ANTISOCIAL BEHAVIOUR IN ADOLESCENCE: UNDERSTANDING RISK FACTORS AND MEDIATORS THROUGH A STRUCTURAL EQUATIONS MODEL

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https://doi.org/10.17060/ijodaep.2016.n2.v1.245

Fecha de Recepción: 9 Julio 2016
Fecha de Admisión: 1 Octubre 2016

ABSTRACT

In this paper we use a SEM analysis to test an explanatory model for antisocial behaviour in adolescence that includes dimensions that have a direct effect on antisocial behaviour (psychoticism and self-control), and dimensions that are relatively malleable during this developmental stage and mediate the role of age on antisocial behaviour (family environment and conformity to social rules). A structural equations model was tested with a sample of 489 participants between 9 and 17 years old. Results show a good fitting model where psychoticism, self-control, age, social conformity and family environment are intertwined in a complex net of relations and effects involved in the explanation of adolescent antisocial behaviour.

Conclusions embrace the differentiated nature of each predictor and its role both directly and in relation to other predictors. The complexity of adolescent antisocial behaviour became evident, showing that it cannot be addressed in simplistic terms, as we need to account for several variables' direct and indirect effects.

Keywords: antisocial behaviour, personality, family, adolescence, social conformity

RESUMO

Apresentamos a análise de um Modelo de Equações Estruturais para testar um modelo explicativo para o comportamento antissocial na adolescência que inclui dimensões com efeito direto no comportamento antissocial (psicoticismo e autocontrolo) e dimensões que apresentam mais variabilidade ao longo deste estádio de desenvolvimento e que medeiam o papel da idade com comportamento antissocial (ambiente familiar e conformidade social).

Foi testado um modelo de equações estruturais com uma amostra de 489 jovens entre os 9 e os 17 anos de idade. Os resultados revelam um modelo significativo, com bons indices de ajusta-

mento, no qual o psicoticismo, autocontrolo, idade, conformidade social e ambiente familiar se entrecruza numa complexa rede de relações e efeitos envolvidos na explicação do comportamento antissocial na adolescência.

As conclusões reconhecem a natureza distinta de cada preditor e o papéis diretos e através das relações com outras variáveis preditoras. Fica evidenciada a complexidade do comportamento antissocial na adolescência, demonstrando que tal fenómeno não pode ser abordado de forma simplista, já que há que considerar efeitos diretos e indiretos de diversas variáveis.

Palavras-chave: comportamento antissocial, personalidade, família, adolescência, conformidade social

Adolescence stands out as a stage when deviancy is particularly prevalent in comparison to other moments in the lifespan. This paper addresses antisocial behaviour in adolescence presenting a structural equations model that considers psychoticism, and self-control having a direct effect on antisocial behaviour, while other variables that undergo developmental change mediate the role of age in the explanation of antisocial behaviour in adolescence.

The rapid increase in deviant behavior during adolescence followed by a rapid decrease after this developmental stage has been identified as the age crime curve (Blonigen, 2010), a curve characterized by a rapid increase in deviancy in mid adolescence, a peak in late adolescence, a marked decrease in early adulthood followed by a gradual, monotonic decline. Moffitt (2006) developed one of the most influential developmental taxonomies of antisocial behaviours that is based on the age of onset of deviant behaviours, arguing that both prevalence and incidence of offending are more frequent in adolescence and that criminal offenders are mostly teenagers. This occurs because, in childhood, delinquency is more of an individual psychopathology, while in adolescence it becomes almost normative (changing again to being psychopathological in adulthood). The Cambridge Study for Delinquent Development presents interesting results regarding distinct predictors for early onset and late-onset offending (Zara & Farrington, 2010), as well as data relating early onset with more persistent criminal careers (Farrington, 2007). There is agreement that the processes and risk factors involved in persistent and chronic antisocial behaviour may be different from those involved in adolescence limited deviancy.

Personality and individual dispositions play an important role in social behaviours as each person brings to his relationships a set of individual traits and characteristics that may influence the way he interacts with others. In fact, prior personality characteristics can predict social relations and, conversely, social relations may predict changes in personality over time (Robins, Caspi & Moffitt, 2002).

Eysenck (1996) suggested that individuals are more or less predisposed to behave or react in predictable ways in specific environmental conditions, arguing that individuals high on extraversion, psychoticism and neuroticism would be less able to react to social urges and, consequently, more prone to deviancy. As Morizot (2015, p.138) mentions, “personality traits are not merely convenient psychometric aggregates of behaviour consistencies, but are postulated as internal latent dispositions that explain systematic covariation among different cognitions, emotions and behaviours”. Recent empirical evidence has confirmed large significant effects of psychoticism on antisocial behaviour, but the role of extraversion and neuroticism is not as consensual (Carrasco, Barker, Tremblay & Vitaro, 2006; Center, Jackson & Kemp, 2005; Morizot, 2015).

Psychoticism describes a trait that goes from aggressiveness, egocentrism, toughness, and impulsivity, to empathy and caution. Hence, individuals with high psychoticism tend to be more egocentric, impulsive and insensitive to others’ feelings and, consequently, more prone to engage in

antisocial behaviours (Carrasco et al., 2006; Center et al., 2005; Morizot, 2015). Morizot (2015), argues that this trait could have been labelled as "disinhibition" or "psychopathy".

Impulsivity is characterized by poor self-control and is a consensual prominent characteristic of antisocial individuals (Carrasco et al., 2006; McEachern & Snyder, 2012; Morizot, 2015), strongly associated with psychoticism (Cale, 2006) and, more modestly, with extraversion (Morizot, 2015). Gottfredson and Hirschi's General Theory of Crime (1990) suggests that low self-control is the most important factor in antisocial behaviour and it tends to remain stable across the life course in antisocial individuals: it is developed in the first years of childhood and believed to end up conditioning the choices that people make in their life-course (Fonseca & Simões, 2002). Individuals with low self-control tend to be impulsive, insensitive, action-oriented, present oriented, self-centered, negatively tempered, risk takers, prone to accidents, have a lack of persistence and tenacity, have unstable social relations, and tend to perform poorly and fail to meet the responsibilities of school, work, and family. These individuals "also commit significantly greater amounts of deviant, imprudent, and maladaptative behaviours across numerous contexts than do persons with higher levels of self-control" (DeLisi & Vaughn, 2008, p. 522).

The tendency to show social desirability may be determinant in preventing an antisocial trajectory, whereas lack of social sensitivity, empathy and perspective-taking in social interactions may put individuals at higher risk of engaging in antisocial behaviours, as discussed by authors describing this as a characteristic of individuals with high psychoticism and low self-control. In this purpose, Sampson & Laub (2005) suggest that the occurrence of crime is less likely when informal social control makes individuals create strong bonds to society. Such social ties are viewed both formally (police, judicial authority...) and informally (family, neighbours...). Consequently, a low score on the Lie scale of Eysenck's Personality Questionnaire has been mentioned as a characteristic of antisocial individuals, since it may correspond to indifference to social expectations. In fact, the Lie scale has been considered as a measure of socialization and social conformity (Center et al., 2005), that is, "of the degree to which one is disposed to give socially expected responses to certain types of questions" (Center & Kemp, 2002, p. 356). A recent study on social influence on risk perception found that, unlike other stages in the life course, adolescents are more influenced by the social expectations of their peers than by the adult social-influence (Knoll, Magis-Weinberg, Speekenbrink & Blakemore, 2015). This could imply that adolescents tend to disregard generally established social rules in favour of what is valued by other adolescents and may collide with the broad societal norms.

Connolly & O'Moore (2003, p.560), argue that "a child's personality is greatly influenced by their upbringing and experiences. Therefore the experiences of children who come from less cohesive, or dysfunctional homes may be related to their personality type". Likewise, "the lack of self control does not necessarily lead to crime, it can be compensated by circumstances and by other individual characteristics" (Gottfredson & Hirschi, 1990, p. 89). This calls our attention to family environment as an important context of social development. In adolescence family environment tends to be perceived in a more negative fashion compared with other moments in the life course, as "the relationship between adolescents and their parents involves a delicate balancing act, with parents struggling to exert the right amount of support and control while continuing to allow their adolescents to explore their autonomy" (White & Renk, 2012, p.158). The development of the children's internal control, and the implementation of consistent discipline, control, and problem-solving strategies in the family and of the quality of bonds between parents and their children during this stage are pointed out as protective factors against deviant trajectories (Fonseca & Simões, 2002; Gottfredson & Hirschi, 1990; Pardini, Waller & Hawes, 2015).

Considering the state of the art in antisocial behaviours, our goal was to test a model able to explain antisocial behaviour in adolescence including the dimensions described above. We assumed

that some of these dimensions have a direct effect on antisocial behaviour (psychoticism and self-control), while some diminish as adolescents develop and play a negative role in antisocial behaviour mediating the role of age on antisocial behaviour: family environment, and social conformity.

METHOD

Participants

Prior to the questionnaires' application, permissions were asked the Ministry of Science and Education as well as to the National Committee for Data Protection. Afterwards, each school was consulted and agreed to participate in the study. Parents from all the students in the schools were asked to give their informed consent to allow their children to participate in the study, and were also requested to answer to the Portuguese version of Child Behaviour Checklist. All participants that agreed, to participate in the study were assured of the confidentiality and anonymity of their answers. Measures were applied collectively to small groups in classroom.

The sample was gathered in three schools from the region of Coimbra (Portugal) and included all the 489 individuals who, together with their parents, agreed to collaborate. 1217 requests were sent from which 40,18% consented to participate, with the characteristics presented in table 1. Socioeconomic status was determined based on the parents' job title and qualifications (Simões, 1994).

Table 1.
Sample Description

Sociodemographic Characteristics	Frequency	%
Gender		
Male	193	39.5%
Female	295	60.5%
TOTAL	489	100%
Age		
9	13	2.7%
10	81	16.6%
11	87	17.8%
12	66	13.5%
13	82	16.8%
14	68	13.9%
15	25	5.1%
16	40	8.2%
17	27	5.5%
TOTAL	489	100%
School Year		
5	83	17.0%
6	94	19.2%
7	74	15.1%
8	75	15.3%
9	79	16.2%
10	23	4.7%
11	43	8.8%
12	18	3.7%
TOTAL	489	100%
Socioeconomic Status		
Low	63	12.9%
Medium	243	49.6%
High	183	37.5%
TOTAL	489	100%

Dimensions were measured through an assessment protocol of self-report questionnaires. The choice of measures was guided by the robustness of its psychometric characteristics, the potential for collective and anonymous data collection, its accessibility for individuals with reading skills at a basic level and the potential for replication in distinct cultural contexts.

Antisocial behaviour was measured through a combination of self-reported and parent-reported dimensions: parents were asked to fill the Portuguese version of Child Behaviour Checklist (CBCL, Fonseca, Simões, Rebelo, Ferreira & Cardoso, 1994), with the factor "aggressive behaviour" (a= .69), composed of items about lying, destroying things, aggression, etc., while adolescents filled the Portuguese version of Youth Self-Report (YSR, Achenbach, 1991; Fonseca & Monteiro, 1999), more specifically, its "antisocial" factor (a= .78), with items related to cruelty, disobedience, fights and threats, etc.

Personality was assessed through the Portuguese version of Eysenck's Personality Questionnaire for Children (Fonseca, 1989), a 81 items questionnaire with dichotomous answers (yes/no), organized in four scales: "psychoticism" (a= .77), "extraversion" (a= .71), "neuroticism" (a= .83), and "lie" (a= .79). We only used the "psychoticism" and "lie" scales, given our hypothesis and literature review.

To assess self-control, we used the Portuguese version of Social Skills Questionnaire – Student From (Mota, Matos, & Lemos, 2011), with 39 items (a= .87) distributed in 3 scales: "assertion" (a= .70), "empathy" (a= .77), and "self-control" (a= .80). Each item could be answered according to its frequency (0=never, 1= sometimes, 2= many times). For this study, we only analysed the "self-control" factor.

Perception of family environment was measured with the Portuguese version of the Family Environment Scale (Matos & Fontaine, 1996), composed of 90 items, corresponding to 10 scales organized in three underlying dimensions: relationship ("cohesion", "expressiveness", and "conflict"), personal growth ("independence", "achievement orientation", "intellectual/cultural orientation", "active/recreational orientation", and "moral and religious emphasis"), and system maintenance ("organization" and "control"). Items can be answered with a 6 points Lickert scale from 1 (completely disagree) to 6 (completely agree). Given the low internal reliability of some scales, we chose to use only a global score of family environment (a= .88) consisting on all the items in the questionnaire. Due to the nature of the "conflict" scale, we inverted its items in order to assure that all items were in the same direction, that is, a higher score being equivalent to a general better perception of family environment.

Results

Our hypothesis stated that a possible explanatory model for adolescent antisocial behaviour would include dimensions directly predicting antisocial behaviour and others that would mediate the role of age. Therefore, we checked for correlations between such variables, presented on table 2.

Table 2.
Pearson Correlations between variables in the model

	Age	P	L	FE	SCont	AS	Agg
Age	1						
P	.029	1					
L	-.322**	-.380**	1				
FE	-.203**	-.231**	.391**	1			
SCont	-.128**	-.335**	.449**	.521**	1		
AS	.151**	.560**	-.503**	-.355**	-.400**	1	
Agg	-.012	.279**	-.167**	-.137**	-.114*	.370**	1

**p< .01 ; *p< .05
NOTES: P (Psychoticism); L (Lie); FE (Family Environment); SCont (Self-Control); AS (Antisocial – Youth Sefl-Report); Agg (Aggressive Behaviour – Child Behaviour Checklist)

THE HYPOTHESIZED MODEL

A structural equation model (SEM), based on the literature review and previous data was tested. The hypothesized model is presented in figure 1., where the circle represents the latent variable "ASB" (Antisocial behaviour) composed of two measured variables ("antisocial" from YSR – AS; and "aggressive behaviour" from CBCL – Agg), represented by rectangles, as all the remaining variables. Absence of a line connecting variables implies no hypothesized direct effect.

As data measuring risk behaviour are often non-normally distributed (Agan et al., 2015), maximum likelihood estimation was used. Variables showed skewnesses ranging from .098 to 2.042 and kurtosis ranging from .322 to 4.028. After checking for outliers, we verified that higher and lower results in each variable came from the legitimate variability in the population. Hence, given the sample size, we chose to maintain all cases that were collected (Warner, 2013). The configuration of missing values supports the assumption of missing at random. Therefore, missing data was handled through the estimation of means and intercepts with AMOS (Agan et al., 2015; Allison, 2003; Graham & Coffman, 2012)[1].

The hypothesized model examined the predictors of antisocial behaviour (ASB), assuming that psychoticism (P) and self-control (SCont) would be correlated between them and have a direct predictive effect on ASB. Psychoticism as a personality trait, would also have a direct effect on family environment (FE) and conformity to social rules as assessed by the lie scale of EPQ-J (L). Self-control would also have a direct effect on L and would be correlated with FE. The effect of age on ASB would be mediated by FE and L, also correlated between each other. We included correlations between age and self-control but we did not hypothesize the latter as a mediator of the effect of age on antisocial behaviour.

We found support for the tested model, presented in figure 1., revealing good fit indices: c^2 = 7.762 , p = .256 with robust CFI = .998 and RMSEA = .025.

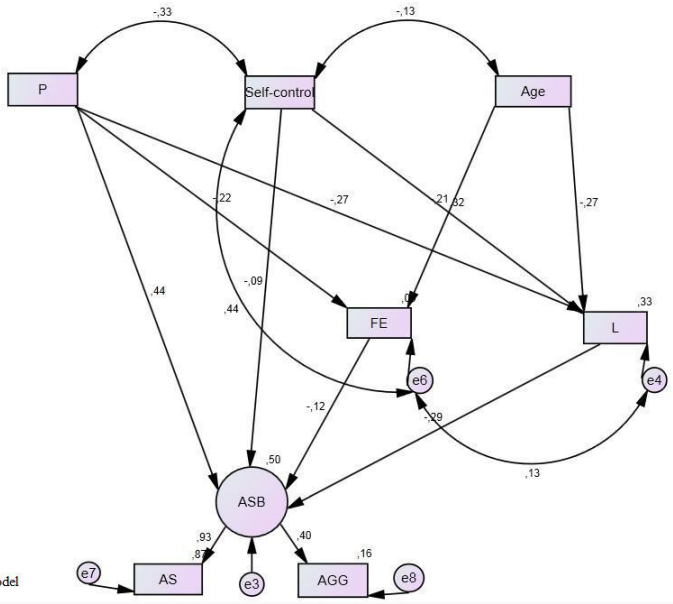

Figure 1. The Model

ASB, as a latent variable, was translated mostly by AS (b= .933 ; p < .001) and only modestly (but significantly) by Agg (b= .396 ; p < .001). P and SCont were significantly correlated and with significant covariance estimates (-3.168 ; p < .001). P directly predicted ASB (b= .438 ; p < .001), presenting the strongest effect on ASB of the entire model, and showed significant negative effects on FE (b= -.220 ; p < .001) and L (b= -.266 ; p < .001). The effect of SCont on ASB was very small and not statistically significant but it was close to the admissible significance value (b= -.087 ; p = .068). SCont significantly predicted L (b= .325 ; p < .001) and revealed significant covariances with e6 (FE) (55.732 ; p< .001) and age (-.997 ; p= .005).

The negative role of age was confirmed on FE (b= -.207 ; p< .001) and L (b= -.271 ; p < .001). FE showed a significant role on ASB (b= -.123 ; p = .007), such as L (b= -.287 ; p < .001). The errors of these mediating variables had significant covariance and correlations between them. 50% of variance in ASB was accounted for by this model. Table 3 shows, in detail, regression weights from the final model and table 4 presents covariance estimates.

Table 3.
Regression Weights

			Estimate	Std.Error	Std. Estimate	P
FE	←	Age	-3.468	.749	-.207	< .001
L	←	Age	-.509	.071	-.271	< .001
L	←	P	-.405	.060	-.266	< .001
FE	←	P	-2.998	.608	-.220	< .001
L	←	SCont	.354	.044	.325	< .001
ASB	←	P	.424	.039	.438	< .001
ASB	←	FE	-.009	.003	-.123	.007
ASB	←	L	-.182	.028	-.287	< .001
ASB	←	SCont	-.060	.033	-.087	.068
AGG	←	ASB	.318	.049	.396	< .001
AS	←	ASB	1.000		.933	< .001

Table 4.
Covariances

	Estimate	Std.Error	P
P ↔ SCont	-3.168	.473	< .001
Age ↔ SCont	-.997	.352	.005
e4 (L) ↔ e6 (FE)	15.072	4.735	.001
e6 (FE) ↔ SCont	55.732	6.166	< .001

DISCUSSION AND CONCLUSIONS

Even though psychoticism has a direct effect on antisocial behaviour during adolescence while other individual characteristics are more malleable and mediate the effects of adolescent development, it is reductive to assume that they excerpt independent influences on antisocial behaviour. As our model shows, there is a complex net of relations and influences between predictors of antisocial behaviour.

Antisocial behaviour was, in fact, directly predicted by psychoticism, that also predicted family environment and social conformity. In fact, an individual with tendency for low empathy, egocentrism and impulsivity may have greater difficulty in building adjusted social relations, including those inside the family, affecting the general family environment. As children grow into adolescence, family

relations become more complex and "require going beyond unilateral concepts such as parental warmth or restrictiveness to more reciprocal constructs" (Maccoby & Martin, 1983 *cit in* Grotevant & Cooper, 1985, p.415) that embrace, among others, the contribute of the children's personality characteristics to the overall family environment. The role of psychoticism on conformity to social rules is equally significant. Indeed, a less empathic, more egocentric and impulsive individual may be less able or motivated to follow rules that aim to promote respect towards other people and social interests when they go against his/her own immediate desires and needs. All these dynamics illustrate the direct and indirect effect of psychoticism on antisocial behaviour, on the relation of adolescents with their families and with society in general.

We confirm the importance of psychoticism on adolescent antisocial behaviour at several levels. Indeed, there is a tendency for normative changes in personality in adolescence, during the transition into adulthood (Blonigen, 2010) which may explain the fact that, despite not being correlated with age, psychoticism has a role in other factors that have a significant relation with age. Thus, the role of psychoticism appears to be both direct and indirect, through its role on social conformity and family environment.

Results on self-control were the most surprising of our model. Contrary to our assumptions, we did not find significant direct effects of this variable in antisocial behaviour. However, the fact that it was correlated with psychoticism (that includes a dimension of impulsivity characteristic of self-control) and predicted social conformity suggests that self-control must be taken into account in explanatory models for antisocial behaviour. Its role is not so much direct, as expected, but mediated by social conformity. Indeed, our results suggest that adolescents with lower self-control (consequently with higher impulsivity and difficulty in delaying gratification and meeting social responsibilities) may easier disregard social rules and, for that reason, are more likely to engage in antisocial behaviours. Furthermore, self-control was negatively correlated with age, indicating that, as children develop into adolescence, they tend to show less self-control and, in parallel, higher antisocial tendencies. Self-control was also correlated with family environment, showing, again, the important relation between children's characteristics, including self-control, and family environment. Indeed, when family management is ineffective or inconsistent, it may result in children's low self-control (Higgins, 2004). In turn, children with low self-control may perceive their family's environment more negatively or contribute to an overall decrease in the quality of the family environment.

The effect of age on antisocial behaviour was mediated by the role of family environment and conformity to social rules which are found to decrease with age and negatively affect antisocial behaviour, as expected.

Results on family environment confirm the importance of this context of development, that is also related to self-control and predicted by psychoticism, as discussed above. Indeed, as children develop into adolescence, family environment tends to become more negatively perceived. Because such negative perceptions have a direct impact on antisocial behaviour, it is important to understand to what extent this changes in family environment may have a *normative* effect in a *normative* phenomenon that will naturally decrease (the predictor and the antisocial behaviour) as most individuals enter into young adulthood.

Conformity to social rules was the strongest mediator of the relation between age and antisocial behaviour and also mediated the role of self-control on antisocial behaviour. Results reveal the importance of sensitivity to social expectations, that is, social desirability, in explaining the role of self-control and age on antisocial behaviour. It also showed significant covariance with family environment. As Calvo, González & Martorell (2001) suggested, higher antisocial and aggressive individuals are less concerned about helping others, show less respect towards others and also show higher impulsivity scores. Furthermore, increased family cohesion has been found to strengthen the

children's engagement in behaviours that are consistent with prosocial norms with which the family identifies (Pardini et al., 2015). These results highlight the importance of understanding motivations for deviancy and the mechanisms that explain why some individual dispositions and perceptions have a role on antisocial behaviour.

Generally looking at this model, several dimensions explain the antisocial phenomenon in adolescence. However, while some were found to develop with age, contributing to higher antisocial scores (family environment and conformity to social rules), psychoticism had a direct effect, while presenting no correlation with age and self-control, correlated with age, only had an indirect effect through its role on social conformity. Social conformity was, not only an important mediator of the relation between age and antisocial behaviour, but also a mediator of the relation between self-control and antisocial behaviour.

This study has some limitations. Psychological and developmental deficits were not assessed, neither was drug and alcohol consumption, which could have had some unaccounted effect on behaviour. In addition, the sample was not random, since we were dependent on parents' permission for participation, which may also bring some restrictions to the generalization of results to the population. Nevertheless, the large size of our sample offers some confidence on the generalization of conclusions. Results based on parents' reports were less significant and possibly have undervalued, in our sample, adolescents' problematic behaviour. This may indicate some lack of parents' knowledge regarding their children's behaviours. Hence, although parent reports are important to balance the subjectivity of self-report measures, results suggest that they may be far from the reality. Other sources of information could have been used (peers, teachers) to obtain a more accurate perspective of reality.

A future possibility for research would be a longitudinal research design to verify if, over time and without any intervention, those individuals with less psychoticism would show lower antisocial tendency, while those with higher psychoticism would show higher tendency to maintain a deviant trajectory. We anticipate that the stability of psychoticism and the relation with age of other predictors could possibly explain the difference between adolescence-limited *normative* antisocial behaviour and more persistent trajectories. In any case, it would be important to understand what can be done to prevent both adolescence-limited and life-course-persistent antisocial behaviour since these two antisocial trajectories may require distinct approaches.

Another important direction would be to assess the effect of interventions focused on conformity to social rules (in which psychoticism and self-control have a role) and on family environment (also predicted by psychoticism and related with self-control) in order to verify if we could reverse the direction of the relations between those factors. In other words, to find out if, by increasing adolescents' motivation to follow social rules and by fostering positive perceptions of family environment, we could have significant improvements in terms of impulsivity/dishinibition.

Our model proves the importance of holistic preventive approaches that are able to acknowledge this complexity. It is crucial to embrace the differentiated nature of each predictor and understand its role both directly and in relation to other predictors. We also acknowledge the need for further research with longitudinal design to confirm our assumptions regarding the specific role of these variables in more and less persistent antisocial trajectories in order to address different intervention needs.

In summary, this research draws our attention to the complex net of relations that is involved in the explanation of adolescent antisocial behaviour. We highlight the role of psychoticism on antisocial behaviour and the role of self-control on the mediators of the role of age on antisocial behaviour, as well as the upmost importance of social conformity – the strongest moderator of the effect of age on antisocial behaviour. Indeed, the complexity of adolescent antisocial behaviour became quite evi-

dent, showing that it cannot be addressed in simplistic terms, as we need to account for the involvement of both direct and indirect effects, most of which are related to age differences.

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1 We tested the same models having replaced missing data with the mean scores of the sample, and having eliminated 18 participants based on the analysis of Z scores for every variable in the model. Results did not differ significantly from the models presented in this paper: the same relations were found, but with minor different effects and significance