meldrum et al. 2012; Pratt, Turner, and Piquero 2004) even cross-culturally (Vazsonyi and Belliston 2007) and across socioeconomic strata (Vazsonyi and Klanjsek 2008). In addition, some studies have found that between parent-child attachment and parental supervision, only the first (i.e. parent-child attachment) predicts child's self-control (Cochran et al. 1998; Miller et al. 2009). Others encountered a significant association between parental neglect and adolescent's self-control (Rebellon, Straus, and Medeiros 2008). Further research has been focusing on the transgenerational relations of self-control, showing that parents' self-control predicts child's levels of self-control (Boutwell and Beaver 2010). In this line, Nofziger (2008) was able to demonstrate how mothers' self-control influenced their own punishment and supervision practices which, in turn, affects child's levels of self-control.

Circumplex model

In response to the main importance of multiple family variables, Olson (2000, 2011) developed the *Circumplex Model of Marital and Family Systems*. This model integrates the systemic approach, and is considered as a particularly useful model for the relational diagnosis because it integrates the two dimensions that are repeatedly referred to as key aspects to the understanding of family functioning, i.e. *family cohesion* and *family flexibility*.

Family cohesion

Firstly, family cohesion is defined "as the emotional bonding that couple and family members have toward one another" (Olson and Gorall 2003: 516) and concerns the way families are organized between the two extremes, from total separateness to the absolute togetherness. Olson's Circumplex Model (2011) describes family cohesion as a *continuum*, from *disengaged families* (extremely low levels of cohesion) to *enmeshed families* (extremely high levels), crossing several moderated levels of family connectedness.

This conception of the cohesion´s *continuum* states that the central levels correspond to balanced degrees of family cohesion, hypothetically associated with healthy family functioning, while the extreme levels of family cohesion (i.e. *disengaged* and *enmeshed*) correspond to unbalanced levels, which tends to be problematic for family members over the long term.

Family flexibility

Secondly, family flexibility deals with how family systems are balanced between the two extremes of stability and change, and is defined as the "amount of change in its leaderships, and relationship rules" (Olson and Gorall 2003: 519). Systemic understanding of family functioning tells us that families require both stability and change, because they have to meet the individual needs, the same way they must maintain a sense of unity/stability (Minuchin 2003; Sampaio and Gameiro 2005). Like the previous dimension, family flexibility is described as a *continuum*, from *rigid families* (extremely low flexibility) to *chaotic families* (extremely high flexibility), crossing several moderated types of family flexibility, where the balanced levels of family flexibility are most conducive to healthy individuals' outcomes, and the extreme levels of family flexibility (i.e. *rigid* and *chaotic families*) represent unbalanced family systems, potentially leading to symptomatic behaviors.

Family functioning according to the circumplex model

The central hypothesis of the Circumplex Model, or the curvilinear hypothesis, assumes that balanced family relationships are most conducive to healthy family functioning, while unbalanced family relationships are associated with problematic family functioning (Olson 2011). The Circumplex Model has demonstrated its relevance in family systemic intervention in multiple contexts, such as deviant behavior (e.g. Blaske et al. 1989; Gomes and Gouveia-Pereira 2014; Matherne and Thomas 2001; Shields and Clark 1995) and illicit substance use (e.g. Natakusumah et al. 1992; Tafá and Baiocco 2009), as well as suicidal ideation (e.g. Compton, Thompson, and Kaslow 2005; Gouveia-Pereira, Abreu, and Martins 2014).

Self-control as a mediator

Despite the great amount of research linking multiple family factors to juvenile deviant behavior, General Theory of Crime (Gottfredson and Hirschi 1990) assumes that family characteristics should impact deviant behavior only indirectly through youth self-control. In other words, self-control should fully mediate the relationship between family factors and deviant behavior. In fact, Feldman and Weinberger (1994) found that parenting practices predicted juvenile deviant behavior only indirectly through the mediation of self-control. Additionally, McKee (2012) encountered that parental monitoring had no direct effect on youth delinquent behavior, regardless of family structure. However, researchers such as Hay (2001) found that low self-control only partially mediated the effects of parental monitoring on juvenile delinquency and Miller et al. (2009) found that low self-control only partially mediated the effects of maternal attachment on deviant behavior. Furthermore, Vazsonyi et al. (2016) tried to disentangle some maternal variables and found that while maternal support affected deviance indirectly, maternal conflict maintained a direct effect on juvenile deviance.

Nevertheless, a common characteristic of these studies is the sole focus on isolated aspects of the family life, such as the family structure, parental monitoring, parent-child attachment, among others. Instead, researchers might consider studying more complex and integrative variables of family functioning, like the intersection of the family cohesion and family flexibility described in the Circumplex Model of Marital and Family Systems (Olson 2011), which would allow a more holistic understanding of these relationships.

General theory of crime and circumplex model

One interesting idea is that the two principal dimensions of the Circumplex Model (Olson 2011) seem to adequately fit the four conditions described by Gottfredson and Hirschi (1990). Family cohesion, which refers to the emotional bond between family members, seems to perfectly accommodate the General Theory of Crime's first condition, i.e. *attachment of the parent to the child*. On the other hand, family flexibility, which deals with discipline and family rules, seems to integrate the

remaining conditions, i.e. *parental supervision, recognition of deviant acts*, and *punishment*. Therefore, if we assume the familial origin of self-control as described by Gottfredson and Hirschi (1990), we would expect that balanced family relations, as described by Olson (2011), present balanced family cohesion and flexibility, which would provide feelings of belonging, as well as adequate leadership and rules, would be able to provide the parent-child attachment and parental supervision conducive to self-controlled family members.

However, contrary to Olson's (2011) curvilinear hypothesis, Gottfredson and Hirschi (1990) assume parental variables to have linear relationships with positive child outcomes. Nevertheless, in regards to effective punishment of deviant acts, even General Theory of Crime describes how it should not be performed nor too harshly, nor too leniently, which, in our view, stresses the curvilinear hypothesis defended by Olson (2011). In this manner, it is our opinion that General Theory of Crime can be better understood under the family functioning paradigm presented by the Circumplex Model of Marital and Family Systems.

Present research

In the present research, we intend to explore two main propositions of General Theory of Crime. Firstly, we will explore the proposition that low self-control fully mediates the relationship between family functioning and juvenile deviant behavior. Secondly, we will test the adequacy of the Olson's (2011) curvilinear hypothesis in the proposed familial origins of low self-control.

Thereby, we developed the following hypotheses, H1: self-control fully mediates the relationship between the family functioning and deviant behavior. In other words, family functioning should not significantly affect deviant behavior after controlling for the effect of self-control. H2: adolescents from dysfunctional family systems according to the Circumplex Model will present lower levels of self-control. Thus, we expect to find a positive relationship between family functioning and self-control and, on the other hand, a negative correlation between both extremely high (i.e. enmeshed cohesion and chaotic flexibility) and extremely low (i.e. disengaged cohesion and rigid flexibility) levels of the family variables and self-control.

Method

Participants

The sample in the present study was comprised of 448 adolescents and young adults, 260 girls and 188 boys, aged between 12 and 22 years old (M = 16.74, SD = 1.45). Participants were students from several schools in the city of Lisbon. 83.7% (n = 375) of the sample were high-school students (i.e. 10th, 11th, and 12th grade), whereas the remaining 16.3% (n = 73) participants were studying from the 6th to the 9th grade. The vast majority of our sample (n = 397, 88.6%) were Portuguese nationals. Slightly above half of the participants lived with both parents (n = 248, 55.6%), whereas 44.4% (n = 198) lived in a single parent household.

Measures

Family functioning

In this study, family functioning was measured with the *Family Adaptability and Cohesion Evaluation Scale IV* (FACES IV) (Olson 2011). We applied the Portuguese version of FACES IV by Gomes, Peixoto, and Gouveia-Pereira (2017). FACES IV is a self-report instrument with a total of 42 items, divided into six subscales, two balanced subscales and four unbalanced subscales. The two balanced scales assess the balanced levels of family cohesion (e.g. "*Family members are involved in each others lives*") and flexibility (e.g. "*Discipline is fair in our family*"). The unbalanced subscales access the lowest and the highest levels of family cohesion, i.e. *Disengaged* (e.g. "*Our family seldom*

does things together"), and *Enmeshed* (e.g. "*We spend too much time together*") and flexibility, i.e. *Rigid* (e.g. "*There are strict consequences for breaking the rules in our family*" and *Chaotic* (e.g. "*It is hard to know who the leader is in our family*"). Response format is a five-point Likert scale (1 = *strongly disagree*; 5 = *strongly agree*). According to the methods proposed by Olson (2011), the raw sum scores of each of the six subscales were converted into percentile scores. Thereafter, we applied the following formula to calculate both Cohesion Ratio and Flexibility Ratio: *Ratio* = *Balanced Subscale*/([*Unbalanced Subscale* + *Unbalanced Subscale*]/2). Finally, the mean score of both cohesion ratio (M = 1.95, SD = .83, *Min* = .33; *Max* = 4.97) and flexibility ratio (M = 1.52, SD = .51, *Min* = .35; *Max* = 3.06) represented the Total Circumplex Ratio (M = 1.74, SD = .59, *Min* = .35; *Max* = 3.53), which reflects the family functioning according to the Circumplex Model (higher scores represents better family functioning).

An analysis of the psychometric properties of the translated version of FACES IV was developed through a Confirmatory Factor Analysis, which revealed acceptable fit scores (χ^2/df = 2.78, GFI = .80, PGFI = .71; RMSEA = .063) (Arbuckle 2013). Moreover, FACES IV as a whole (i.e. the 42 items) revealed good internal consistency (α = .85), both Family Cohesion (α = .77) and Family Flexibility (α = .75) presented satisfactory levels of reliability, whilst the FACES' subscales revealed lower but still acceptable Cronbach's alphas over the threshold of .5 (Field 2013; Nunnally 1967).

Self-control

Secondly, we applied the *Self-Control Scale* (Grasmick et al. 1993) developed within the study of the General Theory of Crime, validated to the Portuguese population by Fonseca (2002). This scale consists of a total of 24 items (e.g. "*I often act on the spur of the moment without stopping to think*"), which provides a total value ranging from 0 to 72. We computed this scale in ways that higher values represented higher levels of self-control. In the present study, the Self-Control Scale revealed good reliability scores (M = 47.81; SD = 9.20; *Min* = 17; *Max* = 72; α = .80).

Deviant behavior

The adolescents' deviant behavior was accessed by the *Deviant Behavior Variety Scale* (Sanches et al. 2016). This instrument assesses juvenile deviant behavior by introducing them to 19 items or types of deviant behavior, such as addictive behaviors (e.g. "*I have smoked hashish or marijuana*"), or behaviors related to theft (e.g. "*I have stolen, or tried to steal, money or objects such as a cell phone, watch, MP3, etc., from a stranger*"). Responses were given in a two point scale (0. *No*; 1. *Yes*), where participants should respond if they practiced each of these types of deviant behavior in the last year. Thus, this scale is operated by the sum of the responses, obtaining a global value ranging from 0 to 19 (M = 3.96, SD = 3.05, *Min* = 0; *Max* = 19; α = .80).

Procedure

In order to access a sample from school contexts, the present project was evaluated and authorized by the Portuguese General Education Directorate of the Ministry of Education and Science. Five schools agreed to participate in the data collection. A convenience sampling method was used. All participants returned parental consent forms and voluntarily accepted to participate in this study. Data collection occurred in a classroom assigned for that purpose. At the beginning of the assessment, the researcher provided the required instructions and ensured the anonymity of the questionnaire and the confidentiality of the data. The questionnaire, comprised some demographic data (e.g. age, gender, school grade), followed by the scales described above.

Data analysis

All statistical analyses were developed using SPSS v22 software (IBM SPSS, Chicago, IL), with exception of the Confirmatory Factor Analysis (CFA) for the 42 FACES' items that was performed using Amos software v22.0. To test our first hypothesis (i.e. mediation hypothesis), regression

Table 1. Descriptive statistics for study measures.

Scales	M (SD)	SK	K	Scales	M (SD)	SK	K
Coh. Subscales				FACES Ratios			
Balanced	58.69 (13.51)	−.61	.01	Coh. Ratio	1.95 (.83)	1.18	2.09
Disengaged	35.36 (14.89)	1.17	1.58	Flex. Ratio	1.52 (.51)	.38	−.01
Enmeshed	31.39 (10.95)	1.06	2.12	Total Ratio	1.74 (.59)	.29	−.08
Flex. Subscales							
Balanced	52.97 (12.00)	−.40	−.28	Self-Control	47.81 (9.20)	−.33	.14
Rigid	42.54 (14.92)	.62	.08				
Chaotic	31.74 (13.87)	1.14	1.56	Deviance	3.96 (3.05)	1.18	2.09

Note. M – Mean; SD – Standard Deviation; SK – Skewness; K – Kurtosis; Coh – Cohesion; Flex. – Flexibility.

analyses of total effect and direct effect (with 1000 bootstrap samples for bias corrected bootstrap confidence intervals with a level of confidence of 95%), as well as the Z Sobel test, were developed using the PROCESS macro for SPSS (Hayes 2012, 2013). The second hypothesis was tested through a set of Pearson correlation analyses.

With regard to the CFA, the first step was to impute the missing values for the FACES IV items. We found a mean of 2 missing values per item (0.4%). We performed Little's MCAR test for each of the six FACES IV subscales, which revealed non-significant results and showed that the missing values were random. Therefore we imputed these missing values using the Bayesian Estimation method (Arbuckle 2013). The CFA was carried out using the Maximum Likelihood method, considering the Modification Indices based on the Lagrange Multiplier higher than 11, and referring the Relative Chi-Square ($\chi^2/df \leq 5$), Goodness-of-Fit Index (GFI ≥ .80), Parsimony Goodness-of-Fit Index (PGFI ≥ .6), and the Root Mean Square Error of Approximation (RMSEA ≤ .08) fit indexes as indicative of acceptable model fit (Arbuckle 2013; Marôco 2010).

Secondly, we tested the normality assumptions of these measures (Table 1) considering the Kolmogorov-Smirnov test and the distribution criteria of Skewness (values below 3) and Kurtosis (values under 8) (Kline 2005). Only the Flexibility Ratio and the Total Circumplex Ratio presented a normal distribution in the Kolmogorov-Smirnov test. Yet, considering the values of Skewness (ranging from −.61 to 1.18) and Kurtosis (ranging from .99 to 2.12) we concluded that the normality assumption was not grossly violated by none of the remaining measures.

Results

A preliminary analysis shows that self-control presented a negative, statistically significant correlation with deviant behavior ($r = -.40$, $p < .001$). From the main measures in this study (i.e. family functioning, self-control, and deviant behavior), only self-control presented a statistically significant, despite small, positive correlation with the age of participants ($r = .10$, $p < .05$). On the other hand, male participants ($M = 4.58$, $SD = 3.68$) presented more deviant behaviors than females ($M = 3.52$, $SD = 2.41$) ($t_{(300,078)} = 3.42$, $p < .01$). Conversely, girls ($M = 49.28$, $SD = 8.95$) presented significantly higher self-control than boys ($M = 45.78$, $SD = 9.18$) ($t_{(446)} = -4.04$, $p < .001$). As for the Family Functioning, though girls ($M = 1.78$, $SD = .63$) reported higher means of family functioning (i.e. Total Circumplex Ratio) than boys ($M = 1.68$, $SD = .54$), the difference did not reach statistical significance ($t_{(434,559)} = -1.96$, $p = .051$). Further analysis demonstrated that boys and girls did not differ on the Flexibility Ratio ($t_{(446)} = -1.035$, $p = .301$). But, in what regards to the Cohesion Ratio, girls ($M = 2.02$, $SD = .89$) presented significantly higher scores than boys ($M = 1.86$, $SD = .72$) ($t_{(439,579)} = -2.17$, $p < .05$). Finally, participants living with both parents presented less deviant behaviors ($M = 3.62$, $SD = 3.06$) than those living in single-parent households ($M = 4.37$, $SD = 3.01$) ($t_{(444)} = 2.56$, $p < .05$). While, on the contrary, participants living with both parents presented higher self-control ($M = 48.57$, $SD = 9.40$) than those living with single parents ($M = 46.85$, $SD = 8.92$), despite the difference only reaching marginal statistical significance ($t_{(444)} = -1.96$, $p = .05$).

Testing the mediation model

In our first hypothesis, we expected to find a mediation model in which self-control would fully mediate the relationship between family functioning and deviant behavior. Taking into consideration the previous results, we carried out this mediation model controlling for the effects of sex, age, and living conditions (i.e. living with both or single parents). The model illustrated in Figure 1 shows that family functioning presented a significant direct effect on the deviant behavior ($\beta = -.68$, $p < .01$). Secondly, this analysis revealed that self-control presented a statistically significant mediating role in the relationship between family functioning and deviant behavior ($F_{(5, 440)} = 21.77$, $p < .001$, $R^2 = .20$; $Z = -3.49$, $p < .001$). However, even after controlling for the mediation role of self-control, data showed that family functioning still presented a significant indirect effect on deviant behavior ($\beta = -.33$, Bca CI [−.553, −.145]).

Testing the circumplex hypothesis

As seen above, and as Table 2 illustrates, the Total Circumplex Ratio is associated with both deviant behavior ($r = -.22$, $p < .001$) and self-control ($r = .20$, $p < .001$). Moreover, the correlation matrix in Table 2 shows that both family dimensions in the Circumplex Model (i.e. Cohesion Ratio and

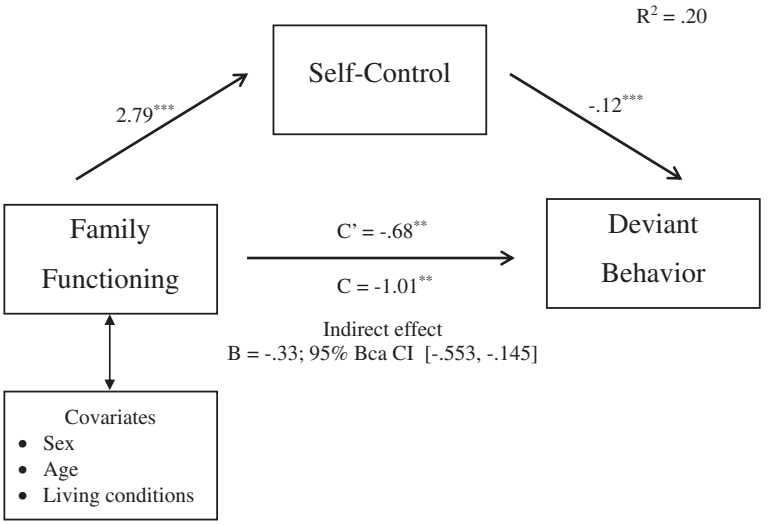

Figure 1. Mediation model.
Note: * p < .05; ** p < .01; *** p < .001.

Table 2. Correlation matrix between family variables, deviant behavior, and self-control.

	Self-Control	Deviant Behavior
FACES RATIOS		
Total Circumplex Ratio	.20***	−.22***
Cohesion Ratio	.19***	−.21***
Flexibility Ratio	.17***	−.18***
FAMILY COHESION		
Disengaged subscale	−.18***	.18***
Enmeshed subscale	−.22***	*n.s.*
FAMILY FLEXIBILITY		
Rigid subscale	−.13**	*n.s.*
Chaotic subscale	−.18***	.17***

Note. *n.s.* = Statistically non-significant; * $p < .05$; ** $p < .01$; *** $p < .001$.

Flexibility Ratio) are, in the one hand, positively correlated with self-control and, on the other hand, negatively correlated with juvenile deviance. However, this evidence is not enough to definitely conclude for the presence of a curvilinear relationship, mainly because a curvilinear relation between family functioning and deviant behavior is not to be expected.

Therefore, we extended our correlational analyses to test the association between the unbalanced subscales of FACES IV (i.e. disengaged and enmeshed cohesion, rigid and chaotic flexibility), self-control, and deviant behavior. First, and accordingly to the literature, both disengaged cohesion and chaotic flexibility were positively correlated with deviant behavior, whereas enmeshed cohesion and rigid flexibility showed no statistically significant associations with juvenile deviance (Table 2). These results are indicative of a linear relation between family functioning and juvenile deviance. On the other hand, both extreme levels of family cohesion (i.e. disengaged and enmeshed) and family flexibility (i.e. rigid and chaotic) presented negative and statistically significant correlations with self-control (Table 2). In turn, these results are evidence of a curvilinear relation between these family dimensions and adolescents' self-control.

Discussion

The present research aimed to shed some light on two main General Theory of Crime assumptions. First, the assumption that self-control fully mediates the relation between family functioning and juvenile deviant behavior. Second, the premise of familial origins of low self-control under the Olson's paradigm of family functioning. Overall, our results presented a model where the relationship between family functioning and juvenile deviant behavior were partially mediated by self-control. Moreover, our results demonstrated how family functioning is related to self-control in a curvilinear fashion. In other words, both extreme levels of family cohesion (i.e. disengaged and enmeshed family relationships) and family flexibility (i.e. rigid and chaotic family relationships) are significantly related to youth low self-control.

Main findings from a preliminary analysis showed that low self-control was significantly associated with higher juvenile deviance, with a medium effect size ($r = -.40$). This result adds to the multiple knowledge about the self-control – crime relation that has repeatedly been shown, making low self-control one of the strongest predictors of crime and analogous behaviors (Pratt and Cullen 2000; Vazsonyi, Mikuška, and Kelley 2017).

Results from our first hypothesis, supported in part the model proposed by Gottfredson and Hirschi (1990), in which self-control is the mediator variable of the relationship between family functioning and juvenile deviant behavior. In fact, our results show that family functioning was associated with both self-control and juvenile deviance, in ways that adolescents from balanced family systems presented higher self-control and, in turn, youth with higher self-control presented less deviant behaviors. Thus, these results contribute to a better understanding of the family importance in the development of both self-control and deviant behavior.

Nonetheless, the obtained mediation model described only a partial mediation, once the family context maintained a significant direct effect on juvenile deviance, even after considering the role played by low self-control. This finding is in line with the results previously found by Hay (2001) and Miller et al. (2009). In this manner, our results support only in part the General Theory of Crime's predictions, in which it would be expected that the family role in the development of deviant behavior would be played through its inability to promote self-control skills in their children. Our findings suggest that the familial effect on deviance goes beyond the development of self-control, and some of its characteristics such as low emotional support and lack of family rules also play an important role in the development of deviant behaviors, even when considering the role of low self-control.

In our final hypothesis, we set out to test the premise of Gottfredson and Hirschi (1990) on the development of self-control within the family system under the Circumplex Model. We expected that individuals from functional family systems, as opposed to youth from unbalanced ones, would

present higher self-control levels. Data showed that both high and low extremes of the two main dimensions (i.e. family cohesion and flexibility) were associated with juvenile low self-control. The more unbalanced the family system is, whether extremely high family cohesion/flexibility or extremely low family cohesion/flexibility, the lower the adolescents' self-control. Furthermore, similar analyses showed that only extremely low family cohesion and extremely high family flexibility were associated with deviant behaviors, as expected in the literature.

These results indicate that family functioning relates in a curvilinear shape with self-control, in ways which dysfunctional family environments fail to promote high levels of self-control in their adolescents. This conclusion is consistent with the main hypothesis of the Circumplex Model (Olson 2011) and with the General Theory of Crime's predictions, where Gottfredson and Hirschi (1990) conceded great importance to the family environment in the promotion of children's self-control. Moreover, we should further note that even Gottfredson and Hirschi (1990) defined some parental behaviors as curvilinear, namely the punishment of child's deviant behavior, that should not be made, nor too harshly, nor too leniently, concordantly with Olson's (2011) curvilinear hypothesis. Therefore, this study provides evidence for the articulation between these two models and suggests a new approach to the familial origin of low self-control.

According to this new approach, family functioning conducive to optimum individual development, in which adolescents present higher levels of self-control, seems to be reserved for balanced family systems. In these balanced family relations, the adolescent is allowed to spend time both separately and together with his family, where there is sharing of activities and decision making, where leadership tends to be democratic, where there are stable roles that can be shared, and where the family rules are consistent and better suit the developmental needs of its members.

However, this raises the question about why does it seem that some family systems (i.e. Enmeshed and Rigid) are incapable of promoting adolescents' self-control, but are not associated with deviant behavior? Note that enmeshed family systems are described by an extreme emotional closeness, which compromises individuality, private space, and relationships outside of the family. Whereas rigid family relationships are typically under an authoritarian leadership by a highly controlling individual, where there is no negotiation, roles are strictly defined, and rules are unchangeable over time. Therefore, we believe that these characteristics that compromise the development of self-control may also reduce the opportunities for practicing deviant behaviors. If we consider the present findings, adolescents from all unbalanced family systems present lower self-control and are more probable to commit crimes when presented with the opportunity, though family closeness and authoritarian leadership thus seem to act as a buffer for juvenile deviance by limiting the opportunities to do so.

Limitations

Some limitations should be pointed out for the better understanding of the present results, such as the fact that we relied exclusively on self-report measures applied only to the adolescents (for reviews see Gomes, Maia, and Farrington 2018; Schwarz 1999). Moreover, we emphasize the fact that the assessment of family functioning has been performed by taking account of the family system as a whole, which may constitute a limitation in that it prevents the understanding of different relationships within the family system itself, e.g. the mother-child and father-child relationships. Nonetheless, we believe that a systemic comprehension of the family provides a more holistic understanding of its variables, and more researchers should consider instruments such as the FACES IV among their studies.

Another limitation refers to the use of cross-sectional data in this study. The Circumplex Model is a dynamic model. Therefore changes in the parent-child relations are expected throughout the life-course. Still, as Olson and Gorall (2003) explained, the Circumplex Model predicts a somewhat stability within family relations in different stages of the family life cycle. Therefore, it would be expected that the assessment of the family functioning during the adolescence would be a reliable

indicator of the overall relations between the family members. Nevertheless, future research should consider longitudinal designs to further explore the curvilinear relations between family functioning and the development of self-control.

Conclusion

In conclusion, this study revealed the Circumplex Model as an asset for understanding the familial role in the General Theory of Crime, in that it establishes a curvilinear relationship between family functioning and adolescents' self-control. These results, strive towards the central hypothesis of the Circumplex Model which assumes that balanced levels of family cohesion and family flexibility are conducive to a healthier individual development (Olson 2011). In addition, results presented a mediation model, where the relationship between family functioning and adolescents' deviant behavior is partially mediated by self-control. By showing the adequacy of the Circumplex Model in the General Theory of Crime, the present study stresses out the importance of systemic interventions among juvenile delinquents, as well as the importance of promoting balanced family relationships in order to prevent juvenile deviance.

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