

**Testing the predictive value of antisocial beliefs and attitudes over
offending behaviour in adolescents**

Mirko Esposito

D.Clin.Psy. thesis (Volume 1), 2020

University College London

UCL Doctorate in Clinical Psychology

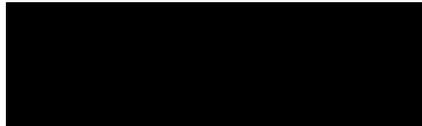
Thesis Declaration Form

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Name: Mirko Esposito

Date: 19th June 2020

Signature:



Overview

This thesis, divided in three parts, delineates a research process aimed at studying the contribution of antisocial beliefs and attitudes in determining recidivism behaviour in young offenders.

Part one of this thesis details a review of the literature on the role of beliefs and attitudes in predicting behaviour and their specific relevance in predicting offending behaviour in adolescents. It also reviews measurement methods of antisocial beliefs and attitudes. These findings shaped the theoretical framework wherein the empirical study was then devised and carried out.

Part two of this thesis describes the empirical testing of a set of inferential and hierarchical structural models in a large dataset of young offenders. The models aimed to ascertain the degree to which antisocial beliefs could longitudinally predict risk of recidivism in young offenders and explored the impact on this relationship of other established risk factors for offending (i.e. emotional and attentional disturbances, prior rate of offending and demographic factors). Results suggested that higher levels of self-reported antisocial beliefs led to higher incidence of recidivism in adolescents even when other variables were included in the model (e.g. rate of prior offending as a covariate). On the other hand, self-reported emotional disturbances ameliorated such risk.

Part three represents a critical appraisal of the whole research process. This part includes a recount of the different stages of research with a view on personal challenges, reflections and learning points that arose at each stage.

Impact Statement

Part one of this thesis presented a review of the literature on the role of beliefs and attitudes in predicting behaviour and their specific relevance in predicting offending behaviour in adolescents. Evidence spanning decades of research in a wide range of context was found in support of theories of behavioural prediction based on beliefs and attitudes (e.g. Theory of Reasoned Action and Theory of Planned Behaviour). Models specifically focusing on describing antisocial behaviour in young people (e.g. Socioinformation Processing model and Instrumental Antisocial Decision-making model) were also found to have accrued substantial evidence in support of their claims. Nevertheless, these theories ascertained a key role to the cognitive determinants of behaviour at the expenses of emotional, contextual and social determinants. In relation to the measurement of antisocial beliefs in young people, the Antisocial Beliefs and Attitudes Scale was found to be most appropriate measure available. These findings shaped the theoretical framework wherein the empirical study was then devised and carried out.

Part two of this thesis described the testing of a set of inferential and hierarchical structural models in a large dataset of young offenders. The models aimed to ascertain the degree to which antisocial beliefs could longitudinally predict risk of recidivism in adolescents and explored the impact of possible other contributing factors to this relationship such as demographic variables, as well as emotional and attentional disturbances. The principal finding of this study is that higher levels of antisocial beliefs were found to be significantly linked with higher incidence of recidivism in adolescents in the following 18 months; the relationship remained significant when other variables were included in the model (e.g. rate of prior offending as a covariate). Such finding has wide practical implications due to the fact that antisocial beliefs can be considered a dynamic risk factor, as opposed to static (i.e. history of offending), and, as such, changeable to a degree. For example, rehabilitation programs for

young offenders might be made more effective at reducing risk of re-offending in young people by including cognitive elements aimed at curtailing the strength of beliefs and attitudes towards antisociality. Moreover, high levels of self-reported emotional disturbances were found to ameliorate the risk of re-offending in the sample whereas self-reported attentional disturbances were not associated with recidivism. This result is particularly relevant due to the established high prevalence of emotional and attentional difficulties in prison populations and historical findings suggesting that these disturbances might be indeed be risk factors for offending. Dissemination of this new evidence might help challenging the stigma about offenders and possibly foster a more critical view on how emotional and attentional disturbances relate to risk of offending.

Attention of policy makers, practitioners and field workers should be drawn to the role of beliefs and attitudes in determining antisocial behaviour as several levels of the criminal justice system could benefit from an informed consideration of such an association when planning, devising and delivering services. Dissemination of the findings of this thesis through scientific journal has been planned as the first step to contribute to the evidence base.

Table of Contents

Acknowledgements	10
Part I: Conceptual Introduction.....	11
Abstract.....	12
Introduction.....	14
Beliefs and Attitudes	15
Antisocial beliefs and attitudes	16
Measuring anti-social beliefs and attitudes in adults	17
Measuring anti-social beliefs and attitudes in older children and adolescents ..	20
Social theories of behavioural prediction based on beliefs and attitudes	23
Theory of Reasoned Action & Theory of Planned Behaviour.....	24
Supporting evidence for social theories of behavioural prediction	28
Critiques of social theories of behavioural prediction	30
Theories of reactive and instrumental antisocial behaviour in adolescents ...	32
Social Information Processing model	33
Instrumental Antisocial Decision-making	35
Critiques to theories of antisocial behaviour in adolescents	36
Considerations for an empirical study	37
Conclusions.....	42
References	43
Part II: Empirical Paper	55
Abstract.....	56
Introduction.....	57
Aims.....	61
Methods.....	61
Participants.....	62
Design	62
Measures	63
<i>Antisocial Beliefs and Attitudes</i>	<i>63</i>
<i>Emotional difficulties</i>	<i>65</i>
<i>Attentional difficulties.....</i>	<i>66</i>
Analyses.....	66
<i>Variables.....</i>	<i>67</i>

<i>Assumptions and model estimation</i>	68
<i>Sample size</i>	68
<i>Indices of model fit</i>	70
Models	71
<i>Latent factors</i>	71
<i>Nested structural models</i>	72
<i>Sensitivity analyses</i>	74
Results	75
Missing Data	75
Descriptive Statistics.....	76
Latent Factors Analysis	77
Nested structural models.....	78
<i>Model fit indices</i>	78
<i>Predictors of offending</i>	79
<i>Sensitivity analyses</i>	83
Discussion	84
References	90
Part III: Critical Appraisal	101
Background	102
The thesis process	103
Project choice.....	103
Project proposal	103
Data processing.....	104
Analysis	106
Writing	107
Reflections	108
Conclusion	110
References	111
Appendix A – Inclusion and exclusion criteria for the START study	113
Appendix B – Antisocial Beliefs and Attitudes Scale (ABAS)	114
Appendix C – Short Mood and Feelings Questionnaire (SMFQ)	115
Appendix D – Strength and Difficulties Questionnaire (SDQ)	116
Appendix E – Factor Loadings of Confirmatory Factor Analysis	117
Appendix F – Mplus Visual Output for Nested Models	120
Appendix G – Summary of Sensitivity Analyses	123

List of Tables

Part II: Empirical Paper

Table 1. Descriptive Statistics.....	76
Table 2. Confirmatory Factor Analysis and correlations of latent factors.....	77
Table 3. Model fit indices for structural models.....	79
Table 4. Correlations and main effects for M1	79
Table 5. Correlations, covariates and main effects for M2.....	81
Table 6. Correlations, covariates and main effects for M3.....	82

Appendices

Table 1. Factor loadings for Antisocial Beliefs latent factor	117
Table 2. Factor loadings for Attentional difficulties latent factor	117
Table 3. Factor loadings for Emotional difficulties latent factor.....	118
Table 4. Model fit indices for sensitivity analyses	123
Table 5. Correlations, covariates and main effects for M3 with Square Rooted offending variables	123
Table 6. Correlations, covariates and main effects for M3 without outliers.....	123

List of Figures

Part I: Conceptual Introduction

Figure 1. Theory of Reasoned Action Model (Fishbein & Ajzen, 1975)	26
Figure 2. Theory of planned behaviour model (Ajzen, 1991)	28
Figure 3. Social information-processing model (Crick & Dodge, 1994)	34
Figure 4. Instrumental Antisocial Decision-making model (Fontaine, 2007)	36

Part II: Empirical Paper

Figure 1. Hypothesised latent factors' structure	72
Figure 2. Structural model 1 (M1)	73
Figure 3. Structural model 2 (M2)	74
Figure 4. Structural model 3 (M3)	74
Figure 5. Outcomes of CFA and latent factors	78
Figure 6. Outcomes of Structural Model 1 (M1)	80
Figure 7. Outcomes of Structural Model 2 (M2)	81
Figure 8. Outcomes of Structural Model 3 (M3)	83

Appendices

Figure 1. Mplus visual output for latent factors CFA	119
Figure 2. Mplus visual output for structural model 1	120
Figure 3. Mplus visual output for structural model 2	121
Figure 4. Mplus visual output for structural model 3	122

Acknowledgements

I would like to thank Stephen Butler for allowing this project to come to life, I hope to have valuably added to his work. I am also very grateful to Marc Tibber for his thorough and responsive feedback to my ideas and writing which I know for a fact has enriched the quality of this thesis and my thinking. I owe a special mention to Rob Saunders as these ideas would have not found realisation without his expert advice. I would like to extend a sincere thanks to the whole UCL staff for having always been a spring of knowledge and inspiration as well as a source of support when needed.

I also wanted to thank the wonderful 2017 cohort. These three years have undoubtedly been coloured by your kindness, encouragement, reflections and friendship. I hope I will carry some of those colours with me beyond the end of this journey.

I am especially grateful to my Krakóvian muse for her contagious energy and passion which helped me through the most gruelling moments and made the rest blissfully special.

Finally, I am immensely grateful to my family and closest friends. Their unshakable belief in me is what gives me the confidence every day to try anything in life without the need of succeeding or fear of failing, as these things simply do not matter when you are truly loved unconditionally.

Part I: Conceptual Introduction

**The role of beliefs and attitudes in predicting behaviour and their
application in predicting offending behaviour in adolescents**

Abstract

Aims: This introduction aimed to review the role of beliefs and attitudes in predicting behaviour and their specific application in predicting offending behaviour in adolescents. Findings were used to delineate a theoretical framework which informed and subsequently shaped the planning of the empirical study described in the following chapter of this manuscript.

Findings: Antisocial (AS) beliefs can be measured via a range of self-report measures. Of these, both the Criminal Sentiment Scale – Modified (CSS-M) and the Antisocial Beliefs and Attitude Scale (ABAS) showed good psychometric properties and predictive value. Nonetheless, the ABAS was the only scale specifically devised to measure AS beliefs in older children and adolescents. Theories attempting to predict behaviour based on beliefs and attitudes and the evidence on their effectiveness were also reviewed. The Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB) focused on how domain-specific beliefs and attitudes (i.e. health beliefs) predicted behavioural engagement in those specific domains (i.e. health promotion behaviour). Models of socioinformation processing (SIP) focused especially on AS behaviour and studied how context-specific cognitive processes (i.e. hostile attribution bias) led to the enactment of AS behaviours (i.e. reactive aggression in response to perceived hostility). Of note, the reviewed theories paid reduced attention to emotional processes, despite their established link to decision making.

Conclusions: There is substantial evidence in support of theories of behavioural prediction based on beliefs and attitudes. Nevertheless, these theories ascertained a central role to cognitive determinants of future behaviour at the expenses of emotional, contextual and social determinants. A model organised around AS beliefs and attitudes that aims to be comprehensive and of high predictive value must therefore take into account the contribution

that other risk factors for AS behaviours in adolescents (i.e. demographics, emotional difficulties) might have in determining offending behaviour and recidivism.

Introduction

This project aimed to ascertain the degree to which antisocial beliefs can predict risk of re-offending behaviour in adolescents. Anti-social beliefs and attitudes have been identified as risk factors for engaging in antisocial behaviour (Shader, 2001). Furthermore, persistent anti-social behaviour in adolescents seemed to be able to predict an increased risk of future criminal acts and convictions (Hill & Maughan, 2011). Nevertheless, the absence of standardised and age appropriate measures aimed at assessing anti-social beliefs in adolescents frustrated research efforts and potentially stunted interesting clinical developments within the field.

This thesis tested this hypothesised relationship between antisocial beliefs and re-offending using the large dataset collected for the Systemic Therapy for at Risk Teens (START) trial (Fonagy, et al., 2018), a randomised controlled trial (RCT) to evaluate multi-systemic therapy in the UK context. Multi-systemic therapy is an intensive family-based intervention carried out at the home, school and community of young people with serious antisocial behaviour (Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 2009).

A set of inferential models were conceptualised and tested by using Structural Equation Modelling, a form of casual modelling (Kaplan, 2008). Factors such as demographic variables (Shader, 2001), emotional and attentional disturbances (White, Moffitt, Earls, Robins, & Silva, 1990; Mordre, Groholt, Kjelsberg, Sandstad, & Myhre, 2011) were also included in these models because of their established links with offending behaviour. The study therefore aimed to determine the discrete contribution of antisocial beliefs in explaining offending behaviours in adolescents. The work hoped to enrich the understanding of offending behaviour in adolescents in a way that could potentially inform the extent to which targeting antisocial beliefs is a useful target for intervention when aiming to reduce the risk of re-offending in this population.

This conceptual introduction sought to provide an overview of the theoretical background and research findings on the link between beliefs and behavioural expression, with a specific focus on anti-social beliefs and offending behaviours in adolescent populations.

Beliefs and Attitudes

Attention to the systematic study of beliefs and attitudes in psychology was possibly first drawn by Allport 1935's "A handbook of Social Psychology" (Allport, 1935). In his writing, Allport hypothesised that attitudes might have driving and directive properties and that these could be specific or general (as in being broad or narrow in scope), common (as in shared amongst members of a certain group) or pertain to the individual. He also considered that attitudes could have a link to both personality and behaviour, the former somehow being involved in the shaping and origin of attitudes and the latter more being an expression of such attitudes. Almost a hundred years later, the study of beliefs and attitudes and their capacity to predict behaviour is still a central topic of discussion in a wide range of, and often quite disparate, contexts. For instance, beliefs and attitudes have been heavily researched in health for their capacity to inform how likely people might be to engage in health promotion and disease prevention behaviours (Conner & Norman, Predicting health behaviour, 2005) and have been found to be a key aspect motivating pro-environmental behaviours (Steg & Vlek, 2009). In other contexts, such as in marketing, beliefs and attitudes are in a similar fashion regularly probed, in the hope of predicting and capitalising on consumers' spending behaviour (Darley, Blankson, & Luethge, 2010). These are just few of the many fields in which beliefs and attitudes have been investigated and found to play central role in predicting behavioural responses in humans.

The terms beliefs and attitudes are often used together in both common language and scientific literature. Nevertheless, they are distinctive constructs and their dictionary definition

separates them conceptually. The Oxford Learner's Dictionary defines beliefs as "an opinion about something; something that you think is true" (Belief, 2019) whereas attitudes are defined as "the way that you think and feel about somebody/something; the way that you behave towards somebody/something that shows how you think and feel" (Attitudes, 2019). Despite both being an opinion and a way of thinking, the former is specifically about something being true, whereas the latter tells us more about a possible positive or negative emotional reaction and is directly linked to behaviour. In the extensive psychological literature covering the topic, beliefs and attitudes have been treated as psychological constructs and have therefore been differently defined according to the theoretical framework in which they were investigated. For this reason, the next section of the conceptual introduction covered a range of psychological theories that ascribe a central role to both beliefs and attitudes in motivating and, to an extent, predicting behaviour.

Antisocial beliefs and attitudes

Literature on anti-social beliefs and attitudes has generally defined antisocial beliefs and attitudes as those beliefs about and attitudes underpinning antisocial behaviours and accordingly measured such beliefs and attitudes, in terms of acceptability of, emotional reaction to or likelihood of engaging in such behaviours. Anti-social behaviour is defined as those actions that harm or lack consideration for others' wellbeing (Berger, 2018). Anti-social behaviours therefore include several behaviours that are not just socially disruptive but constitute a violation of societal rules. These are referred to as offending behaviour, often differentially defined as 'criminal behaviour' in adults, and 'delinquent behaviour', in adolescents (Morizot & Kazemian, 2014). The systematic observation of antisocial beliefs and behaviours led to a body of evidence solid enough to warrant, already in 1968, a nosological classification of antisociality as a personality disorder (APA, 1968). The most recent version of the Diagnostic and Statistical Manual of Mental Disorders distinctively defines antisocial

personality disorder as characterised by a range of pathological personality traits that cause impairments in the individual's ability to self-function and to function interpersonally (APA, Diagnostic and statistical manual of mental disorders, 2013). These traits were categorised in two classes described as antagonism (i.e. manipulateness, deceitfulness, callousness, hostility) and disinhibition (i.e. irresponsibility, impulsivity, risk taking).

Unsurprisingly, a large amount of research in the field of antisociality, both in terms of behaviours and underlying beliefs and attitudes, originated from prison studies. Directly relevant to our conceptual introduction, is a particularly well-developed stream of clinical research in correctional facilities which has consisted of epidemiological studies investigating the prevalence of psychopathological diagnostic clusters in prison populations. There has been consistent evidence, thoroughly reviewed by Fazel & Danesh in 2002, of an extreme overrepresentation of the antisocial personality disorder population in correctional facilities (Fazel & Danesh, 2002). The rates of antisocial personality disorder found were the most common diagnostic cluster with 47% (95% CI 46-48) of the 23,000 prisoners meeting diagnostic criteria out of the 65% that were diagnosable with a personality disorder (95% CI 61-68%). Knowing that personality disorders (PDs) are overall estimated to have a prevalence of about 10% in the general population (Lenzenweger, 2008), and that antisocial PD is only one of the ten types of PDs, further highlights the largely skewed proportion of antisocial PD presentations in prisons.

Measuring anti-social beliefs and attitudes in adults

Naturally, different epistemological positions, disciplines and interpretative theoretical frameworks shape how a subject is studied. This is also true with regards to the study, measurement and utilisation of data relevant to antisocial beliefs and attitudes. In fact, despite often sharing the same research setting and sample population (i.e. correctional facilities and

their prisoners), clinical research and forensic research have often worked from different perspectives, with minimal overlap in the way they attempt to measure the aforementioned constructs.

One systematic attempt to measure antisocial beliefs stemmed from Beck's cognitive model, a psychological model that, arguably, most explicitly links the role of cognition (i.e. beliefs) to emotional and behavioural elements. Cognitive therapy was originally conceptualised by Beck in 1979, specifically to explain the role of cognition on our emotional experiences and behaviour within the context of depressive symptomatology (Beck, 1979). As the model obtained a wide and long-lasting consensus, including being a stepping stone for the inception of cognitive behavioural therapy (CBT) (Beck, 1993; Beck, 1991), possibly the form of treatment with the largest evidence base (Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012), the theory evolved and provided a belief based explanation for the aetiology of personality disorders (Beck, Davis, & Freeman, 2015). Beck and his colleagues postulated that dysfunctional beliefs shape the interpretation of both internal stimuli (i.e. goals, values, etc.) and external stimuli (i.e. other people's behaviours, events, etc.) via cognitive distortions which then trigger dysfunctional emotional reactions and behaviours. This mechanism was posited to be at its strongest in people with personality disorders, where their pervasive patterns of thinking and behaving (i.e. same interpretations across a wide range of contexts) and inflexible patterns of thinking and behaving (i.e. rigid interpretations self-serving their beliefs) ultimately lead to a persistent and generalised level of dysfunction (Beck, Davis, & Freeman, 2015). Unfortunately, a more exhaustive review of how the Cognitive model explains the complex link between beliefs and general psychopathology falls beyond the remits of this introduction; nonetheless, the proposed framework led to the development of an interesting measure of antisocial beliefs: namely the personality belief questionnaire (PBQ). The PBQ questionnaire was first developed for clinical utility only (Beck & Beck, 1991), to aid clinicians in the

assessment of certain dysfunctional patterns of thinking for therapy purposes. With time, however, the psychometric properties of the PBQ were formally investigated and the measure was found to have good test-retest reliability (r coefficients between 0.81 and 0.93) when distinguishing between set of beliefs for the different types of personality disorders, which included antisocial personality disorder (Beck, et al., 2001). Unfortunately, the personality belief questionnaire did not seem able to discriminate unambiguously between men with antisocial personality disorders and those with no personality disorder (McMurran & Christopher, 2008). Interestingly, men with antisocial personality disorder held significantly more antisocial beliefs than those without a personality disorder, although, they also held more dysfunctional beliefs on most other sub-scales associated with other PDs, which made the scale sensitive but not specific (Parikh, Mathai, Parikh, Sekhar, & Thomas, 2008). Furthermore, the measure was developed with the aim of distinguishing between people who could be diagnosed with a specific type of personality disorder, and despite this being done via the assessment of their beliefs and attitudes, it shares no common theoretical ground with the study of rule-breaking behaviour and offending. Moreover, there have been no prospective studies linking the personality belief questionnaire to antisocial behaviours or criminal activity. In summary, this measure of beliefs and attitudes pertaining to antisociality not only is psychometrically weak but also not theoretically attuned with the aim of this review and the proposed study.

Within forensic studies, the systematic investigation of cognitive determinants for law-breaking behaviour is underpinned by the final intent of preventing such behaviour. Measures developed within the field are therefore found to be more focused on the direct link between beliefs and attitudes and the resultant behaviour. The Criminal Sentiment Scale – Modified (CSS-M) is considered the gold standard (Simourd, 1997; Skilling & Sorge, 2014) within these measures and has been widely employed in forensic research. The CSS-M is a self-report instrument that measures antisocial attitudes, values, and beliefs directly related to criminal

activity. It consists of 41 items grouped into five subscales: attitudes toward the law, court, police, tolerance for law violations, and identification with criminal others. Through combining the first three subscales the questionnaire also provides a measure of respect for the law and criminal justice system which was defined as the law court police subscale. The tolerance for law violation is an interesting sub-scale because it aims to measure neutralisation (McCarthy & Stewart, 1998), a specific form of justification for criminal behaviour that effectively discounts the gravity of law violating behaviour. Previous versions of the scale have been employed in a number of studies with wide ranging samples including probationers, provincial prisoners, young offenders, forensic prisoners, and university students (Andrews, Wormith, & Kiessling, 1985; Roy & Wormith, 1985; Andrews & Wormith, 1984). Of special interest to this conceptual introduction is a study that found the original Criminal Sentiments Scale predicted recidivism among young adults (Wormith & Andrews, 1995) and a second study that replicated the findings with the Modified scale, although this time predictive value over recidivism was only tested among adult violent offenders (Simourd & Van De Ven, 1999). More recently, a meta-analysis reviewed 1,789 subjects distributed across thirteen non-overlapping samples in an attempt to ascertain the value of using the Criminal Sentiments Scale to predict risk of re-offending in adult and juvenile offenders (Walters, 2016). The effects, although significant, were found to be low to modest and it was concluded that further research was necessary to confidently answer the posed question. The process of validation of the scale, particularly in regards to the validity of the measure in predicting recidivism, makes the Criminal Sentiments Scale a solid choice of measure for research purposes aimed at studying risk of offending.

Measuring anti-social beliefs and attitudes in older children and adolescents

The CSS has been utilised to effect in a number of studies involving older children and adolescents. For example, the scale was able to predict predatory behaviour expressed by older

adolescents (16 to 19 years) while detained in a maximum-security detention centre (Shields & Simourd, 1991). The scale was also successfully used to highlight differences in the degree and type of anti-social beliefs and attitudes between underage sexual and non-sexual offenders (Butler & Seto, 2002) as well as between adolescent sex offenders, general offenders and a comparison group of non-offenders (Valliant & Bergeron, 1997).

Unfortunately, aside from the few isolated references evidencing the use of the Criminal Sentiments Scale in samples of older children and adolescents, there was otherwise a striking lack of research on the topic of anti-social beliefs and attitudes within these populations. Moreover, a scale that has been devised, validated and predominantly employed in the study of adult offenders (Simourd, 1997; Simourd & Van De Ven, 1999) is arguably not a tool to be used indiscriminately with a population as different as the one of interest. In support of this claim is the consistent evidence that late childhood and adolescence are critical stages in which beliefs and attitudes about anti-social behaviour both develop and are consolidated (Landsheer & Hart, 1999; Tarry & Emler, 2007; Mak, 1990; Zhang, Loeber, & Stouthamer-Loeber, 1997). A developmentally sensitive scale that could capture the wide-range of antisocial cognitions associated with the development of persistent and serious antisocial behaviour in young age would be a more appropriate tool to use with these populations.

There may also be other reasons for the paucity of research in this area, including that the majority of anti-social behaviour research in children focused on aggression (for a review see (De Castro, Veerman, Koops, Bosch, & Monshouwer, 2002)) and the lack of appropriate standardized measures assessing antisocial beliefs and attitudes in older children and adolescents. With such an established tradition in the study of childhood aggression, even those research efforts aimed at beliefs and attitudes were limited to those linked to aggression rather than the whole spectrum of possible anti-social beliefs conceptually posited by the developmental models explaining anti-social behaviour in young people.

More recently, the development of the Antisocial Beliefs and Attitudes Scale (ABAS) (Butler, Leschied, & Fearon, 2007; Butler, Parry, & Fearon, 2015), devised to specifically assess a broad range of antisocial cognitions in older children and adolescents, filled this gap in the literature. An initial exploratory factor analysis clustered the items around three factors: Rule Noncompliance, Peer Conflict and Severe Aggression. The factorial structure was further narrowed to a dual factor structure when Severe Aggression was found not to be predictive of antisocial behaviour (Butler, Leschied, & Fearon, 2007). This data driven factorial structure was then confirmed in a second study involving a UK sample, results which also confirmed the scale to be a reliable and valid measure of antisocial thinking in young people (Butler, Parry, & Fearon, 2015). The Rule Noncompliance factor was defined as the beliefs and attitudes that young people had in support of contravening common age appropriate rules and directives set out by parents and teachers. The Peer Conflict factor was defined as measuring those beliefs and attitudes that young people had in support of behaving aggressively, engaging in physical fighting or conflict with peers (Butler, Parry, & Fearon, 2015). Interestingly, the predictive value of the two factors seemed to be modulated by age. Specifically, Peer Conflict was able to predict self and parent reported anti-social behaviour for ages 9-16 years, whereas Rule Noncompliance became an effective predictor only for ages 11-16 years. Rule Noncompliance might become an issue only later (relative to Peer Conflict), due to increased socionormative expectations that we place on adolescents. Adolescents holding stronger antisocial beliefs and attitudes towards Rule Noncompliance might struggle to adapt to the more stringent and complex social norms resulting in antisocial behaviours. Moreover, the Rule Noncompliance factor seemed to be able to predict a significant proportion of the variance of antisocial activity beyond the predictive capability of the CSS-M. These findings seem to support the value of using a measure of beliefs and attitudes that is developmentally sensitive and appropriate for preadolescent and adolescent youth, such as the ABAS, rather than the application of adult

measures of antisocial behaviour. This is particularly the case in regards to rule-compliance and rule-breaking beliefs and activity as these are strongly context and age dependent. Despite these promising results, the predictive value of the scale was based on youth self-reported anti-social behaviour rather than objective offending rates and therefore prone to a range of potential biases. Nonetheless, unpublished data suggests that these factors, particularly Peer Conflict, are robustly associated with re-offending in a broad sample of antisocial young people referred for treatment (Butler & Fearon, Unpublished Manuscript).

Social theories of behavioural prediction based on beliefs and attitudes

Ever since the inception of Allport's idea that beliefs and attitudes might drive behaviour (Allport, 1935) empirical findings have challenged the hypothesis. A seminal study carried out in the United States by LaPiere in 1934 (LaPiere, 1934) best exemplified the challenges to Allport's suggestion. At the time of the study, anti-Chinese sentiments were strongly rooted and freely spoken about across the United States. LaPiere's first stage of research involved writing to 250 establishments asking whether they would accept Chinese guests; out of the 128 replies, an outstanding 118 (92%) brazenly replied that they would not. The research team then carried out field visits to each of these establishment. The fact that only one out of 250 establishments refused service to Chinese guests cast strong doubts on the possibility to predict behavioural choices on the basis of self-reported beliefs and attitudes. A few years later, a review that included 42 studies on the subject found that attitudes correlated only weakly with behaviours $r=.15$ (aggregate estimate) and therefore concluded that it was likely for attitudes to be unrelated or at least only mildly related to expressed behaviours (Wicker, 1969). Fortunately, these findings did not discourage scientific interest but instead focused the attention of social psychology into developing a better understanding of the circumstances in which beliefs and attitudes could effectively explain behavioural outcomes.

The thorough investigation of the relationship between attitude and behaviour led to the exploration of the possible moderating and mediating factors in this relationship, leading to the development of two well established theories that more comprehensively explained the attitude-behaviour link (Montano & Kasprzyk, 2015).

Fishbein and Ajzen (Fishbein & Ajzen, 1975) were the first to note how *global* (as opposed to specific) attitudes were incorrectly inferred to be able to directly explain specific actions. In their work, they for instance criticised the validity of ascertaining predictive value to the attitude towards religion onto the behaviour of attending church. Despite the logical overarching link, the strength of such relationships should be considered in light of factors such as type of behaviour, time, target and context. More recently, a meta-analysis confirmed the validity of this critique claiming that specific attitudes were significantly better at predicting specific behaviours when compared with general attitudes (combined $p < 0.001$) (Kraus, 1995). Fishbein & Ajzen identified behavioural intentions to be the key mediator that mostly enriched the understanding of how attitudes and behaviours are linked (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980). Behavioural intentions were defined as the individual's motivation and decision to engage in a course of action. The pair of social psychologists theorised that behavioural intentions would therefore be the mediating variable working as a lynchpin between beliefs in a global sense, the ensuing attitudes towards certain actions and the resulting behavioural course of action. A later published quantitative review found behavioural intentions to be moderately correlated to behaviour ($r = .53$) (Sheppard, Hartwick, & Warshaw, 1988) reinforcing the idea that attitudes might be able to predict behaviour but only to the extent that they influence behavioural intentions, which in turn direct action.

Theory of Reasoned Action & Theory of Planned Behaviour

The focus shift towards third variables potentially involved in explaining the relationship between attitudes and behaviours resulted in the formalisation of the theory of planned behaviour (TPB) (Ajzen, 1988; Ajzen, 1991) which attempted to build upon and improve on the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975). The initial TRA postulates that behavioural intentions are formed on the basis of attitudes and subjective norms (*Figure 1*). The former, i.e. attitudes, are defined as a positive or negative evaluation of a certain behaviour, whereas the latter, i.e. subjective norms, are defined by the perceived social pressure from significant others (Fishbein & Ajzen, 1975). Within the theory, individuals' beliefs are identified as key factors in determining both attitudes and subjective norms. Specifically, behavioural beliefs underpin attitudes whilst normative beliefs underpin subjective norms. Moreover, each behavioural and normative belief consists of two components. Namely, behavioural beliefs are the resultant of an interaction between an outcome belief (i.e. how likely it is for an outcome to occur) and an outcome evaluation (i.e. how positively or negatively the individual values the outcome). This means that only valued outcomes are likely to inform one's attitudes. According to the theory, for someone to engage in anti-social behaviour, i.e. stealing or robbing a car, one would not only positively value obtaining an asset (positive outcome evaluation) but also believe in a likelihood of doing so as a result of theft or robbery (outcome belief of high likelihood). Finally, salient normative beliefs consist of referent beliefs (i.e. beliefs of the individual or group of reference) and motivation to comply (i.e. degree to which one is willing to comply with the referent's beliefs). Similar to the components of behavioural beliefs described above, referent beliefs and motivation to comply are deemed to interact and form an individual's subjective norms. The theory hence explains how social pressure might be differently weighed by an individual based on the choice of referent. To follow from the example introduced above, someone who is considering stealing as a way to gain a certain asset would be more likely to take advice from gang associates (high motivation

to comply with the referent’s beliefs) but dismiss advices by family members (low motivation to comply). The TRA therefore provided a theoretical framework whereby behavioural intention could be explained and predicted by the joint contribution of behavioural and normative beliefs, formed as described above.

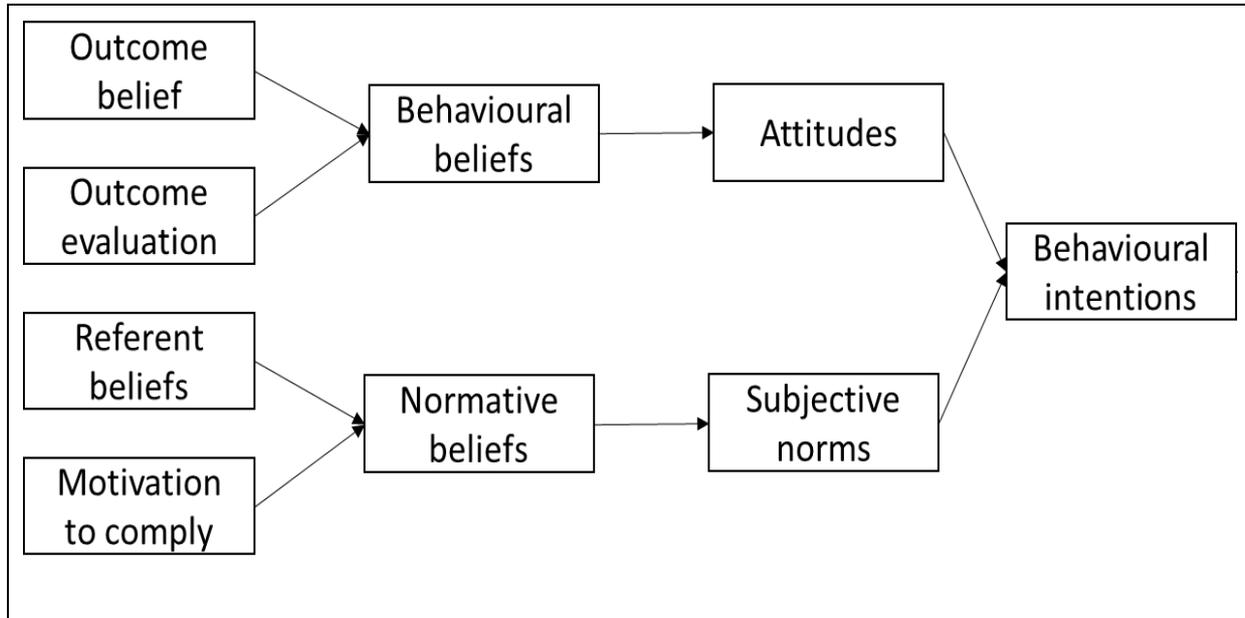


Figure 1. Theory of Reasoned Action Model (Fishbein & Ajzen, 1975)

Whilst the TRA seemed to account for a variety of behaviours in a range of contexts (For a review see (Montano & Kasprzyk, 2015)), the theory failed to exhaustively describe those behaviours that are bound to be - at least to an extent - controlled by external factors, such as personal resources, reliance on other people’s actions, environmental impediments or advantages. For example, someone without a vehicle on which to practice or the economic resources to pay for driving lessons, might not succeed at learning how to drive, or even be able to engage in the behaviours required in order to learn. In cases such as the one described above, the TRA would fail to explain why, the final behavioural outcome could not be explained solely on the basis of the individual’s positive beliefs and attitudes towards such an outcome.

It is because of this inability of the TRA to account for such classes of behaviours that Ajzen proposed the TPB (Ajzen, 1988; Ajzen, 1991), which included the essential contribution of the perceived behavioural control not only in determining the behavioural intention but also the behavioural outcome. The TPB postulates the effect of perceived behavioural control to be direct, i.e. not mediated or modulated, on both behavioural intention and outcome. This dual influence is explained by the fact that perceived behavioural control could be both a reflection of the degree of confidence in one's ability to achieve the behaviour as well as an estimate of actual control over the outcomes. In terms of self-confidence, perceived behavioural control determines behavioural intentions (i.e. I am confident, or not confident, that I can steal or rob a car); in terms of actual control, the effect of perceived behavioural control is directly impacting on the behaviour (i.e. having, or not having, a tool to break into the car or a weapon to carry out a robbery). Henceforth, there are three determinants of behavioural intentions within the TPB: attitudes, subjective norms and perceived behavioural control. In the same way that behavioural and normative beliefs underpinned and shaped attitudes and subjective norms respectively, in the TPB, control beliefs underpin the degree of perceived behavioural control. These control beliefs are defined by Ajzen as the result of the perceived frequency of factors facilitating or inhibiting a certain behaviour and the strength by which those factors facilitate or inhibit such behaviour. The model proposed by theory of planned behaviour is visually exemplified in the figure below (*Figure 2*).

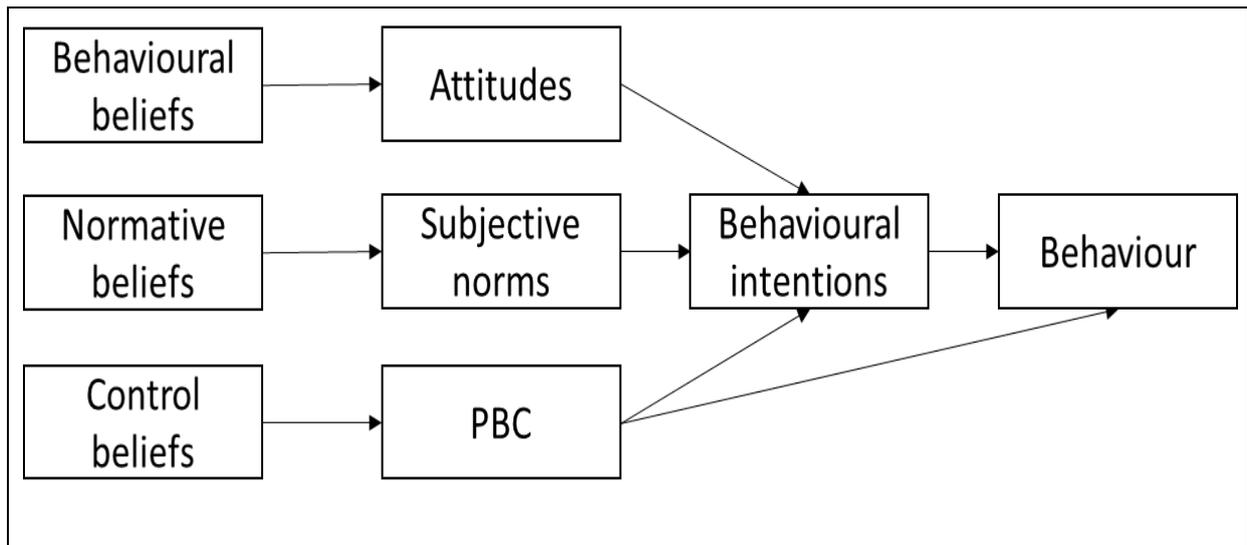


Figure 2. Theory of planned behaviour model (Ajzen, 1991)

PBC = Perceived Behavioural Control

Supporting evidence for social theories of behavioural prediction

A vast body of literature initially endorsed the claims of the TRA (Sheppard, Hartwick, & Warshaw, 1988; Hagger, Chatzisarantis, & Biddle, 2002; Montano & Kasprzyk, 2015). Of particular interest are the findings of a meta-analysis carried out by Sheppard et al. (Sheppard, Hartwick, & Warshaw, 1988) which found an average intention-behaviour correlation of $r = .53$ to be improved to $R = .66$ when the behavioural intention was computed from attitude and subjective norms. These findings seemed to assign to the TRA good predictive validity.

The ensuing TPB also attracted significant attention and its efficacy in enhancing the predictive value of the theory of reasoned action was reviewed a number of times (Ajzen, 1991; Godin & Kok, 1996; Armitage & Conner, 2001). All of these meta-analyses conclusively agreed that measures of perceived behavioural control significantly augmented the prediction of both behavioural intentions and observable behaviour. Of note, Armitage & Conner's review included 185 studies (Armitage & Conner, 2001) and concluded that the TPB explained $R^2=.39$ of the variance in behavioural intentions as well as $R^2=.27$ of the variance of behaviours. A more recent meta-analysis looked specifically at the long term prediction of health-related

behaviours with the TPB (McEachan, Conner, Taylor, & Lawton, 2011) and found that intention and perceived behavioural control were consistent predictors of behaviours in 237 prospective studies. The predictive capability of the theory was different according to the type of behaviour; the authors found better predictions for behaviours such as physical activity and dieting (respectively 23.9% and 21.2% of the variance explained) when compared to behaviours such as safer sex and abstinence from drugs (between 13% and 15% of the variance explained). The TPB cannot explain the discrepancy in predicting the two classes of behaviours, although one possibility is that the former class of behaviours includes more socially accepted behaviours and participants might have felt more comfortable or socially desirable to report them, and the associated attitudes towards them, more openly. Other theories have motivated this discrepancy as the result of a dual-system processing system that included reflective and more impulsive, unconscious and affective-based determinants of behaviour (Hofmann, Friese, & Wiers, 2008). Reflective determinants of behaviour would be the conscious factors included in the social theories of interest, those that could be accessed by self-report measures (e.g. beliefs and attitudes), whereas the more unconscious determinants were those that cannot be verbalised or self-reported as they are not available to conscience (e.g. impulses, implicit biases or emotions). Moreover, a meta-analysis evaluating studies of interventions aimed at changing behaviours by modifying intentions established that a medium to large change in behavioural intentions ($d=0.66$) led to a small to medium change in behaviour ($d=0.36$) (Webb & Sheeran, 2006). These results seemed to experimentally endorse the postulated link between intentions and behaviours.

At the time of this writing, the TPB, was possibly the most researched, cited and efficient attempt to explain the link between attitudes and behaviour (Armitage & Christian, 2003; Montano & Kasprzyk, 2015). The TPB has been found to be highly adaptable to a range of disciplines such as nursing (O'Boyle, Henly, & Larson, 2001), social policy (Cordano &

Frieze, 2000) and information technology (Mathieson, 1991). Even within psychological research, the model has been applied beyond social psychology and it has been extensively used in sport and exercise psychology (for a meta-analysis see (Hausenblas, Carron, & Mack, 1997)) as well as being regarded as the dominant model in the field of health psychology (Armitage & Christian, 2003). Studies investigating healthy eating (Conner, Norman, & Bell, 2002), smoking cessation (Norman, Conner, & Bell, 1999) and general health screening behaviour (Sheeran, Conner, & Norman, 2001) are just some of the most well-known applications of the TPB in the study of health related behaviours.

Critiques of social theories of behavioural prediction

Despite the remarkable evidence base, the social theories of reasoned action and planned behaviour showed some limitations, which have been investigated and critiqued by a range of experts in the field. Sutton et al. (2003), noted a striking lack of research regarding how to effectively measure the underlying beliefs that are salient to the behaviours investigated, despite the central importance of this to the model (Sutton, et al., 2003). This was particularly the case with respect to the affective drives behind behavioural intentions. Sutton and colleagues investigated beliefs associated with planning to engage in increased physical activity in the following 12 months in a large sample. The study found that respondents systematically provided different answers based on whether the question eliciting the belief had an affective focus (pleasure, dislike, etc.) or asked about the instrumental outcomes of exercising (advantages vs disadvantages). The former group of participants were found to have been effectively primed to weigh the affective valence to be more salient in determining their behavioural intentions towards exercising; the latter group instead tended to favour instrumental outcomes in the formation of their intentions. A further study carried out by the same research group (French, et al., 2005), highlighted that whilst instrumental beliefs explained 48% of the intention to increase physical activity, affective attitudes were able to

independently explain 11% of the variance. These findings raised the possibility that some people might have a systematic tendency to rely more on one type of information over another (e.g. affective vs instrumental) when making decisions, which in turn could influence what beliefs they might find salient when evaluating a certain course of action. Unfortunately, the theories of reasoned action or planned behaviour did not discriminate between affective and instrumental attitudes and therefore failed to explain how these determinants are attributed saliency or interact towards the formation of behavioural intentions. Moreover, it became evident that, by asking instrumentally focused questions, research within the TPB tended to elicit instrumental determinants of behaviours rather than affective ones, and therefore might have systematically failed to capture part of the affect-based variance. In substance, these studies exposed some of the limitations of a model of behavioural prediction that almost solely relies on cognitive factors, at the expenses of the affective ones.

A regained interest in the affective, and sometimes unconscious, determinants of behavioural choice led to research efforts in this direction (Sheeran, Gollwitzer, & Bargh, 2013; Conner, Godin, Sheeran, & Germain, 2013) and the development of dual process models that utilised both reflective (i.e. cognitive and conscious) as well as impulsive factors (i.e. implicit attitudes or emotions) in predicting behaviour (Hofmann, Friese, & Wiers, 2008).

Another limitation of the TRA and TPB models also is that they seemed to be less able to predict behaviour longitudinally or when the behavioural outcomes were observed rather than self-reported (McEachan, Conner, Taylor, & Lawton, 2011). Despite a few studies having looked at the discordance between self-reported and actual behavioural outcomes (Jenner, et al., 2006; Chao & Lam, 2011) there was no conclusive explanation of such discrepancy. Theorists of reasoned action and planned behaviour have often commented on how measures of beliefs, attitudes and behaviour should be taken as closely as possible in time and should be

as compatible as possible (i.e. referring to the same action, context etc.) in order to maximise predictive validity (Armitage & Christian, 2003; Abraham & Sheeran, 2003).

Another major critique of the TRA and TPB is that they do not account very well for the fact that individuals may have multiple goals that change dynamically over time and in different contexts (Abraham & Sheeran, 2003). Thus, at any one point in time, an individual may have competing goals (and related beliefs) that may be more or less salient to them. This dynamic goal formation processes might explain why, when behaviours are measured objectively and longitudinally, the strength of the link between beliefs and attitudes and actions might wane. In response, Abraham & Sheeran attempted to improve the predictive validity of the TPB by including key concepts of Goal Theories (Austin & Vancouver, 1996; Gollwitzer & Moskowitz, 1996; Carver & Scheier, 2001), within the TPB model (Abraham & Sheeran, 2003; 2017). Goal theories is a cluster term for those motivational theories that study the relationship between goals, motivation and behaviour (Carver & Scheier, 2001). Abraham & Sheeran (Abraham & Sheeran, 2003) acknowledged that goal formation processes, i.e. the processes whereby a particular goal is identified (Carver & Scheier, 2001), were neglected by the TRA and the TPB. The authors argued that focusing on the process whereby a specific behavioural outcome is selected within a possibly larger set of goals or sequenced actions in conflict would improve the understanding of beliefs and attitudes translate into action within a goal-informed decisional context thus enhancing the overall predictive value of the theories of reasoned action and planned behaviour (Abraham & Sheeran, 2003; 2017). Yet, to our knowledge, the ideas of Abraham & Sheeran have not been followed up in practice by researchers in the field.

Theories of reactive and instrumental antisocial behaviour in adolescents

As far as we know, social theories of behavioural prediction, e.g. the TRA and TRB, have not been directly applied to antisocial behaviour. Nonetheless, there have been attempts to explain antisocial behaviours in adolescents in terms of social information processing (Crick & Dodge, 1994; Fontaine, 2007). We will briefly review these models in the section below with specific attention to the role ascertained to beliefs and attitudes.

Social Information Processing model

Dodge's Social Information Processing (SIP) model (Dodge & Coie, 1987) is a model aiming to explain the development of antisocial tendencies and anti-social behaviour in children. The model proposed that reactive-aggressive youths have a tendency to interpret ambiguous provocations as threatening which would then justify the use of aggression as an appropriate reaction to a perceived hostility. This finding was described as a hostile attribution bias. Interestingly, the hostile attribution bias (measured by the number of errors of presumed hostility for neutral stimuli) could not be detected in neither non-aggressive peers nor in proactive-aggressive ones (Dodge & Coie, 1987). As further evidence supporting the SIP model accumulated (for a review see (Crick & Dodge, 1994)), Crick & Dodge reviewed their original model five stages model (Dodge & Coie, 1987) in favour of a cyclical, six stages process (Crick & Dodge, 1994). The authors suggested that after an initial encoding of the social stimulus, both internal and external cues are interpreted before a goal is clarified. Following these initial three stages, the response is constructed, evaluated and then enacted. Each stage of this cycle would be affected by cognitive structures defined as rules, social schemas and social knowledge by the authors (see figure 3 for a visual representation) (Crick & Dodge, 1994).

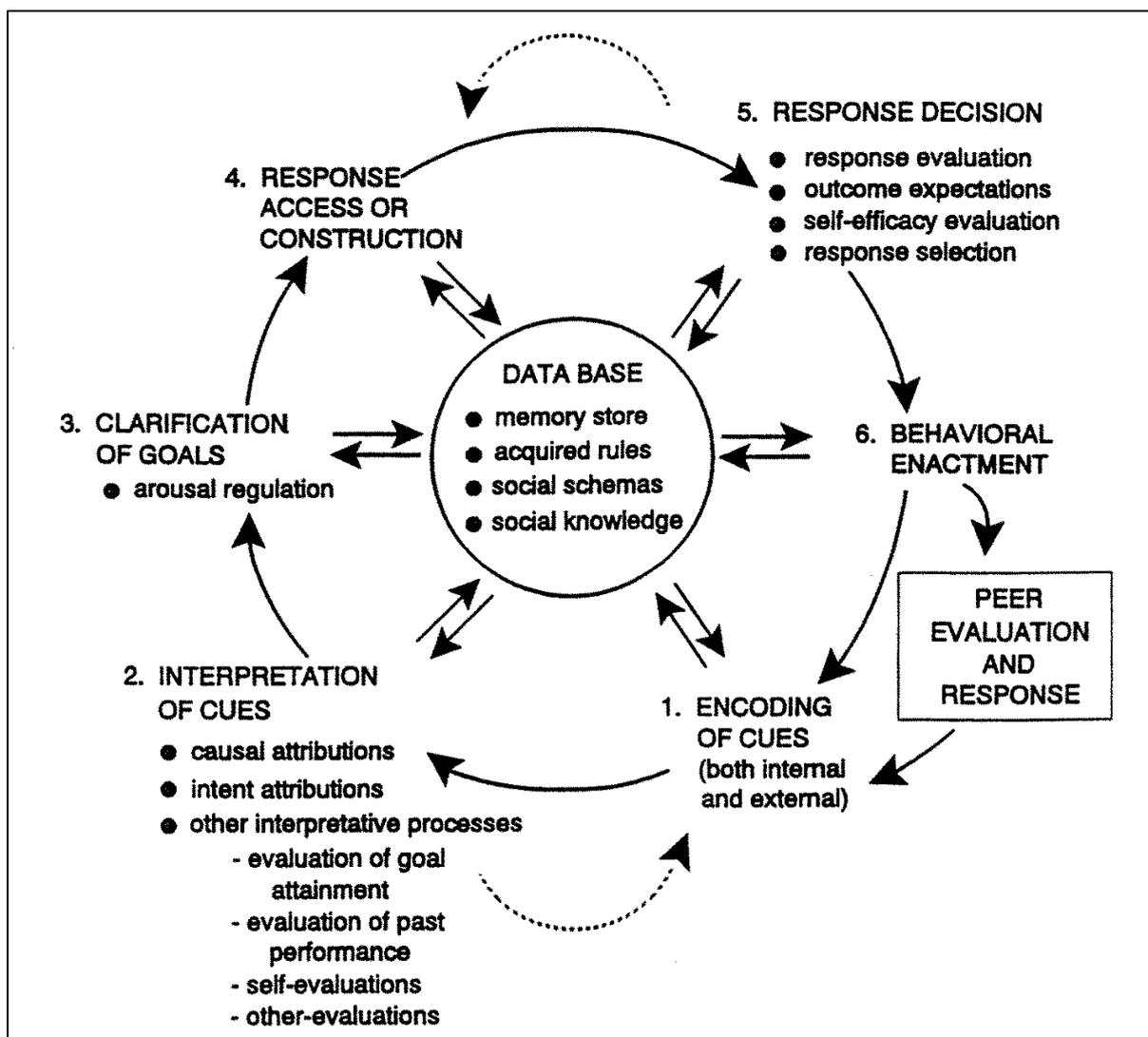


Figure 3. Social information-processing model (Crick & Dodge, 1994)

Finally, the model was expanded and tested again (Crick & Dodge, 1996), this time with respect to both reactive (hostile) and proactive (instrumental) aggression (Kempes, Matthys, De Vries, & Van Engeland, 2005). The authors not only confirmed that reactive-aggressive children had a tendency to show a hostility bias towards social cues but also that proactive-aggressive children demonstrated a propensity to evaluate aggression and its consequences positively instead (Crick & Dodge, 1996).

Notwithstanding the interesting developments, the use of SIP in the literature remained generally confined to the explanation of reactive patterns of aggression, therefore neglecting

those processes leading to instrumental antisocial behaviours (Fontaine, 2007). Specifically, the SIP struggled to account for the fact that instrumental aggression is mostly motivated by internal drives whereas the model, originally developed with attention to reactive aggression, worked best to explain antisocial behaviour when performed in response to external stimuli (Fontaine, 2007).

Instrumental Antisocial Decision-making

In order to address the limited applicability of the SIP model to the study of instrumental antisocial behaviour in the youth Fontaine proposed the Instrumental Antisocial Decision-making model (IAD) model (Fontaine, 2007). The IAD aimed to account for both instrumental and reactive aggressive behaviour in youth by favouring a goal-driven decision-making process over the role of biases in interpreting social stimuli. In other words, if in the SIP model aggression was conceptualised as a reaction to stimuli which could either trigger a misinterpretation of hostility (for reactive aggression) or favourable gains (for instrumental aggression), in the IAD model both forms of aggression are thought of as goal oriented. The IAD model therefore conceptualised reactive aggression as aimed at goals such as righting a wrong, reasserting social status and protecting against others who are misinterpreted as hostile. Instrumental aggression, by definition, is also goal-driven and therefore the model interpreted it as a behavioural strategy aimed at forcibly obtain something desired. The IAD model postulated antisocial behaviour decision making to be underpinned by five processes (figure 4): goal assessment, strategy and opportunity realisation, sociomoral congruence, outcome and risk appraisal and behavioural decision. The young person would first identify and evaluate a goal in terms of feasibility (e.g. obtaining someone's wallet) before generating behavioural plans aimed at achieving such goal (e.g. forcibly obtain the wallet). At this point the young person would then evaluate the behavioural choice in terms of sociomoral standards (i.e. "it is ok to steal from those who have more") and decide whether to actualise it before beginning to

weigh the likelihood of desired vs undesired outcomes of such action (i.e. obtaining the wallet and walking away vs not obtaining it or being caught). Finally, these processes, which are regarded to influence each other, converge into an antisocial behavioural choice which is then enacted.

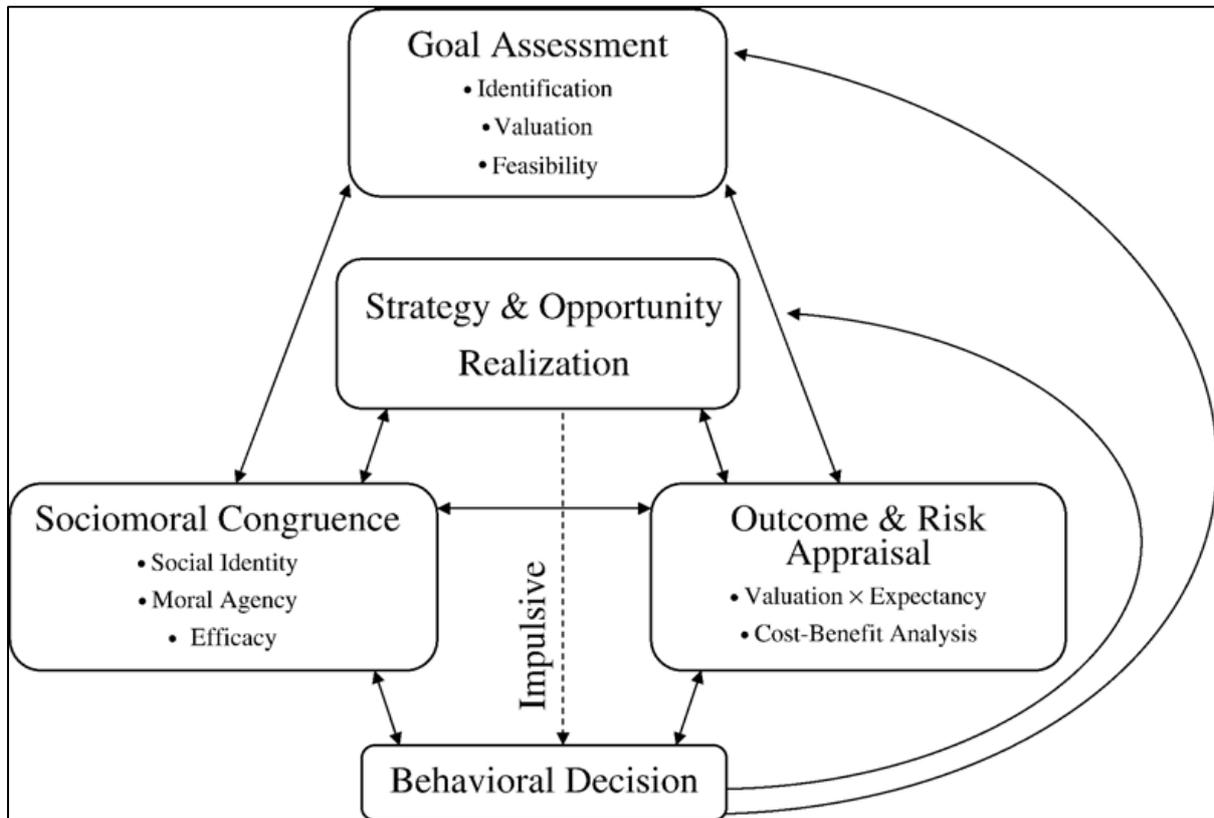


Figure 4. Instrumental Antisocial Decision-making model (Fontaine, 2007)

Critiques to theories of antisocial behaviour in adolescents

As the main focus of the models of antisocial behaviour in adolescents remained on context-specific cognitive processes (i.e. attributional biases), the important role of beliefs and attitudes in shaping those contextual decision-making processes was acknowledged but not formally investigated. For instance, in both Crick & Dodge’s SIP model (Crick & Dodge, 1994) and Fontaine’s IAD one (Fontaine, 2007) the interpretation of both external and internal cues was a key stage in the response decision making process. Despite the centrality of the interpretation process, the role of beliefs and assumptions in underpinning such bias has not

been an object of study. The attention very much remained on the “on-line”, as in context-specific, cognitive decision-making processes (i.e. attribution biases) whilst the “off-line”, as in context-aspecific, latent cognitive structures (i.e. beliefs and attitudes) were simply assumed (Butler, Parry, & Fearon, 2015). For instance, in Crick & Dodge’s reformulated model, these “off-line” structures stored in the long-term memory were postulated to be involved at each step of the six-stage cycle, yet were given little to no importance within the paper. Moreover, within the IAD model (Fontaine, 2007) the sociomoral congruence, strategy and opportunity realisation and outcome and appraisal stages were thought of as fully separate processes, either in opposition or in agreement with each other. Arguably these processes could all be underpinned by those sets of beliefs and attitudes that pertain to antisociality instead, and the impact of such beliefs could be thought of as a central process affecting the separate stages of decision making.

A significant lacuna of the models of socioinformation processing appeared to be the reduced attention to emotional processes and their impact on decision making (Fontaine, 2007) despite the link between emotions and decision making processes having been extensively studied and ascertained (Schwarz, 2000; Bechara, Damasio, & Damasio, 2000; Lerner, Li, Valdesolo, & Kassam, 2015). The inclusion of emotional processes in models concerning antisocial populations was arguably an even more pressing matter as both adult and young offending populations present with very high rates of emotional and psychiatric disturbances (Fazel & Danesh, 2002; Shelton, 2001).

Considerations for an empirical study

Anti-social behaviour in adolescents is a significant issue, leading to major consequences for the individual, the people around them and society (NICE, 2013). Such behaviour has been found to be costly beyond the damage directly associated with delinquent

acts. Longitudinal studies have linked delinquent behaviour in adolescence with increased risk of health and social problems leading to a tenfold increase in public sector costs by the time offenders reach the age of 28 (Colman, et al., 2009; Khan, Parsonage, & Stubbs, 2015). The increased cost of public funds has been investigated in depth by prospective studies that showed persistent anti-social behaviour in adolescents to be significantly linked with increased risk of future criminal acts and convictions, relational issues and mental health difficulties in adulthood (Hill & Maughan, 2011). These findings call for a better understanding of the determinants of reoffending behaviour.

An age-crime relationship has been observed in delinquency literature, indicating that rates of aggressive and nonaggressive anti-social behaviours increase through late childhood and adolescence. After the peak in mid-late adolescence, the relationship wanes into adult age (Loeber & Hay, 1997). Interestingly, a range of cross-sectional studies (Landsheer & Hart, 1999; Tarry & Emler, 2007; Mak, 1990), and one longitudinal study (Zhang, Loeber, & Stouthamer-Loeber, 1997), provided evidence of a similar relationship between age and levels of antisocial beliefs. A possible interpretation of these consistent findings is that late childhood and adolescence are critical stages in which beliefs and attitudes about anti-social behaviour develop. The findings are especially important as antisocial beliefs and attitudes have been identified as risk factors for engaging in antisocial behaviour in adolescents, whereas intolerance towards deviance has been identified as a protective factor (Shader, 2001). In fact, offender rehabilitation programs generally include both behavioural and cognitive elements as targets for intervention (Bernfeld, Farrington, & Leschied, 2003), and programs for adolescents with a particular focus on both these elements have been found to be more effective than deterrence-based programs with intensive supervision treatments at reducing reoffending (Koehler, Lösel, Akoensi, & Humphreys, 2013). Further research into the process of belief

formation therefore has the potential to inform translational research and adaptations in rehabilitation programs for young offenders.

Gains in the study of antisocial beliefs and offending behaviour are especially to be made in regards to improving the feasibility and reliability of the investigation of such processes. Theorists of the TRA and TPB demonstrated that collecting compatible (i.e. all referring to the same context and action) and timely (i.e. as close as possible in time to the called behavioural choice) measures for each factor included in the model (see figure 1 and 2) indeed seemed to hold higher predictive value than behavioural intention on its own (Sheppard, Hartwick, & Warshaw, 1988). Nonetheless, such measurement is difficult to operationalise and time-consuming, something that led researchers in the field to widely rely on measurement of behavioural intention on its own as a global measure of attitude (Sheeran, 2002; Armitage & Christian, 2003). A similar challenge about the scale of what to measure was found in the socioinformation processing models. Early models, such as the SIP, narrowed their focus on measuring attributional bias processes (Crick & Dodge, 1994) only to be later criticised by other researchers in the field that included other cognitive determinants such as sociomoral beliefs and contextual evaluations of outcome and risk for behavioural strategies (see IAD model) (Fontaine, 2007). Obtaining timely and context specific measurements of so many factors is not only costly and time-consuming, but also, hard to standardise and assess with respect to reliability. We would argue that a standardised measure assessing antisocial cognitions would not only be a more parsimonious way to investigate beliefs and attitudes, as opposed to obtaining an individual measurement for all of the factors identified by the models discussed above, but also a more reliable and ecologically valid option (Butler, Leschied, & Fearon, 2007). We would also argue that a greater focus on high-order cognitive structures and their transversal (i.e. context-free) role in shaping contextual decision making processes has

the potential to increase our understanding, and potentially prediction, of offending behaviour (Butler, Parry, & Fearon, 2015).

Having reviewed the most relevant theories in the prediction of behaviour (Montano & Kasprzyk, 2015; Fontaine, 2007), we felt that limiting our model to beliefs and attitudes alone, i.e. neglecting contextual determinants of behaviour, would have heavily limited the validity of our study. In fact, the reviewed social theories of behavioural prediction (Fishbein & Ajzen, 1975; Ajzen, 1991; Abraham & Sheeran, 2017) and those focusing on the socioinformation processing (Crick & Dodge, 1994; Fontaine, 2007) all posit a key role for contextual determinants such as social influences, pressures and resources in the formation of normative beliefs and norms, the interpretation of social information, behavioural intentions and goals. Consistent with this view also, a large review of the risk factors for delinquency in youth linked anti-social behaviour in young people with a range of risk factors including gender and age, as well as several environmental factors associated with low socio-economic status (Shader, 2001). Upon reviewing the theoretical and empirical literature on the topic, we therefore decided to include demographic and socioeconomic factors (i.e. socioeconomic status, age, and ethnicity) in our model in the attempt to comprehensively model the complexity of antisocial behaviour in young people.

As mentioned before, another major flaw that the reviewed models shared was the disregard for the affective determinants of behavioural choice (Hofmann, Friese, & Wiers, 2008; Fontaine, 2007). Consideration of such affective determinants may be particularly important within our population of interest, especially given the elevated incidence of severe psychological difficulties in adult and young offenders (Fazel & Danesh, 2002; Shelton, 2001). In addition, earlier history of persistent attention and conduct problems (White, Moffitt, Earls, Robins, & Silva, 1990; Mordre, Groholt, Kjelsberg, Sandstad, & Myhre, 2011) have been found to be associated with delinquency in childhood and adult age (for a review see (Lipsey & Derzon, 1998)). Notably, a well-established assessment tool called Historical-Clinical-Risk

Management-20 (HCR-20) includes psychiatric disturbances such as major mental disorders and personality disorders as critical factors to assess when attempting to predict the risk of violence (Douglas, Hart, Webster, & Belfrage, 2013; Douglas, et al., 2014). On the other hand, research on the relationship between emotional disturbances and offending behaviour has separately focused on sexual offending (Ward & Beech, 2006) and violent offending and psychopathology (Skeem, Johansson, Andershed, Kerr, & Loudon, 2007) but unfortunately paid reduced attention to beliefs and attitudes toward these acts. A model that aims to be comprehensive and of high predictive value must therefore take into account the contribution that emotional disturbances might have in explaining antisocial decision-making processes, offending behaviour and recidivism in adolescents.

Although these risk factors have all been described in developmental studies of anti-social disorder (Patterson, DeBaryshe, & Ramsey, 2017) they have not been tested simultaneously within a single model applied to a single population sample. Arguably, using the same sample when attempting to ascertain the relative predictive value of a range of factors is indeed crucial. In this regard, we aimed for our study to examine antisocial beliefs and attitudes within the context of well-established individual-level risk factors (including not only beliefs and attitudes but also demographics, socioeconomic factors, attentional and affective symptoms), and evaluate their relationship to anti-social behaviour longitudinally.

We used structural equation modelling (SEM) methods (Kaplan, 2008) for our study, a suitable statistical approach to assess mediation because it allows the user to examine the interrelationship between multiple independent factors on dependent variables (Geiser, 2012). Moreover, the SEM's ability to model latent path analysis (i.e. include latent / theorised variables rather than observed variables) permits the study of latent variables from manifest ones via multiple estimates of measurement error and intercorrelations between a range of different measurements (Kaplan, 2008). This approach was particularly suited to our research

questions because we aimed to estimate the impact that putative psychological constructs of importance (derived from the literature) have in shaping behaviour, rather than simply evaluating the predictive validity of a certain measurement tool or risk factors over a manifest behavioural outcome.

Conclusions

The proposed study aimed to empirically test the association between anti-social beliefs and attitudes and anti-social behaviour, as well as the impact of mental health and neurodevelopmental symptomatology (including ADHD, conduct and emotional disorders) on this relationship in a young offender population, whilst controlling for well-established demographic risk factors (e.g. gender, age and ethnicity). The broader purpose of the study was to understand how these factors interact within the population of interest and ultimately allow us to test a model that proposes to explain the complex relationship between these factors. Specifically, the following hypotheses were tested:

- Antisocial beliefs will be predictive of future offending behaviour (H1).
- The relationship between beliefs and outcome (i.e. future offending behaviour) will remain significant after the inclusion of Emotional and Attentional Disturbances as well as demographic and socioeconomic variables in the model (H2).
- Antisocial beliefs will be superior to demographic risk factors and Emotional and Attentional Disturbances in predicting future offending behaviour (H3).

References

- Abraham, C., & Sheeran, P. (2003). Implications of Goal Theories for the Theories of Reasoned Action and Planned Behaviour. *Current Psychology*.
- Abraham, C., & Sheeran, P. (2017). Implications of goal theories for the theories of reasoned action and planned behavior. In *In Planned Behavior* (pp. 101-122). Routledge.
- Ajzen, I. (1988). *Attitudes, personality and behaviour*. Milton Keynes, UK: Open University Press.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. NJ: Prentice-Hall: Englewood Cliffs.
- Allport, G. W. (1935). Attitudes. In G. W. Allport, *A Handbook of Social Psychology* (pp. 798-844). Worcester, MA, US: Clark University Press.
- Andrews, D. A., & Wormith, J. S. (1984). *Criminal sentiments and criminal behaviour*. Ottawa: Ministry of the Solicitor General of Canada.
- Andrews, D., Wormith, J., & Kiessling, J. (1985). *Self-reported criminal propensity and criminal behavior: Threats to the validity of assessments of attitudes and personality*. Ottawa: Ministry of the Solicitor General of Canada.
- APA, A. P. (1968). *Diagnostic and Statistical Manual of mental disorders (2nd ed.)*.
- APA, A. P. (2013). *Diagnostic and statistical manual of mental disorders*. BMC Med.

- Armitage, C. J., & Christian, J. (2003). From attitudes to behaviour: Basic and applied research on the theory of planned behaviour. *Current Psychology*, 22(3), 187-195.
- Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British journal of social psychology*, 40(4), 471-499.
- Attitudes*. (2019). Retrieved from Oxford Learner's Dictionaries: <https://www.oxfordlearnersdictionaries.com/definition/english/attitude>
- Austin, J. T., & Vancouver, J. B. (1996). Goal constructs in psychology: Structure, process, and content. *Psychological bulletin*, 120(3), 338.
- Bechara, A., Damasio, H., & Damasio, A. R. (2000). Emotion, decision making and the orbitofrontal cortex. *Cerebral cortex*, 10(3), 295-307.
- Beck, A. T. (1979). *Cognitive therapy of depression*. Guilford press.
- Beck, A. T. (1991). Cognitive therapy: A 30-year retrospective. *American psychologist*, 46(4), 368.
- Beck, A. T. (1993). Cognitive therapy: past, present, and future. *Journal of consulting and clinical psychology*, 61(2), 194.
- Beck, A. T., & Beck, J. S. (1991). *The personality belief questionnaire. Unpublished assessment instrument*. Bala Cynwyd, PA: The Beck Institute for Cognitive Therapy and Research.
- Beck, A. T., Butler, A. C., Brown, G. K., Dahlsgaard, K. K., Newman, C. F., & Beck, J. S. (2001). Dysfunctional beliefs discriminate personality disorders. *Behaviour research and therapy*, 39(10), 1213-1225.

- Beck, A. T., Davis, D. D., & Freeman, A. (2015). *Cognitive therapy of personality disorders*. Guilford Publications.
- Belief*. (2019). Retrieved from Oxford Learner's Dictionaries: <https://www.oxfordlearnersdictionaries.com/definition/english/belief>
- Bernfeld, G. A., Farrington, D. P., & Leschied, A. W. (2003). *Offender rehabilitation in practice: Implementing and evaluating effective programs*. John Wiley & Sons.
- Butler, S. M., & Seto, M. C. (2002). Distinguishing two types of adolescent sex offenders. *Journal of the American Academy of Child & Adolescent Psychiatry*, 41(1), 83-90.
- Butler, S. M., Leschied, A. W., & Fearon, P. (2007). Antisocial beliefs and attitudes in pre-adolescent and adolescent youth: the development of the antisocial beliefs and attitudes scales (ABAS). *Journal of Youth and Adolescence*, 36(8), 1058-1071.
- Butler, S. M., Parry, R., & Fearon, R. M. (2015). Antisocial thinking in adolescents: Further psychometric development of the Antisocial Beliefs and Attitudes Scale (ABAS). *Psychological assessment*, 27(1), 291.
- Carver, C. S., & Scheier, M. F. (2001). *On the self-regulation of behavior*. Cambridge University Press.
- Chao, Y. L., & Lam, S. P. (2011). Measuring responsible environmental behavior: Self-reported and other-reported measures and their differences in testing a behavioral model. *Environment and Behavior*, 43(1), 53-71.
- Conner, M., & Norman, P. (2005). *Predicting health behaviour*. UK: McGraw-Hill Education.

- Conner, M., Godin, G., Sheeran, P., & Germain, M. (2013). Some feelings are more important: Cognitive attitudes, affective attitudes, anticipated affect, and blood donation. *Health Psychology, 32*(3), 264.
- Conner, M., Norman, P., & Bell, R. (2002). The theory of planned behavior and healthy eating. *Health psychology, 21*(2), 194.
- Cordano, M., & Frieze, I. H. (2000). Pollution reduction preferences of US environmental managers: Applying Ajzen's theory of planned behavior. *Academy of Management journal, 43*(4), 627-641.
- Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological bulletin, 115*(1), 74.
- Crick, N. R., & Dodge, K. A. (1996). Social information-processing mechanisms in reactive and proactive aggression. *Child development, 67*(3), 993-1002.
- Darley, W. K., Blankson, C., & Luethge, D. J. (2010). Toward an integrated framework for online consumer behavior and decision making process: A review. *Psychology & marketing, 27*(2), 94-116.
- De Castro, B. O., Veerman, J. W., Koops, W., Bosch, J. D., & Monshouwer, H. J. (2002). Hostile attribution of intent and aggressive behavior: A meta-analysis. *Child development, 73*(3), 916-934.
- Dodge, K. A., & Coie, J. D. (1987). Social-information-processing factors in reactive and proactive aggression in children's peer groups. *Journal of personality and social psychology, 53*(6), 1146.

- Douglas, K. S., Hart, S. D., Webster, C. D., & Belfrage, H. (2013). *HCR-20V3: Assessing risk for violence: User guide*. . Mental Health, Law, and Policy Institute: Simon Fraser University.
- Douglas, K. S., Hart, S. D., Webster, C. D., Belfrage, H., Guy, L. S., & Wilson, C. M. (2014). Historical-clinical-risk management-20, version 3 (HCR-20V3): development and overview. *International Journal of Forensic Mental Health*, 13(2), 93-108.
- Fazel, S., & Danesh, J. (2002). Serious mental disorder in 23 000 prisoners: a systematic review of 62 surveys. *The lancet*, 359(9306), 545-550.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude. Intention and Behavior: An Introduction to Theory and Research*.
- Fonagy, P., Butler, S., Cottrell, D., Scott, S., Pilling, S., Eisler, I., . . . Ellison, R. (2018). Multisystemic therapy versus management as usual in the treatment of adolescent antisocial behaviour (START): a pragmatic, randomised controlled, superiority trial. *The Lancet Psychiatry*, 5(2), 119-133.
- Fontaine, R. G. (2007). Toward a conceptual framework of instrumental antisocial decision-making and behavior in youth. *Clinical Psychology Review*, 27(5), 655-675.
- French, D. P., Sutton, S., Hennings, S. J., Mitchell, J., Wareham, N. J., Griffin, S., . . . Kinmonth, A. L. (2005). The Importance of Affective Beliefs and Attitudes in the Theory of Planned Behavior: Predicting Intention to Increase Physical Activity. *Journal of Applied Social Psychology*, 35(9), 1824-1848.
- Geiser, C. (2012). *Data analysis with Mplus*. Guilford press.

- Godin, G., & Kok, G. (1996). The theory of planned behavior: a review of its applications to health-related behaviors. *American journal of health promotion*, 11(2), 87-98.
- Gollwitzer, P. M., & Moskowitz, G. B. (1996). Goal effects on action and cognition. In E. T. Higgins, & A. W. Kruglanski, *Social psychology: Handbook of basic principles* (pp. 361-399). New York: Guilford.
- Hagger, M., Chatzisarantis, N., & Biddle, S. (2002). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport & Exercise Psychology*.
- Hausenblas, H. A., Carron, A. V., & Mack, D. E. (1997). Application of the theories of reasoned action and planned behavior to exercise behavior: A meta-analysis. *Journal of sport and exercise psychology*, 19(1), 36-51.
- Henggeler, S. W., Schoenwald, S. K., Borduin, C. M., Rowland, M. D., & Cunningham, P. B. (2009). *Multisystemic therapy for antisocial behavior in children and adolescents. 2nd edn*. New York, NY: Guilford Press.
- Hill, J., & Maughan, B. (2011). *Conduct disorders in childhood and adolescence*. Cambridge University Press.
- Hofmann, S. G., Asnaani, A., Vonk, I. J., Sawyer, A. T., & Fang, A. (2012). The efficacy of cognitive behavioral therapy: A review of meta-analyses. *Cognitive therapy and research*, 36(5), 427-440.
- Hofmann, W., Friese, M., & Wiers, R. W. (2008). Impulsive versus reflective influences on health behavior: A theoretical framework and empirical review. *Health Psychology Review*, 2(2), 111-137.

- Jenner, E. A., Fletcher, B. C., Watson, P., Jones, F. A., Miller, L., & Scott, G. M. (2006). Discrepancy between self-reported and observed hand hygiene behaviour in healthcare professionals. *Journal of hospital infection*, 63(4), 418-422.
- Kaplan, D. (2008). *Structural equation modeling: Foundations and extensions (Vol. 10)*. Sage Publications.
- Kempes, M., Matthys, W., De Vries, H., & Van Engeland, H. (2005). Reactive and proactive aggression in children A review of theory, findings and the relevance for child and adolescent psychiatry. *European child & adolescent psychiatry*, 14(1) 11-19.
- Koehler, J. A., Lösel, F., Akoensi, T. D., & Humphreys, D. K. (2013). A systematic review and meta-analysis on the effects of young offender treatment programs in Europe. *Journal of Experimental Criminology*, 9(1), 19-43.
- Kraus, S. J. (1995). Attitudes and the prediction of behavior: A meta-analysis of the empirical literature. *Personality and social psychology bulletin*, 21(1), 58-75.
- Landsheer, J. A., & Hart, H. T. (1999). Age and adolescent delinquency: The changing relationship among age, delinquent attitude, and delinquent activity. *Criminal Justice and Behavior*, 26(3), 373-388.
- LaPiere, R. T. (1934). Attitudes vs. actions. *Social forces*, 13(2), 230-237.
- Lenzenweger, M. F. (2008). Epidemiology of personality disorders. *Psychiatric Clinics of North America*, 31(3), 395-403.
- Lerner, J. S., Li, Y., Valdesolo, P., & Kassam, K. S. (2015). Emotion and decision making. *Annual review of psychology*, 66, 799-823.

- Lipsey, M. W., & Derzon, J. H. (1998). Predictors of violent or serious delinquency in adolescence and early adulthood: A synthesis of longitudinal research. In R. Loeber, & D. P. Farrington, *Serious & violent juvenile offenders: Risk factors and successful interventions* (pp. 86–105). Sage Publications, Inc.
- Loeber, R., & Hay, D. (1997). Key issues in the development of aggression and violence from childhood to early adulthood. *Annual review of psychology*, 48(1), 371-410.
- Mak, A. S. (1990). Testing a psychosocial control theory of delinquency. *Criminal Justice and Behavior*, 17(2), 215-230.
- Mathieson, K. (1991). Predicting user intentions: comparing the technology acceptance model with the theory of planned behavior. *Information systems research*, 2(3), 173-191.
- McCarthy, J. G., & Stewart, A. L. (1998). Neutralisation as a process of graduated desensitisation: moral values of offenders. *International Journal of Offender Therapy and Comparative Criminology*, 42(4), 278-290.
- McEachan, R. R., Conner, M., Taylor, N. J., & Lawton, R. J. (2011). Prospective prediction of health-related behaviours with the theory of planned behaviour: A meta-analysis. *Health Psychology Review*, 5(2), 97-144.
- McMurrin, M., & Christopher, G. (2008). Dysfunctional beliefs and antisocial personality disorder. *The journal of forensic psychiatry & psychology*, 19(4), 533-542.
- Montano, D. E., & Kasprzyk, D. (2015). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. *Health behavior: Theory, research and practice*, 70(4), 231.

- Mordre, M., Groholt, B., Kjelsberg, E., Sandstad, B., & Myhre, A. M. (2011). The impact of ADHD and conduct disorder in childhood on adult delinquency: A 30 years follow-up study using official crime records. *BMC psychiatry*, 11(1), 57.
- Norman, P., Conner, M., & Bell, R. (1999). The theory of planned behavior and smoking cessation. *Health psychology*, 18(1), 89.
- O'Boyle, C. A., Henly, S. J., & Larson, E. (2001). Understanding adherence to hand hygiene recommendations: the theory of planned behavior. *American journal of infection control*, 29(6), 352-360.
- Parikh, R., Mathai, A., Parikh, S., Sekhar, G. C., & Thomas, R. (2008). Understanding and using sensitivity, specificity and predictive values. *Indian journal of ophthalmology*, 56(1), 45.
- Patterson, G. R., DeBaryshe, B. D., & Ramsey, E. (2017). *A developmental perspective on antisocial behavior. In Developmental and Life-course Criminological Theories.* (pp. 29-35): Routledge.
- Roy, R., & Wormith, J. (1985). *The effects of incarceration: Measuring criminal sentiments.* Ottawa: Ministry of the Solicitor General of Canada.
- Schwarz, N. (2000). Emotion, cognition, and decision making. *Cognition & Emotion*, 14(4), 433-440.
- Shader, M. (2001). *Risk factors for delinquency: An overview.* Washington, DC: US Department of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention.

- Sheeran, P. (2002). Intention—behavior relations: a conceptual and empirical review. *European review of social psychology*, 12(1), 1-36.
- Sheeran, P., Conner, M., & Norman, P. (2001). Can the theory of planned behavior explain patterns of health behavior change? *Health psychology*, 20(1), 12.
- Sheeran, P., Gollwitzer, P. M., & Bargh, J. A. (2013). Nonconscious processes and health. *Health Psychology*, 32(5), 460.
- Shelton, D. (2001). Emotional disorders in young offenders. *Journal of Nursing Scholarship*, 33(3), 259-263.
- Sheppard, B. H., Hartwick, J., & Warshaw, P. R. (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *Journal of Consumer Research*, 15, 325-343.
- Shields, I. W., & Simourd, D. J. (1991). Predicting predatory behavior in a population of incarcerated young offenders. *Criminal Justice and Behavior*, 18(2), 180-194.
- Simourd, D. J. (1997). The Criminal Sentiments Scale-Modified and Pride in Delinquency scale: Psychometric properties and construct validity of two measures of criminal attitudes. *Criminal Justice and Behavior*, 24(1), 52-70.
- Simourd, D. J., & Van De Ven, J. (1999). Assessment of criminal attitudes: Criterion-related validity of the Criminal Sentiments Scale-Modified and Pride in Delinquency Scale. *Criminal Justice and Behavior*, 26(1), 90-106.
- Skeem, J., Johansson, P., Andershed, H., Kerr, M., & Louden, J. E. (2007). Two subtypes of psychopathic violent offenders that parallel primary and secondary variants. *Journal of abnormal psychology*, 116(2), 395.

- Skilling, T. A., & Sorge, G. B. (2014). Measuring antisocial values and attitudes in justice-involved male youth: Evaluating the psychometric properties of the Pride in Delinquency Scale and the Criminal Sentiments Scale–Modified. *Criminal Justice and Behavior*, 41(8), 992-1007.
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of environmental psychology*, 29(3), 309-317.
- Sutton, S., French, D. P., Hennings, S. J., Mitchell, J., Wareham, N. J., Griffin, S., . . . Kinmonth, A. L. (2003). Eliciting salient beliefs in research on the theory of planned behaviour: The effect of question wording. *Current Psychology*, 22(3), 234-2.
- Tarry, H., & Emler, N. (2007). Attitudes, values and moral reasoning as predictors of delinquency. *British Journal of Developmental Psychology*, 25(2), 169-183.
- Valliant, P. M., & Bergeron, T. (1997). Personality and criminal profile of adolescent sexual offenders, general offenders in comparison to nonoffenders. *Psychological reports*, 81(2), 483-489.
- Walters, G. D. (2016). Predicting recidivism with the Criminal Sentiments Scale: A meta-analysis of a putative measure of criminal thought content. *Criminal Justice and Behavior*, 43(9), 1159-1172.
- Ward, T., & Beech, A. (2006). An integrated theory of sexual offending. *Aggression and violent behavior*, 11(1), 44-63.
- Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological bulletin*, 132(2), 249.

- White, J. L., Moffitt, T. E., Earls, F., Robins, L., & Silva, P. A. (1990). How early can we tell?: Predictors of childhood conduct disorder and adolescent delinquency. *Criminology*, 28(4), 507-535.
- Wicker, A. W. (1969). Attitudes versus actions: The relationship of verbal and overt behavioral responses to attitude objects. *Journal of Social issues*, 25(4), 41-78.
- Wormith, J. S., & Andrews, D. A. (1995). The development and validation of three measures of criminal sentiments and their role in the assessment of offender attitudes. *Annual convention of the Canadian Psychological Association*. Charlottetown, Canada.
- Zhang, Q., Loeber, R., & Stouthamer-Loeber, M. (1997). Developmental trends of delinquent attitudes and behaviors: Replications and synthesis across domains, time, and samples. *Journal of Quantitative Criminology*, 13(2), 181-215.

Part II: Empirical Paper

**Testing the predictive value of antisocial beliefs and attitudes over
offending behaviour in adolescents**

Abstract

Aims: The study aimed to ascertain the degree to which antisocial beliefs could longitudinally predict risk of recidivism in adolescents and explored the contribution of possible other contributing factors to this relationship.

Method: A set of inferential and hierarchical models was tested in a large dataset collected for the Systemic Therapy for at Risk Teens (START) trial using Structural Equation Modelling (SEM). Alongside antisocial beliefs, the inferential model also included factors such as demographic variables, as well as emotional and attentional disturbances because of their established links with increasing the risk for adolescents to engage in offending behaviour.

Results: Higher levels of antisocial beliefs were found to be significantly linked with higher incidence of recidivism in adolescents in the subsequent 18 months. This finding remained consistent when other variables were included in the model (e.g. rate of prior offending as a covariate). Interestingly, high levels of self-reported emotional disturbances were found to ameliorate the risk of re-offending in the sample. The level of self-reported attentional disturbances was not found to be associated with offending. The only static factor that was found to be linked with higher risk of offending was a higher frequency of prior offending; demographic factors such as age and gender did not predict offending.

Conclusions: Antisocial beliefs and attitudes were found to be independently predictive of recidivism (in the following 18 months) in adolescents. Antisocial beliefs and attitudes can be considered a cognitive dynamic risk factor and can therefore be targeted by cognitive interventions. Rehabilitation programs for young offenders would likely benefit from a greater focus on antisocial beliefs and attitudes when assessing, managing and reducing risk of recidivism.

Introduction

Anti-Social (AS) behaviour is defined within the UK as “conduct that has caused, or is likely to cause, harassment, alarm or distress to any person” and distinction is made between violent and non-violent crimes (Anti Social Behaviour, Crime and Policing Act 2014). In psychological literature, AS behaviour has been defined as “those actions that harm or lack consideration for others” (Berger, 2018). According to these definitions, AS acts can span a wide range of behaviours that either violate societal rules and/or are considered to be socially disruptive.

AS behaviour in adolescents, often referred to as “delinquent behaviour” as opposed to “criminal behaviour” which pertains to adult offenders (Morizot & Kazemian, 2014), tends to lead to major consequences for the individual, the people around them and society well beyond the damage directly associated with such acts (NICE, 2013). In fact, longitudinal studies have linked delinquent behaviour in adolescence with increased risk of health and social problems leading to a tenfold increase in public sector costs by the time offenders reach the age of 28 (Colman, et al., 2009; Khan, Parsonage, & Stubbs, 2015). Such increased demand on public funds was partially explained by the fact that AS behaviour in adolescents seems to persist into adulthood, which in turn leads to an increased risk of future criminal acts and convictions, relational issues and mental health difficulties (Hill & Maughan, 2011).

The Ministry of Justice annually surveys and releases statistics on Youth Justice for England and Wales (National Statistics, 2018). The report published in 2016/17 showed that there had been a regular and sizeable decrease in the number of first-time offenders throughout the last 10 years. First time offenders’ numbers have recently reached a new low of about 20,000 from the original 100,000, a total reduction of 79%. Despite this very positive trend, across this same period the proportion of children and young people who reoffended increased

by 4%. Interestingly, it was reported that 42.2% of new offenders had reoffended within the next 12 months. These findings call for a more in depth understanding of the processes that lead to reoffending behaviour.

Rates of aggressive and nonaggressive AS behaviours have been found to increase through late childhood and peak in mid to late adolescence, before waning in adult age (Loeber & Hay, 1997). Understanding the nature of this marked increase is especially important since young offenders are very likely to continue offending across the lifespan, particularly where exhibiting violent behaviour or offending (Leschied, Chiodo, Nowicki, & Rodger, 2008; Burt, 2012; Young, Taylor, & Gudjonsson, 2016). Interestingly, a similar trend seems to exist between age and level of AS beliefs. A range of cross-sectional (Landsheer & Hart, 1999; Tarry & Emler, 2007; Mak, 1990) and one longitudinal study (Zhang, Loeber, & Stouthamer-Loeber, 1997) provided evidence of such beliefs strengthening through late childhood and peaking in mid to late adolescence. A possible explanation of these findings is that as the AS beliefs consolidate at this stage of development, an increased incidence of AS behaviour ensues. In fact, literature on deviant peer association and AS beliefs has already established a link between beliefs about peer conflict and delinquent peer association (Thornberry, Lizotte, Krohn, Farnworth, & Jang, 1994; Brewer, 2017).

A dominant model aiming to explain the development of AS tendencies and AS behaviour in children is Dodge's Social Information Processing (SIP) model (Dodge, Pettit, McClaskey, Brown, & Gottman, 1986). The model proposes that reactive aggressive youths would be more likely to show aggressive behaviour as a result of a hostile attribution bias whereby they would tend to interpret ambiguous provocations as threatening. The model was later expanded to include an element of contextual decision making, which would then justify the use of aggression as an appropriate reaction to a perceived hostility (Fontaine, 2007). The role of beliefs and attitudes in shaping those contextual decision-making processes was

acknowledged but not formally investigated, as the main focus of these studies remained on context-specific cognitive processes such as hostile attribution biases, goal assessment and opportunity realisation. Butler et al. exhorted to bring more attention to these cognitive structures in the study of AS behaviours in adolescents (Butler, Parry, & Fearon, 2015). The authors speculated that “off-line” cognitive structures such as beliefs, values and attitudes would shape “on-line” context-specific cognitive decision-making processes, leading to an AS response. For example, an adolescent who holds an “off-line” belief such as “the police cannot be trusted” (context non-specific) would be more likely interpret “on-line” an otherwise neutral look from a police officer as hostile (context specific). If this were true, then young individuals that report high levels of antisocial beliefs should be more likely to engage in ASB as they deem it to be not only acceptable but also necessary as a response to threat. It is also important to note that similarly to other cognitive theories of behavioural prediction such as the theory of reasoned action (Fishbein & Ajzen, 1975) or the theory of planned behaviour (Ajzen, 1988; Ajzen, 1991), the SIP model has largely neglected the well-documented role of emotional processes involved in goal formation, decision making and choice of action (Schwarz, 2000; Bechara, Damasio, & Damasio, 2000; Lerner, Li, Valdesolo, & Kassam, 2015) by excessively focusing on cognitive determinants (i.e. cognitive biases or beliefs).

Despite the interest in AS beliefs and attitudes, and evidence that found AS beliefs to be a risk factor for AS behaviour in adolescents (Shader, 2001), surprisingly, there has been relatively little research in this area. This may be because of a historical focus on aggression in children (De Castro, Veerman, Koops, Bosch, & Monshouwer, 2002) rather than AS behaviours in general. Consequently, even when beliefs and attitudes have been investigated, this has typically pertained to a narrow exploration of beliefs about the use of *aggression*, rather than the whole spectrum of possible AS beliefs and resulting acts. The lack of a developmentally sensitive scale addressing the wide-range of antisocial cognitions associated

with the development of persistent and serious antisocial behaviour in young people also posed a major limitation to the study of AS beliefs in youth. In fact, those instances in which AS behaviours were indeed the subject of study in younger populations, the focus seemed to be on questions specific to law-breaking behaviour and were investigated by adapting measures of AS belief and attitudes that were standardized on samples of older adolescents and adults only, e.g. the Criminal Sentiment Scale – Modified (Simourd, 1997), (Skilling & Sorge, 2014).

The Antisocial Beliefs and Attitudes Scale (ABAS) (Butler, Leschied, & Fearon, 2007) recently overcome this practical impediment to the study of AS beliefs in the young. The measure, initially tested in a sample of Canadian students (Butler, Leschied, & Fearon, 2007) and further standardised with a UK sample of students and young offenders (Butler, Parry, & Fearon, 2015), was specifically devised to assess a broad range of antisocial cognitions in older children and adolescents. The measure was found to be a reliable and valid measure of antisocial thinking in young people, able to predict self and parent reported AS behaviour in young children and adolescents (Butler, Leschied, & Fearon, 2007). The availability of this measure was instrumental in the planning and implementation of our study.

In order to understand the developmental determinants and trajectories of antisocial behaviour, there have been numerous longitudinal studies of younger populations (Bor, McGee, & Fagan, 2004; Mulder, Brand, Bullens, & Van Marle, 2010) as well as studies of risk factors at the population level (Gendreau, Little, & Goggin, 1996). Within studies of this kind, factors such as gender, age, a range of environmental variables associated with low socio economic status (Shader, 2001) and an early history of persistent attention and conduct problems (White, Moffitt, Earls, Robins, & Silva, 1990; Mordre, Groholt, Kjelsberg, Sandstad, & Myhre, 2011) have all been linked to a higher risk of AS behaviour in youth. Emotional disorders have also been studied in relation to AS behaviour, although most typically in relation to sexual or violent offending (Ward & Beech, 2006; Skeem, Johansson, Andershed, Kerr, &

Louden, 2007). Moreover, the prevalence of psychopathology (mainly personality disorders) in prison population is markedly higher than in the general population (Fazel & Danesh, 2002), which might be indicative of some systematic relationship between offending behaviour and psychopathology. Whilst these risk factors have all been studied separately, attempts have been made to synthesise the findings into a developmental perspective of AS behaviour (Patterson, DeBaryshe, & Ramsey, 2017). Nonetheless, there has been comparatively little research looking at antisocial beliefs and attitudes as a risk factor in young people, despite the attention that has been devoted toward identifying risk factors for offending in young people in general. Furthermore, there are no data-grounded studies that had tested antisocial beliefs and attitudes within the context of well-established risk factors, and evaluated these multifaceted and intricately interwoven determinants for AS behaviours in adolescents longitudinally.

Aims

The proposed study aimed to address the identified gaps in the literature reviewed above by empirically testing the theoretically proposed association between AS beliefs and AS behaviour in adolescents via developing a data-grounded model explaining how these factors, and other well-established risk factors such as gender, age, attentional and emotional disorders, interact. Specifically, the following hypotheses were tested:

- Antisocial beliefs will be predictive of future offending behaviour (H1).
- The relationship between beliefs and outcome (i.e. future offending behaviour) will remain significant after the inclusion of ~~be modulated by~~ Emotional and Attentional Disturbances as well as demographic and socioeconomic variables in the model (H2).
- Antisocial beliefs will be superior to demographic risk factors and Emotional and Attentional Disturbances in predicting future offending behaviour (H3).

Methods

Participants

The dataset for the study was collected as part of the Systemic Therapy for at Risk Teens (START) trial (Fonagy, et al., 2018), a randomised controlled trial (RCT) to evaluate Multi-systemic Therapy (MST) in the UK context. MST is an intensive family-based intervention carried out at the home, school and community of young people with serious antisocial behaviour (Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 2009). The London-South East Research Ethics Committee (reference number 09/H1102/55) approved the START trial. Research and development approval were also given for each trial site by the relevant NHS trust in each geographical site. The full dataset is composed of 433 males and 250 females (total of 683), aged 11 to 17, with significant levels of treatment-resisting AS behaviour. The trial spanned an 18-month period, with regular six months contacts, and participants were selected from nine sites across the UK. The sites were services and institutions designed to manage AS behaviour in the UK, including Youth Offending Teams (YOTs), Child and Adolescent Mental Health Services (CAMHS), social services and social care. The eligibility and exclusion criteria for the study have been listed in Appendix A.

Design

Participants that met inclusion criteria for the START trial and their primary carer completed a battery of questionnaires at baseline (Wave 1). The questionnaires aimed to evaluate different aspects of the young person's antisocial behaviour, functioning, and adjustment at home, school and in the community. Families were then randomly allocated to management as usual (MAU) alone or MST for three to five months followed by MAU. MAU was a non-consistent package of care between participants which could comprise involvement from youth offending teams, CAMHS or social and education services on an as-needed basis and according to the local community practices. Participants and their main carer

in both groups were assessed in the family home at regular intervals: six months (Wave 2), 12 months (Wave 3), and 18 months (Wave 4). At Wave 4 it was found that neither the proportion of participants in out-of-home placement nor the rate of offending was significantly different between the MAU and the MST group (Fonagy, et al., 2018) and it was therefore concluded that MST should not be used over MAU as the intervention of choice for adolescents who show moderate-to-severe levels of antisocial behaviour. Hence, it was possible to consider the two sub-groups as one sample.

A secondary data analysis on the START trial dataset was performed for the current study. More precisely, the self-report measurements pertaining to antisocial beliefs as well as emotional and attentional difficulties, which were collected at baseline (Wave 1), were used to define and test a set of models which attempted to predict the offences recorded in the 18 months that followed (from Wave 2 to Wave 4). Data on criminal offences were provided directly by the Police National Computer and Youth Offender Information System and included information about the 12 months prior to the recruitment into the study. Offences were recorded separately as the cumulative offending behaviour committed over 12 months prior to the recruitment into the study (i.e. Prior Offending) and over the period of 18 months after recruitment (i.e. Later Offending). The total count of offences, used for the analysis, included violent, non-violent and breaches of orders.

Measures

As part of their study design, the START trial measured a range of outcomes including out-of-home placements, number of offences, antisocial beliefs and attitudes, parenting skills and family functioning (Fonagy, et al., 2018). In line with the theoretical rationale delineated in the introduction, only a subset of these indices was used in the study.

Antisocial Beliefs and Attitudes

An indicator of antisocial beliefs and attitudes was obtained via the Antisocial Beliefs and Attitudes Scale (ABAS) (Butler, Leschied, & Fearon, 2007; Butler, Parry, & Fearon, 2015), a measure devised specifically to assess antisocial cognitions in older children and adolescents (age range from 10 to 18). The scale consists of 18 items rated on a three-point scale (agree, not sure, disagree) and is comprised of two sub-scales, namely Rule Noncompliance and Peer Conflict, derived and tested by a factorial analysis. The Rule Noncompliance factor was defined as the beliefs and attitudes that young people had in support of contravening common age appropriate rules and directives set out by parents and teachers. An example of such items would be: "It's no big deal to skip a few lessons". The Peer Conflict factor was defined as measuring those beliefs and attitudes that young people had in support of behaving aggressively, engaging in physical fighting or conflict with peers. An example of items comprised in this sub-scale would be: "You have to hurt the other person before they hurt you" (Butler, Parry, & Fearon, 2015). The bifactorial structure and internal consistency of the scale was originally tested in a Canadian sample (Butler, Leschied, & Fearon, 2007) and later confirmed in the UK (Butler, Parry, & Fearon, 2015). In its first study the Cronbach's alpha was found to be 0.79 for the Rule Non-Compliance and 0.77 for the Peer-Conflict factor, which were considered to be acceptable due to the fact that the sub-scales appeared to be able to both independently predict self-reported antisocial behaviour in the sample (Butler, Leschied, & Fearon, 2007). In the second study, the Cronbach's alpha for the same two factors was respectively 0.80 and 0.77. In addition, the authors computed a reliability coefficient for both factors both which demonstrated good test-retest reliability after eight weeks (Rule Noncompliance $r=.83$, $p<.001$; Peer Conflict $r=.77$, $p<.001$) (Butler, Parry, & Fearon, 2015). Total scores for the scale were not used in this study; instead, values for each individual item were directly fed into the model as described in the analysis section below. A copy of the ABAS is included in Appendix B.

Emotional difficulties

A measure of emotional difficulties was obtained by combining items from two different questionnaires: the Short Mood and Feelings Questionnaire (SMFQ) (Messer, Angold, Costello, & Loeber, 1995) and the Emotional Symptoms sub-scale from the Young Person Strength & Difficulties (SDQ) (Goodman, 1997; Goodman, Meltzer, & Bailey, 1998).

The SMFQ is a brief scale measuring depression in children and adolescents (Messer, Angold, Costello, & Loeber, 1995). The 13 items are answered on a three-point scale (true, sometimes true, not true) and refer to the two weeks prior to completion. An example would be: “I cried a lot”. As values for each individual item of the scale were directly included in the analysis, aggregated scores were not used. The scale was developed and tested with a large sample of children and adolescents across grades one to 10 (aged 6 to 15). Interestingly, the magnitude of the factor loadings seemed to increase linearly with age and ranged from 0.61 for the youngest cohort to 0.81 for the oldest one (Messer, Angold, Costello, & Loeber, 1995). The scale was also later tested for its criterion validity and adapted so that it could be also administered to caregivers (Rhew, et al., 2010). A copy of the SMFQ is included in Appendix C.

The SDQ is a 25-item measure comprising of five sub-scales with five items each: Hyperactivity, Emotional Symptoms, Conduct Problems, Peer Problems and Prosocial. Each of these items are answered on a three-point scale (agree, not sure, disagree) and refer to a period of six months prior to completion. Only the young person’s individual item scores from the Emotional Symptoms sub-scale were factored into our models and therefore neither the suggested thresholds nor the aggregated total scores were used (Goodman, Meltzer, & Bailey, 1998). “I am often unhappy, down-hearted or tearful” is an example from this sub-scale. The scale has been adapted into alternative forms which can be administered to the young person,

their caregivers and teachers and has shown acceptable coefficients of reliability amongst raters in clinical populations (ranging from 0.39 to 0.58). Specifically, the Emotional Symptoms sub-scale correlation between parent and self-report versions was 0.52 ($p < .001$) (Goodman, Meltzer, & Bailey, 1998). The measure has also been found to have good concurrent and predictive validity (Goodman, 1997). A copy of the SDQ is included in Appendix D.

Attentional difficulties

A measure of attentional difficulties was obtained using the Hyperactivity sub-scale from the Young Person Strength & Difficulties (SDQ) (Goodman, 1997; Goodman, Meltzer, & Bailey, 1998), described above. The Hyperactivity sub-scale correlation between parent and self-report versions was of 0.58 ($p < .001$) (Goodman, Meltzer, & Bailey, 1998). Once again, as only the young person's individual item scores from the Hyperactivity sub-scale were factored into our models, neither the suggested thresholds nor total scores were used. An example of such items is: "I am easily distracted; I find it difficult to concentrate". The SDQ is included in Appendix D.

Analyses

The aim of our study was to ascertain the predictive value of antisocial beliefs on later offending, whilst also considering the contribution of attentional and emotional difficulties as well as demographic variables, which have been linked to this class of behaviour through epidemiologic studies. Structural Equation Modelling (SEM) is ideal when testing such hypotheses because it enables exploration of the interrelationship between multiple independent factors on dependent variables (Geiser, 2012). Moreover, the latent path analysis technique allows the user to mathematically calculate latent variables from manifest ones via multiple estimates of measurement error and intercorrelations between a range of different measurements (Kline, 2015). This particularly suited the focus of the study since it aimed to

estimate the impact that psychological constructs have in shaping behaviour, rather than simply evaluating the predictive validity of a certain measurement tool over a manifest behavioural outcome. Accordingly, the measures' full scores were not used to define constructs such as antisocial beliefs, attentional and emotional difficulties, but instead these were computed as latent variables by using the individual items' scores for each scale as manifest variables.

Variables

The central latent factor investigated was beliefs and attitudes about antisocial behaviour as measured by the ABAS (Butler, Leschied, & Fearon, 2007). Attentional difficulties were inferred from the scores on the Hyperactivity sub-scale from the SDQ (Goodman, 1997). Emotional difficulties were modelled by using both the SMFQ (Messer, Angold, Costello, & Loeber, 1995) and the Emotional Symptoms sub-scale of the SDQ (Goodman, 1997). These latent variables were all computed on the basis of the scores collected at baseline (Wave 1). The latent factors were then regressed onto the dependent variable, which was defined as the number of offences over the period of 18 months post baseline assessment (Waves 2 to 4). It is likely for future offending behaviour reported by the authorities to be a heedful estimate of only the most serious of AS behaviour and therefore to be a theoretically, statistically and ecologically sound indicator of AS tendencies. In order to control for the effect that baseline offending might have had on future offending, cumulative offending behaviour prior to the recruitment into the study (12 months prior to Wave 1) was included as a covariate for the dependent variable. Demographic predictors, namely age and gender, were included as covariates against the dependent variable and all the other factors included in the model. Ethnicity and socioeconomic status were excluded as covariates because the two factors did not capture sufficient variability in our sample; thus, the majority of our participants were classified as White British/European (78.3%) and of low socioeconomic status (62.1%).

Assumptions and model estimation

SEM is a highly diverse statistical method which relies on covariance matrices and regression equations to fit models to data (Kaplan, 2008; Kline, 2015). For this reason, its assumptions should align with those of multilevel models (Curran, 2003). Nonetheless, due to its flexibility and ability to deal with non-normally distributed variables (including categorical variables), testing for the assumptions of multilevel models has become less of a focus in favour of using the right methods of estimation, especially as estimation methods also deal with missing data (West, Finch, & Curran, 1995; Finney & DiStefano, 2006). This is especially true in social sciences, an area of research which notoriously relies on ranked answers on questionnaires when creating latent variables. Some authors have tested the efficacy of Maximum-Likelihood estimation methods, an estimation method for continuous variables, with good results despite the data analysed not being normally distributed (Rhemtulla, Brosseau-Liard, & Savalei, 2012; Skrondal & Rabe-Hesketh, 2014). Others have advocated the use of different estimators for categorical variables, namely weighted least square mean and variance adjusted (WLSMV) (Suh, 2015; Holtmann, Koch, Lochner, & Eid, 2016). The use of the WLSMV method of estimation is advised by a number researchers (Asparouhov & Muthén, 2010; Aitken, et al., 2020), including the creators of the Mplus software (Muthén & B.O., 2017), arguably the golden standard for SEM analyses (Kelloway, 2014; Kline, 2015). The WLSMV estimator has been shown to be an efficient estimator when the pattern of missing data is either missing completely at random (MCAR) or missing at random (MAR) (Asparouhov & Muthén, 2010). Mplus Version 8.1 (Muthén & B.O., 2017) was used for the analysis.

Sample size

A range of methods aimed at determining the required sample size to retain good statistical power in SEM has been debated over the years although with conflicting results.

The majority of theorists broadly agree with the fact that because of the large number of estimates used in modelling techniques, SEM should be considered a large sample technique (Kline, 2015). Kline specifically proposed several criteria to consider when evaluating sample size (Kline, 2015). The first is the sheer sample size, which if above 200 is typically deemed acceptable, unless the model is complex or distributions are severely non-normal. Another issue to consider is directly linked to the complexity of the model, i.e. the number of parameters considered in the analysis. This rule is referred to as the N:q rule (Jackson, 2003). The most conservative estimate for this method would be to require a sample size of 20 times the number of the parameters in the model, although ratio of 10:1 or 5:1 have also been considered admissible. Our most complex tested model includes a total of 148 parameters, and would therefore require a sample size of 740 under the most lenient of conditions. Other theorists (Wolf, Harrington, Clark, & Miller, 2013; Holtmann, Koch, Lochner, & Eid, 2016) claimed that in order to determine the right sample size for a proposed SEM model, a Monte Carlo simulation (Mooney, 1997) should be carried out. This argument, although relevant, was focusing on the issue of challenging some rules of thumb that invariably linked SEM to large samples and therefore this method is a preferential method when working with smaller samples. In fact, the simulations computed in the paper led to recommendations of using sample sizes spanning from 30 to 460. For the present study, with a dataset of almost 700 participants, the necessity of calculating a Monte Carlo simulation abates. In order to address possible concerns regarding having a large enough sample to maintain sufficient statistical power with a high number of parameters, a series of nested, or hierarchical, models (i.e. a set of models in which one or more are a subset of another) were computed and the stability of their coefficients and

indices incrementally studied, from those with fewer parameters, thus adequately powered, to those with more.

Indices of model fit

Whilst the study of AS behaviours predictors seems to call for a comprehensive model that includes several multi-variate predictors, the incremental inclusion of each predictor requires formal testing. In order to do so, a step-wise approach aimed at testing a series of increasingly complex models (i.e. including an increasing number of predictors) was employed. Testing how well each of the specified model reproduces the observed data, i.e. the process of model evaluation, refers to the degree to which the observed and modelled variance-covariance matrix correspond (Kline, 2015). In practice, this is carried out by assessing and comparing a range of indices:

- The Bentler Comparative Fit Index (CFI) (Bentler, 1990) is an index measuring the relative improvement in the fit of the tested model against one that assumes independence of the variables observed (i.e. null model).
- The Steiger–Lind root mean square error of approximation (RMSEA) (Steiger, 1990) is a measure of error (or badness of fit), which offers a 90% confidence interval.
- The Standardized Root Mean Square Residual (SRMR) (Jöreskog & Sörbom, 1989) pertains to the correlation of residuals.

Values of CFI larger than 0.90, an RMSEA value smaller than 0.05 and a SRMR value smaller than 0.08 are considered to indicate a good model fit (Hu & Bentler, 1995; Hu & Bentler, 1999; Schermelleh-Engel, Moosbrugger, & Müller, 2003; Hooper, Coughlan, & Mullen, 2008; Kline, 2015).

A nested model approach in SEM requires the computation of the chi-square difference statistic to ascertain if the more stringent model significantly changes the overall fit (Kline, 2015). Mplus allows for a specific type of corrected chi-square difference test when using WLSMV estimators because the difference in chi-square values for two nested models using this estimator is not distributed as chi-square (Asparouhov, Muthén, & Muthén, 2006; Muthén & B.O., 2017).

Models

Latent factors

First, the hypothesised latent structure for the data (i.e. first and second order latent factors) needed to be confirmed as indeed representative of the manifest data (i.e. questionnaire items). This was a necessary step before moving onto a structural model because despite using validated measures (see measures section above) it had been planned that more than one sub-scale under one latent factor would have needed combining. A Confirmatory Factorial Analysis (CFA) was therefore carried out as described below (*Figure 1*), before moving onto computing nested structural models:

- **Antisocial Beliefs:** a second order latent variable (i.e. a latent variable whose indicators are themselves latent variables (Kline, 2015)) comprising the Peer Conflict and Rule Noncompliance sub-scales that make the ABAS (Butler, Leschied, & Fearon, 2007).
- **Attentional Difficulties:** modelled with the scores from the Hyperactivity sub-scale of the SDQ (Goodman, 1997).
- **Emotional Difficulties:** a second order latent variable computed on the basis of the SMFQ (Messer, Angold, Costello, & Loeber, 1995) and the Emotional Symptoms sub-scale of the SDQ (Goodman, 1997).

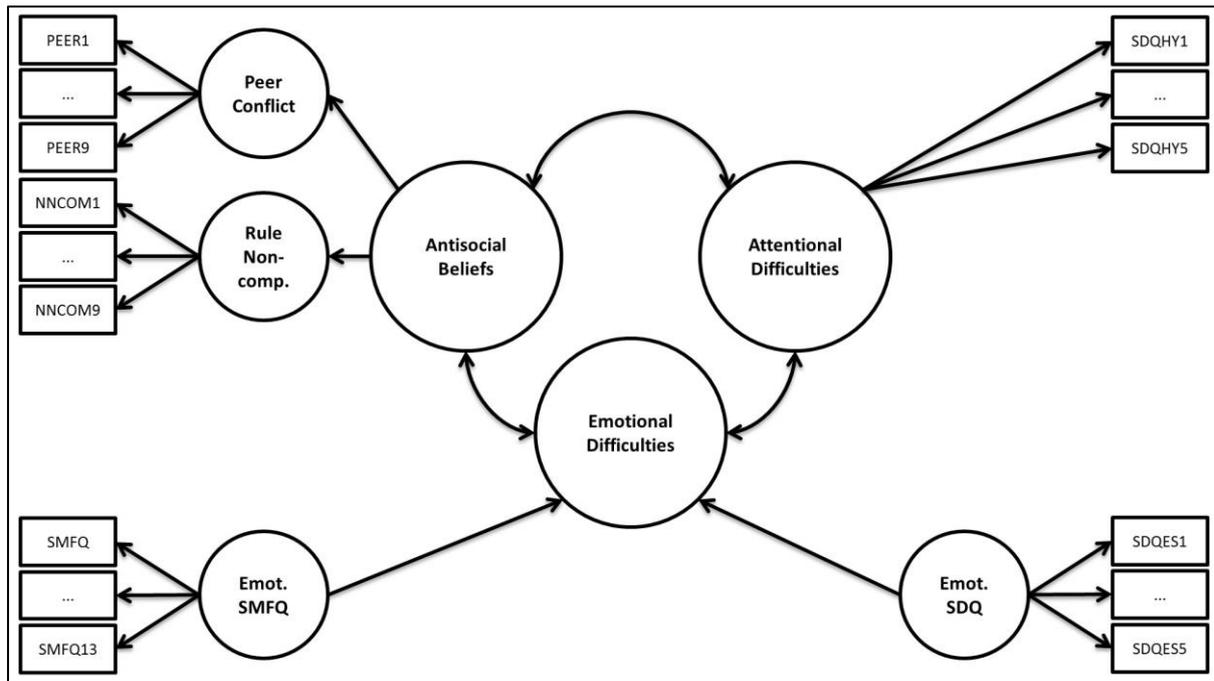


Figure 1. Hypothesised latent factors' structure

Nested structural models

By using the latent factors identified, a series of nested models were tested. The first model (M1), in Figure 2, tested the predictive effect of antisocial beliefs onto the rate of subsequent offending. At this stage, the pre-specified covariates (Age, Gender and Prior Offending) were neither regressed onto the latent factors or the dependent variable. Correlations amongst latent factors were also calculated.

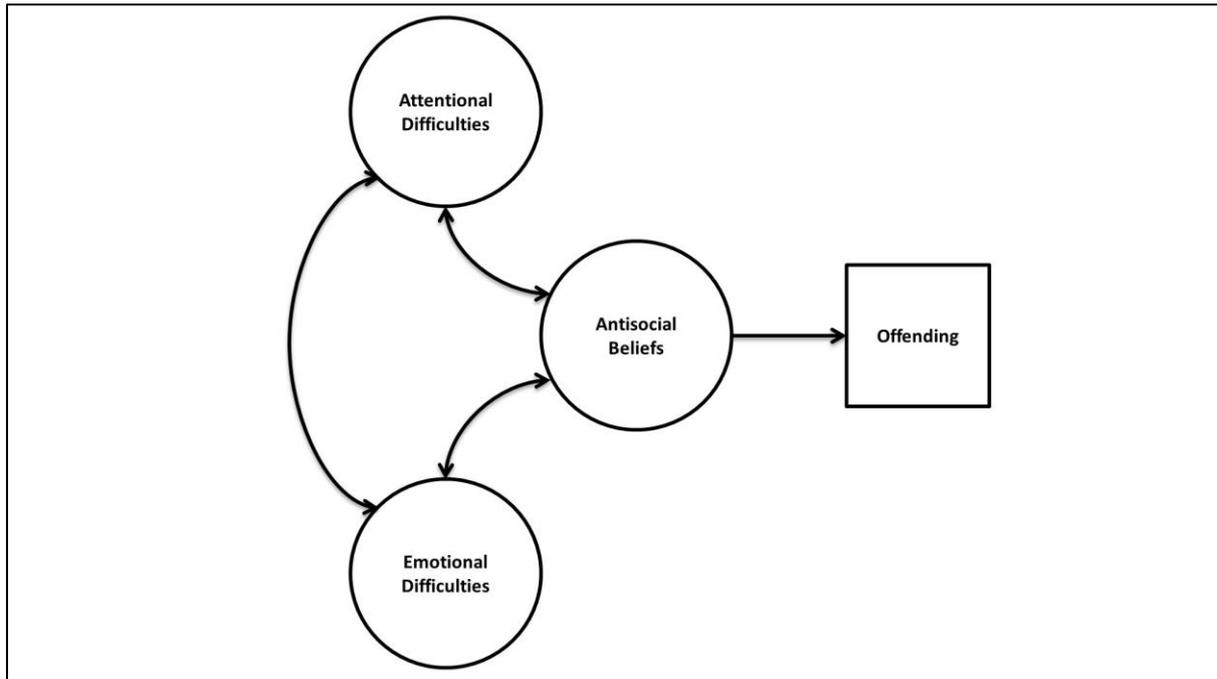


Figure 2. Structural model 1 (M1)

The second model (M2) included the same variables, as per definition of a nested model, although covariates were regressed onto both the latent factors and the dependent variable (Figure 3).

In the final model (M3) the covariates were maintained as for M2 and the three latent factors were regressed onto the dependent variable to ascertain the differential contribution to its prediction (Figure 4).

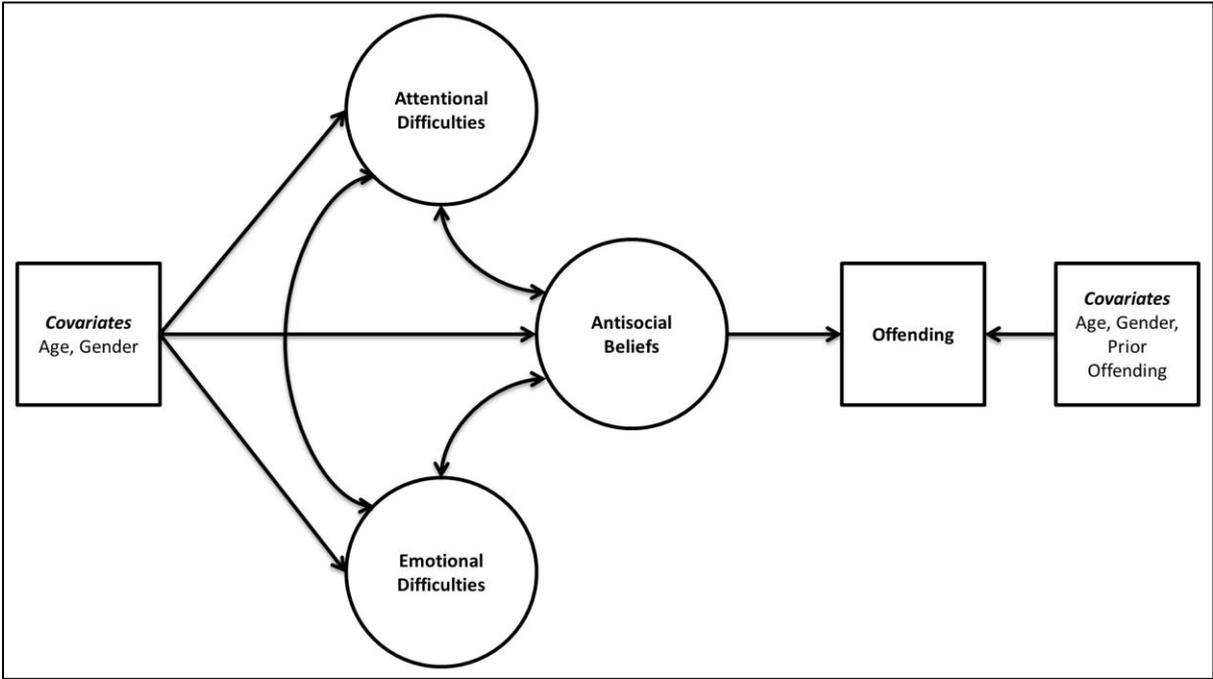


Figure 3. Structural model 2 (M2)

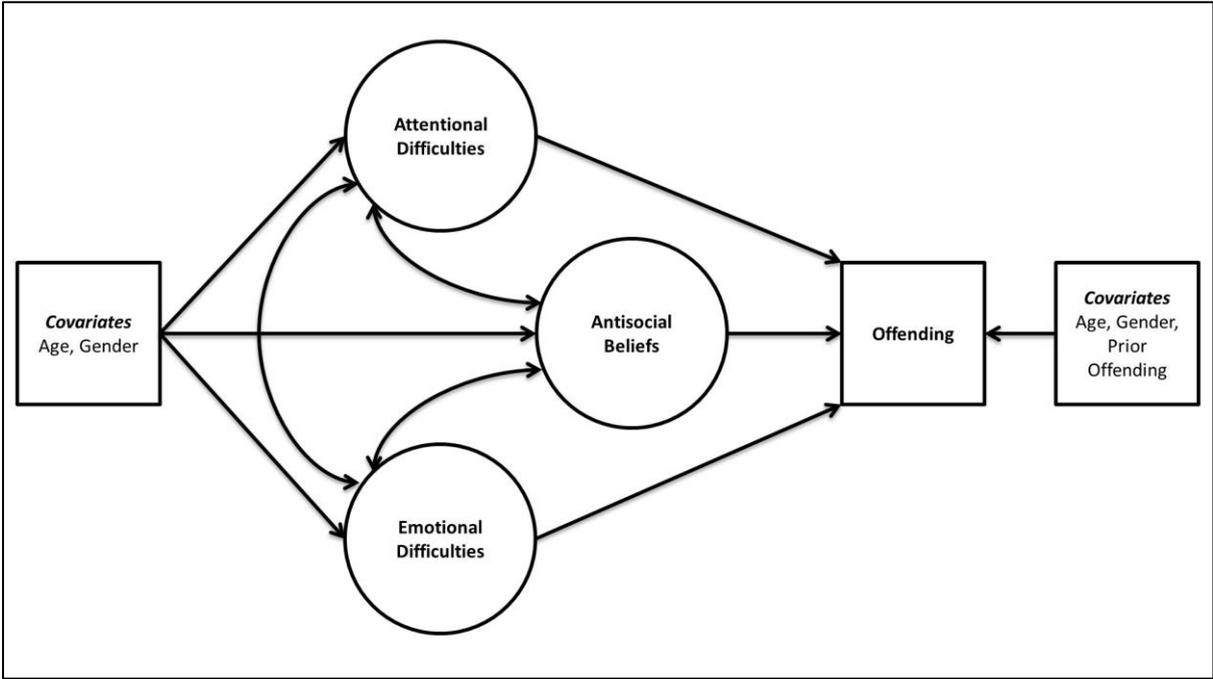


Figure 4. Structural model 3 (M3)

Sensitivity analyses

Preliminary analyses revealed that the two offending variables demonstrated considerable skew, a marked concern being as though later offending was the only dependent

variable. Defining outliers such values that deviated three standard deviations from the median (it is advised to use median instead of mean due to the mean being so affected by severe outliers) (Leys, Ley, Klein, Bernard, & Licata, 2013) would have reduced the sample to a total of 642 participants. The square root transformation can sometimes make a positively skewed variable approach a normal distribution (Bartlett, 1936; Kihlberg, Herson, & Schotz, 1972). On the other hand, the severe abnormality of the offending variables could be considered an inherent property of count variables. Therefore, offending should be treated as a count rather than continuous variables and analysed with reference to a Poisson distribution rather than transformed to fit a normal distribution (O'hara & Kotze, 2010). In order to address these issues, and in the interest of safeguarding statistical power, we decided to first compute the models including all the participants before running a number of sensitivity analyses. These included testing that findings for M3 would remain stable when: (i) using a Poisson regression, (ii) root transforming the dependent variable, and (iii) excluding outliers from the sample.

Results¹

Missing Data

The sample included data from 683 participants although records of offending were unavailable for a total of four participants. The study also included a total of 41 more variables (i.e. individual item scores for each sub-scale of interest). Across these variables the response rate was between 677 and 682, or in other words the response rate ranged between 99.12 and 99.85% per variable. The observed ratio of missing data could be considered negligible, given that missing data imputation algorithms are generally recommended for missing percentages of 20, 40 and even 60% (Dong & Peng, 2013). Nevertheless, the computed models relied on

¹ Figures of models in this section will only include lines that represent a significant coefficient. Moreover, within both figures and tables a “*” corresponds to a p-value < 0.05, “**” to a p-value < 0.01 and “***” to one < 0.001.

the WLSMV estimator, which not only is a required estimator to work with categorical variables in SEM (Suh, 2015; Holtmann, Koch, Lochner, & Eid, 2016) but also a solid method of imputation for missing data for variables of this type (Asparouhov & Muthén, 2010). In conclusion, the CFA was run on a sample of 683 participants. However, since the dependent variable was missing for four participants, structural models are based on a sample size of 679.

Descriptive Statistics

Descriptive statistics are presented in *Table 1*. Of the final included sample (n=679), 430 (63.33%) were males and the remaining 249 (36.67%) were female.

The individual item scores for each sub-scale, rather than their aggregated full scores, were directly used in the model and therefore providing comprehensive descriptive statistics for all the 41 variables would not be informative in this context. However, as it might remain of interest and helpful in contextualising the range of scores observed, descriptive statistics for the sub-scales were still included in *Table 1*. None of these 41 variables met normal distribution assumptions, as expected for ordered categorical variables that can be scored as zero, one or two. As argued in the analysis section, the use of a WLSMV estimator was developed specifically for handling the distribution of categorical variables (Suh, 2015; Holtmann, Koch, Lochner, & Eid, 2016) within SEM thus remaining an appropriate choice for the data.

Table 1. Descriptive Statistics

Variable	Number	Mean	St. Deviation	Median	Range	IQR	Missing (%)
Age	683	13.81	1.412	14	11-17	2	0 (0%)
Prior Offend.	679	1.17	2.319	0	0-23	1	4 (0.6%)
Later Offend.	679	1.56	3.071	0	0-30	2	4 (0.6%)
Noncompliance	679	10.17	3.750	10	0-18	5	4 (0.6%)
Peer Conflict	677	6.94	3.945	7	0-18	6	6 (0.9%)
Total ABAS	677	17.12	6.734	17	1-36	10	6 (0.9%)
SMFQ	681	8.72	6.386	7	0-26	9	2 (0.3%)
SDQ Emotional	680	3.48	2.586	3	0-10	4	3 (0.4%)
SDQ Hyperact.	680	6.44	2.541	7	0-10	4	3 (0.4%)

Latent Factors Analysis

A CFA was carried out to establish whether the proposed structure of latent factors fitted the sample data adequately. Five latent factors were calculated on the basis of 41 observed variables and then combined into three second order latent factors as described above. This resulted in a model with 130 parameters and 683 observations. The indices showed a satisfactory / significant fit of the model to the data ($X_2(772, 683) = 1823.65; p < 0.001$; CFI = 0.919; RMSEA = 0.045; SRMR = 0.075) and all factor loadings for the latent variables were significant ($p < 0.001$), thereby confirming our hypothesised constellation of latent factors. Correlation coefficients between the latent factors (*Table 2*) were all significant ($p < 0.05$) and small to medium in size (Cohen, 2013). Individual factor loadings and the visual output from Mplus are reported in Appendix E.

Table 2. Confirmatory Factor Analysis and correlations of latent factors

Model	X_2	df	P-Value	CFI	RMSEA	SRMR
CFA	1823.65	772	<0.001	0.919	0.045	0.075
Correlations						
			Attention		Emotions	
	AS Beliefs		0.323***		0.109*	
	Attention				0.407***	

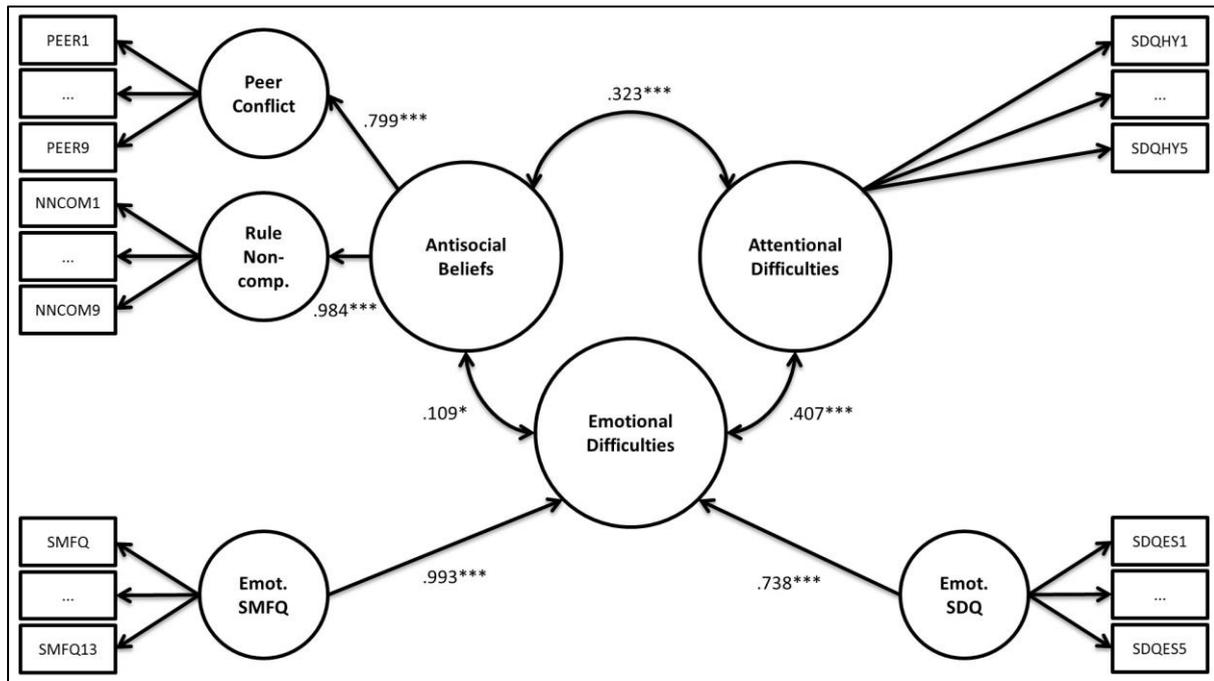


Figure 5. Outcomes of CFA and latent factors

Nested structural models

Model fit indices

All models tested showed good fit indices with limited differences between them (summarised in *Table 3*). Only the SRMR coefficient, which is the index that is most sensitive to misspecified factor covariances in CFA when testing measurement models (Kline, 2015), showed an improvement in fit in M3. In both M1 and M2, the index fell just above good (i.e. < 0.08) levels instead. Consequently, a corrected chi-square difference test for WLSMV estimators was computed, to test whether the added constraints of our nested models significantly increased model fit. Comparing M1 and M2 in this way indicated that M2 significantly differed from M1 ($X_2(9,2) = 91.498; p < 0.001$). The comparison between M2 and M3 was also significant ($X_2(2,2) = 7.327; p < 0.05$). The consideration of fit indices and difference testing analyses therefore suggested that M3 provided the best fit to the data. Effect sizes and significance of the correlation coefficients between the second order factors remained

stable across the three models tested, and comparable to those identified by the CFA, aside from one coefficient. The only exception was the correlation coefficient between AS beliefs and emotional difficulties, which dropped below significance in M2 ($r = .060, p = .445$). However, this emerged as significant again in M3 ($r = .102, p = .042$).

Table 3. Model fit indices for structural models

Model	Parameters	χ^2	df	P-Value	CFI	RMSEA	SRMR
M1	137	2204.78	941	<0.001	0.900	0.044	0.083
M2	146	2076.46	932	<0.001	0.909	0.043	0.094
M3	148	2073.37	930	<0.001	0.909	0.043	0.075

Predictors of offending

AS beliefs consistently predicted the rate of subsequent offending in all models tested. The latent variable predicted around 15% of the variance observed in M1 ($\beta = .393, p < .001$). A visual representation of this model is available in *Figure 6* and its coefficients are summarised in *Table 4*.

Table 4. Correlations and main effects for M1

	Correlation coefficients (r)			Main Effect (β)
	AS Beliefs	Attention	Emotions	Later Offending
AS Beliefs		0.321***	0.101*	0.393***
Attention			0.408***	
Emotions				

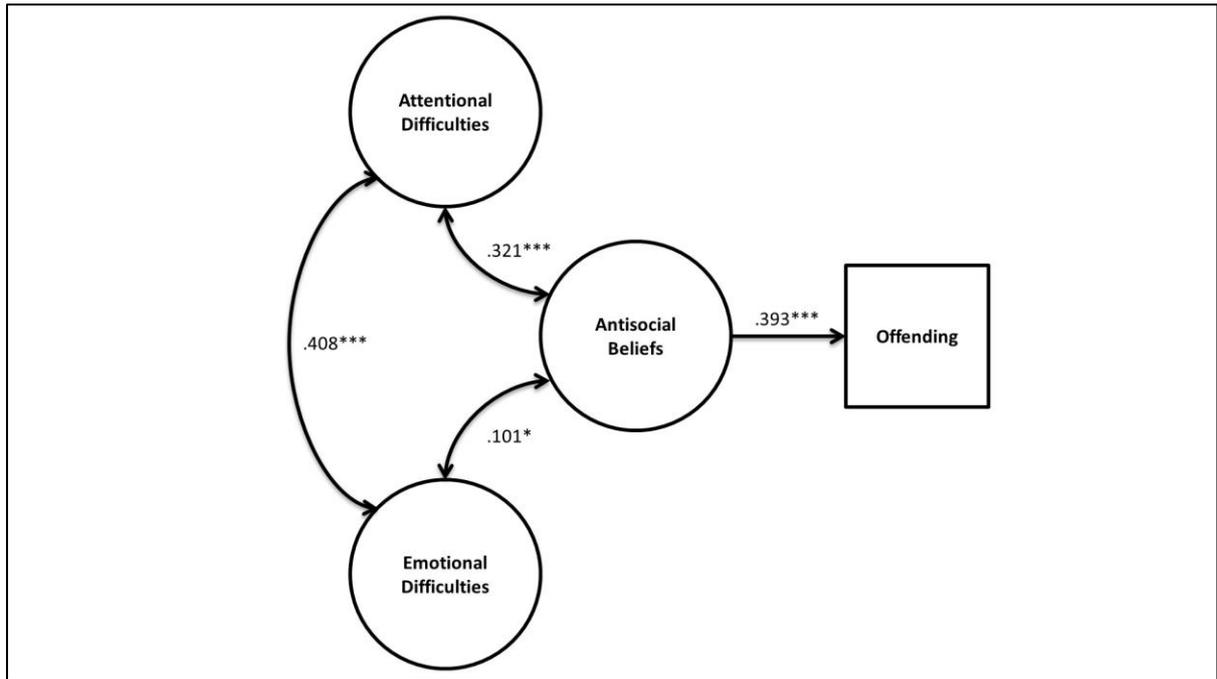


Figure 6. Outcomes of Structural Model 1 (M1)

The variance explained by AS beliefs increased to 30% in M2 ($\beta = .546, p < .001$), when covariates were included in the model. The covariate Age was significantly related to AS beliefs ($\beta = .109, p < .001$) such that older participants showed stronger AS beliefs. Attentional difficulties were also significantly associated with Age so that older participants reported lower difficulties ($\beta = -0.064, p < .05$). It should be noted that the coefficients were small and negligible (respectively) in size. Gender was only associated with emotional difficulties ($\beta = -2.662, p < .05$) such that being male meant reporting lower levels of emotional difficulties. The dependent variable did not correlate significantly with Age or Gender, although Prior Offending showed a significant coefficient approaching a large effect size ($\beta = .490, p < .05$). A summary of the M2's coefficients can be seen in *Table 5* and is represented visually in *Figure 7*.

Table 5. Correlations, covariates and main effects for M2

	Correlation coefficients (r)			Covariate Coefficients (β)		Main Effect (β)
	AS Beliefs	Attention	Emotions	Age	Gender	Later Offending
AS Beliefs		0.327***	0.060	0.109***	-0.500	0.546***
Attention			0.344***	-0.064*	-1.173	
Emotions				-0.011	-2.662*	

	Covariate Coefficients (β)		
	Age	Gender	Prior Offending
Later Offending	-0.103	2.519	0.490***

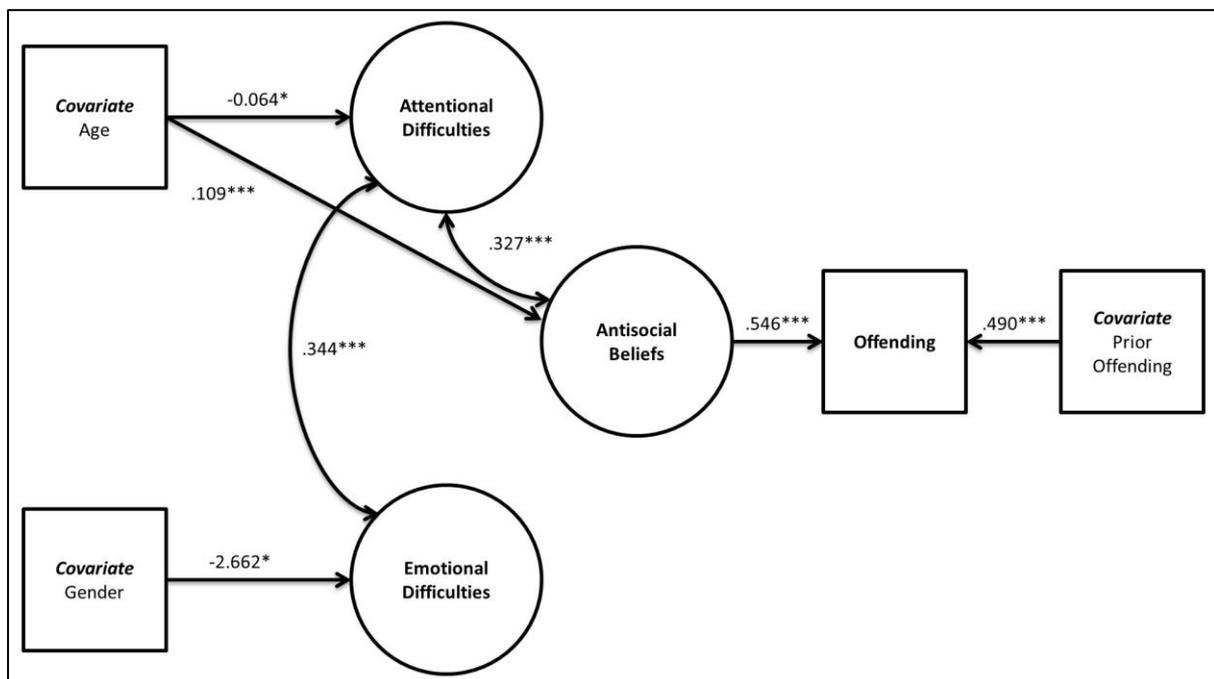


Figure 7. Outcomes of Structural Model 2 (M2)

In M3, both Attentional and Emotional Difficulties were included as further predictors for later Offending. In this model, the predictive value of AS beliefs slightly decreased to 28% of the observed variance ($\beta = .532, p < .001$). Emotional Difficulties were negatively associated with later offending with an effect that approached medium size ($\beta = -0.271, p < .001$), i.e. high emotional difficulties led to a reduced rate of offending. In contrast, Attentional Difficulties did not predict later offending. Finally, despite the coefficients for the covariate Age remaining

stable, those for the covariate Gender shifted. Thus, Gender's regression coefficient onto Emotional Difficulties remained significant but decreased in size ($\beta = -0.526$, $p < .001$) and Gender also appeared to be negatively associated to Attentional Difficulties ($\beta = -0.231$, $p < .05$) such that being male meant reporting lower both emotional and attentional difficulties. The coefficients for M3 are summarised in *Table 6* and drawn in *Figure 8*. The original visual output from Mplus is reported for M1, M2 and M3 in Appendix F.

Table 6. Correlations, covariates and main effects for M3

	Correlation coefficients (r)			Covariate Coefficients (β)		Main Effect (β)
	AS Beliefs	Attention	Emotions	Age	Gender	Later Offending
AS Beliefs		0.339***	0.102*	0.109***	-0.097	0.532***
Attention			0.403***	-0.064*	-0.231*	-0.014
Emotions				-0.011	-0.526***	-0.271*
				Covariate Coefficients (β)		
				Age	Gender	Prior Offending
Later Offending				-0.109	0.270	0.490***

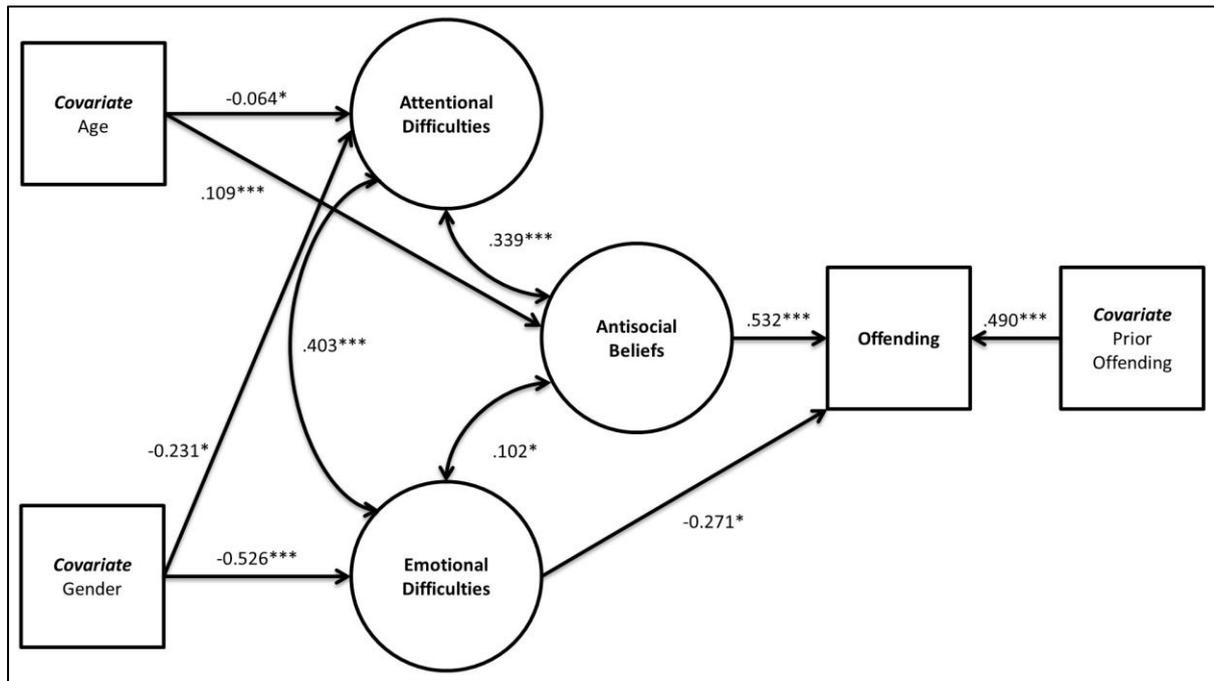


Figure 8. Outcomes of Structural Model 3 (M3)

Sensitivity

analyses

As mentioned, sensitivity analyses were run for M3 to test that findings were robust to changes in analytical methods, specifically in relation to dealing with non-normality (high skew) of the dependent variable. In the first of such analyses, the Offending variables (Prior and Later) were modelled as count data and analysed using Poisson regression (Muthén, Muthén, & Asparouhov, 2017). Unfortunately, the model did not converge, meaning that a Poisson regression was unfeasible with this data-set. A second sensitivity analysis involved using the square root transformed data for prior and subsequent offending. This model converged well, showing good model fit indices ($X^2(679,930) = 2062.91; p < 0.001; CFI = 0.908; SRMR = 0.078; RMSEA = 0.042$) and confirming that the relationship between AS Beliefs and later offending remained significant despite being smaller in size ($\beta = 0.193, p < .001$). Lastly, a final sensitivity analysis in which extreme outliers (>3 Z scores from the median) were excluded. The model specification without outliers generated similar results in terms of model fit indices, all of which fell within the satisfactory range ($X^2(642,930) = 1937.830; p < 0.001;$

CFI = 0.912; SRMR = 0.076; RMSEA = 0.041). Again, the AS Beliefs factor lost some of its predictive power ($\beta = 0.288$, $p < .001$ compared to $\beta = 0.532$) although the relationship remained highly significant. Overall, the sensitivity analyses showed comparable results for model fit, paths direction and significance levels, which further validated the findings of M3. A summary of these analyses is presented in Appendix G.

Discussion

The study presented a structural model for the prediction of recidivism (i.e. re-offending). The model was empirically tested with a large group of British young offenders and included determinants such as AS beliefs, attentional and emotional difficulties whilst also taking into account the contribution of other well-known risk factors i.e. gender, age and prior offending. Beliefs were hypothesised to be predictive of future offending behaviour (H1) and that they would remain so even when considered jointly with other predictors such as demographic risk factors as well as Emotional and Attentional Disturbances (H2). Finally, it was argued that AS beliefs would be superior to the other predictors in determining recidivism (H3).

In support of the main research hypothesis (H1), self-reported AS beliefs independently predicted the rate of re-offending of young people in the 18 months following their enrolment into the study. Thus, young offenders reporting higher levels of AS beliefs were more likely to have offended in the following 18 months than those who reported lower levels of AS beliefs. The relationship between AS beliefs and later offending remained stable even after inclusion of other predictors and covariates to the model (H2). As a matter of fact, including the rate of prior offending as a covariate in the model actually increased the predictive power of self-reported AS beliefs (H3). This finding is particularly important because it suggests that, in our

sample, between two young individuals that had offended the same number of times, the one with a higher level of self-reported AS beliefs was more likely to reoffend in the future.

The added contribution of self-reported emotional and attentional difficulties in predicting recidivism (H2) was also tested, in addition to its main predictors (i.e. AS beliefs and prior offending). Self-reported emotional difficulties were observed to be negatively associated with later rate of offending, meaning that more marked self-reported emotional difficulties were associated with a lower risk of future offending. Surprisingly, attentional difficulties were not associated with the rate of re-offending when all the determinants were included in the model. This is in contrast to studies that have shown attentional difficulties to be associated with an increased risk of offending when in conjunction with conduct disorder (White, Moffitt, Earls, Robins, & Silva, 1990; Mordre, Groholt, Kjelsberg, Sandstad, & Myhre, 2011), a diagnosis that pertained to almost all individuals in the sample (78% of participants had a diagnosis of Conduct Disorder). It is possible that in such studies the contribution of ADHD symptomatology in determining AS behaviour might have been inflated because its predictive value was estimated without taking into account other stronger predictors such as prior offending or AS beliefs. Further findings in support of this idea that these factors (i.e. AS beliefs, Attentional and Emotional difficulties) ought to be studied in conjunction are the consistent correlation coefficients that were observed amongst the factors considered in the presented study. In particular, attentional difficulties appeared moderately and positively correlated to both AS beliefs and emotional difficulties and could therefore share part of their predictive value over recidivism simply because of the correlation between the variables. Another possible reason behind this difference in findings might lie in the way that the construct of attentional difficulties is operationalised across studies. In the study hereby presented, the subscale used to measure attentional difficulties focuses on the inattentiveness and hyperactivity dimensions of ADHD, thereby neglecting impulsivity (APA, Diagnostic and

statistical manual of mental disorders, 2013), a construct which on its own has been linked to offending both in childhood and longitudinally (Higgins, Kirchner, Ricketts, & Marcum, 2013). Similarly, it is worth mentioning that both age and gender did not seem to predict re-offending when other factors (i.e. prior offending) were included in the model, despite having been established as risk-factors for delinquency (Shader, 2001). This finding seems to suggest that despite age and gender having been associated with delinquent behaviour, they are not equally valid indicators of re-offending. This is not entirely surprising considering that most risk-factors are studied with regards to first offending, rather than recidivism. Moreover, the rate of prior offending was such a dependable predictor of recidivism, found to be second only to AS beliefs in this study, that gender and age were found unable to contribute to the explanation of the remaining observed variance.

The study boasts a number of strengths that support the validity of its findings. To our knowledge, this is the first study to have developed and tested a data-driven model of psychological and demographic predictors of recidivism in a population of young offenders. The study of more dynamic predictors (i.e. that can be to an extent modified), such as AS beliefs or emotional difficulties, rather than static ones (i.e. that cannot change) such as age, gender and prior offending is particularly important when thinking about practical implications (Gendreau, Little, & Goggin, 1996). Dynamic predictors can be changeable to some degree and consequently provide with a chance at reducing the risk of recidivism. Another strength of this study lies in its longitudinal design because the right temporal relationship between predictors and outcome is one of the necessary conditions for determining causality (Hill, 1965). According to this condition, the presented study surveyed the psychological constructs defined as predictors prior to the measurement of re-offending, which spanned the following 18 months. Although causality is not guaranteed by the sole temporal relationship between two variables, respecting such condition certainly increases the validity of claims about causation

(Rohrer, 2018). The longitudinal methodology acquires further value when considered within the framework of the social sciences, where such a paradigm is often hard to implement and subsequently scarcely found in the literature. Furthermore, it is important to note that because AS behaviours do not invariably lead to a recorded offence within the justice system, the outcome variable used in the study is a very conservative estimate for AS behaviours. Despite this, results showed a solid relationship between beliefs and the behavioural outcome, such that if anything, the actual association may be stronger than we were able to detect in this study.

The study also had several limitations. First, due to the nature of the subject area, experimental manipulation was not possible. As the study employed an observational methodology, a causal link between the variables of interest has to be evaluated carefully within the context of a flawed internal validity. The use of a prospective methodology might have partially helped in correcting this bias. Moreover, despite having used validated scales and having confirmed the factorial structure of these within the observed data, the measurement of predictors relied on self-reported indicators only. Despite the inherent biases of the self-report measurement of psychological construct (i.e. self-serving biases, social desirability, inaccurate reporting, etc.) (Paulhus & Vazire, 2007) there is no viable alternative to measurement of beliefs and attitudes. It is also worth noting that there is some evidence in favour of the robustness of self-report among offenders (Mills, Loza, & Kroner, 2003) which therefore makes this method of measurement potentially as valid as for the general population. On the other hand, in order to strengthen the validity of measurements, an objective outcome measure (i.e. recorded offending) was preferred over a self-reported measure for AS behaviour despite measuring AS behaviour this way likely having led to underreporting of said behaviour. Unfortunately, relying on recorded offending as the sole outcome measure for the study also meant that several types of offending behaviour (such as violent, non-violent and breaches of order) had to be combined together in order to have an adequate spread and ensure sufficient

power of analysis. Being able to distinguish a certain type of crime, for instance a physical assault, as associated to specific type of AS beliefs, for example peer-conflict, could have provided a more nuanced understanding of the association between antisocial beliefs and behaviour. This would be of great interest especially in light of evidence suggestive of distinct aetiologies and developmental trajectories for violent and non-violent crimes (Burt, 2012; Young, Taylor, & Gudjonsson, 2016). Finally, issues were identified with the severely non-normal distribution of certain key variables due to the presence of extreme values. Of note, both prior and later offending could have been more appropriately treated and analysed as a count variable with the use of a Poisson model, but, as discussed in the analysis' section, unfortunately this was not possible with the collected data. Nonetheless, sensitivity analyses broadly held the same results, which endorses the robustness of the findings. This particular issue is described more in both the methods and analysis' sections.

In conclusion, this study, contextualised within the existing literature of anti-sociality, showed that AS beliefs were predictive of recidivism, independently and in addition to other well-known risk factors. Thus, the findings suggest not only that holding stronger AS beliefs makes an individual more likely to engage in such behaviour but also that a young person with lower levels of self-reported AS beliefs tends to be less likely to reoffend when compared with a matched young person with the same rate of prior offending but higher levels of AS beliefs. These findings potentially have a major clinical implication in the rehabilitation of young offenders although they demand careful consideration lest they exacerbate the existing stigma that affects offenders (Anderson, Vostanis, & Spencer, 2004; Uggen, Manza, & Behrens, 2004). Moreover, the traditional trait-based approach in criminological research was challenged in favour of the study of risk factors within the cultural and social environments in which they exist. Studies carried out in line with this perspective found that the link between impulsivity and criminal behaviour was indeed amplified in more deprived neighbourhoods

(Lynam, et al., 2000; Zimmerman, 2010). The findings of the presented study should be interpreted carefully as the model could not include social determinants. Nevertheless, in comparison to static predictors such as history of offending, AS beliefs have the potential to be effectively targeted by offender rehabilitation programs (Bernfeld, Farrington, & Leschied, 2003). In support of this, it has been shown that rehabilitation programs for young offenders with a particular focus on both behavioural and cognitive elements are more effective at reducing recidivism than deterrence-based programs with intensive supervision treatments, which actually were found to be slightly detrimental (Koehler, Lösel, Akoensi, & Humphreys, 2013). Koehler et al.'s meta-analysis also attested that rehabilitation programs that were conducted in accordance with the risk-need-responsivity principles (Andrews, Bonta, & Wormith, 2011) accounted, on balance, for the most significant reduction in the rate of recidivism. Interestingly, these programs strive to provide tailored interventions to the offender's learning style and abilities which dependably include cognitive elements and are informed by an evaluation of the offender's risk factors (both static and dynamic) as well as their social and individual needs. Since AS beliefs and attitudes are both dynamic risk factors for recidivism and potential targets for intervention, rehabilitation programs for young offenders would likely benefit from a greater focus on such cognitive structures. Recent evidence suggests that family interventions are non-superior to treatment as usual in reducing youth antisocial behaviour in the UK (Humayun, et al., 2017; Fonagy, et al., 2018) Arguably, integrating an individual component targeting these risk factors into these systemic treatments might increase the effectiveness of treatment. Attention of policy makers, practitioners and field workers should be drawn to the role of beliefs and attitudes in determining antisocial behaviour as several levels of the criminal justice system could benefit from an informed consideration of such an association when planning, devising and delivering services.

References

- Aitken, M., Haltigan, J., Szatmari, P., Dubicka, B., Fonagy, P., Kelvin, R., . . . Goodyer, I. (2020). Toward precision therapeutics: general and specific factors differentiate symptom change in depressed adolescents. *Journal of Child Psychology and Psychiatry*.
- Ajzen, I. (1988). *Attitudes, personality and behaviour*. Milton Keynes, UK: Open University Press.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211.
- Anderson, L., Vostanis, P., & Spencer, N. (2004). Health needs of young offenders. *Journal of Child Health Care*, 8(2), 149-164.
- Andrews, D. A., Bonta, J., & Wormith, J. S. (2011). The risk-need-responsivity (RNR) model: Does adding the good lives model contribute to effective crime prevention? *Criminal Justice and Behavior*, 38(7), 735-755.
- Asparouhov, T., & Muthén, B. (2010). *Weighted least squares estimation with missing data*. 1-10: Mplus Technical Appendix 2010.
- Asparouhov, T., Muthén, B., & Muthén, B. O. (2006). Robust chi square difference testing with mean and variance adjusted test statistics. *matrix*, 1(5), 1-6.
- Bartlett, M. (1936). The square root transformation in analysis of variance. *Supplement to the Journal of the Royal Statistical Society*, 3(1), 68-78.

- Bechara, A., Damasio, H., & Damasio, A. R. (2000). Emotion, decision making and the orbitofrontal cortex. *Cerebral cortex*, 10(3), 295-307.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological bulletin*, 107(2), 238.
- Berger, K. S. (2018). *The developing person through childhood and adolescence (11th ed.)*. Worth Publishers.
- Bernfeld, G. A., Farrington, D. P., & Leschied, A. W. (2003). *Offender rehabilitation in practice: Implementing and evaluating effective programs*. John Wiley & Sons.
- Bor, W., McGee, T. R., & Fagan, A. A. (2004). Early risk factors for adolescent antisocial behaviour: an Australian longitudinal study. *Australian and New Zealand Journal of Psychiatry*, 38(5), 365-372.
- Brewer, A. J. (2017). *The Role of Antisocial Cognition in Antisocial Behaviour*. Doctoral dissertation: UCL (University College London).
- Burt, S. A. (2012). How do we optimally conceptualize the heterogeneity within antisocial behavior? An argument for aggressive versus non-aggressive behavioral dimensions. *Clinical psychology review*, 32(4), 263-279.
- Butler, S. M., Leschied, A. W., & Fearon, P. (2007). Antisocial beliefs and attitudes in pre-adolescent and adolescent youth: the development of the antisocial beliefs and attitudes scales (ABAS). *Journal of Youth and Adolescence*, 36(8), 1058-1071.
- Butler, S. M., Parry, R., & Fearon, R. M. (2015). Antisocial thinking in adolescents: Further psychometric development of the Antisocial Beliefs and Attitudes Scale (ABAS). *Psychological assessment*, 27(1), 291.

- Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. Academic press.
- Colman, I., Murray, J., Abbott, R. A., Maughan, B., Kuh, D., Croudace, T. J., & Jones, P. B. (2009). Outcomes of conduct problems in adolescence: 40 year follow-up of national cohort. *Bmj*, 338, a2981.
- Council, S. C. (2015). *Anti Social Behaviour, Crime and Policing Act 2014*.
- Curran, P. J. (2003). Have multilevel models been structural equation models all along? *Multivariate Behavioral Research*, 38(4), 529-569.
- De Castro, B. O., Veerman, J. W., Koops, W., Bosch, J. D., & Monshouwer, H. J. (2002). Hostile attribution of intent and aggressive behavior: A meta-analysis. *Child development*, 73(3), 916-934.
- Dodge, K. A., Pettit, G. S., McClaskey, C. L., Brown, M. M., & Gottman, J. M. (1986). Social competence in children. *Monographs of the society for research in child development*, i-85.
- Dong, Y., & Peng, C. Y. (2013). Principled missing data methods for researchers. *SpringerPlus*, 2(1), 222.
- Fazel, S., & Danesh, J. (2002). Serious mental disorder in 23 000 prisoners: a systematic review of 62 surveys. *The lancet*, 359(9306), 545-550.
- Finney, S. J., & DiStefano, C. (2006). Non-normal and categorical data in structural equation modeling. In *Structural equation modeling: A second course* (pp. 10(6), 269-314).
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude. Intention and Behavior: An Introduction to Theory and Research*.

- Fonagy, P., Butler, S., Cottrell, D., Scott, S., Pilling, S., Eisler, I., . . . Ellison, R. (2018). Multisystemic therapy versus management as usual in the treatment of adolescent antisocial behaviour (START): a pragmatic, randomised controlled, superiority trial. *The Lancet Psychiatry*, 5(2), 119-133.
- Fontaine, R. G. (2007). Toward a conceptual framework of instrumental antisocial decision-making and behavior in youth. *Clinical Psychology Review*, 27(5), 655-675.
- Geiser, C. (2012). *Data analysis with Mplus*. Guilford press.
- Gendreau, P., Little, T., & Goggin, C. (1996). A meta-analysis of the predictors of adult offender recidivism: What works! *Criminology*, 34(4), 575-608.
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: a research note. *Journal of child psychology and psychiatry*, 38(5), 581-586.
- Goodman, R., Meltzer, H., & Bailey, V. (1998). The Strengths and Difficulties Questionnaire: A pilot study on the validity of the self-report version. *European child & adolescent psychiatry*, 7(3), 125-130.
- Henggeler, S. W., Schoenwald, S. K., Borduin, C. M., Rowland, M. D., & Cunningham, P. B. (2009). *Multisystemic therapy for antisocial behavior in children and adolescents. 2nd edn*. New York, NY: Guilford Press.
- Higgins, G. E., Kirchner, E. E., Ricketts, M. L., & Marcum, C. D. (2013). Impulsivity and offending from childhood to young adulthood in the United States: a developmental trajectory analysis. *International Journal of Criminal Justice Sciences*, 8(2).
- Hill. (1965). The Environment and Disease: Association or Causation? *Proceedings of the Royal Society of Medicine*, 58 (5): 295–300.

- Hill, J., & Maughan, B. (2011). *Conduct disorders in childhood and adolescence*. Cambridge University Press.
- Holtmann, J., Koch, T., Lochner, K., & Eid, M. (2016). A comparison of ML, WLSMV, and Bayesian methods for multilevel structural equation models in small samples: A simulation study. *Multivariate behavioral research*, 51(5), 661-680.
- Holtmann, J., Koch, T., Lochner, K., & Eid, M. (2016). A comparison of ML, WLSMV, and Bayesian methods for multilevel structural equation models in small samples: A simulation study. *Multivariate behavioral research*, 51(5), 661-680.
- Hooper, D., Coughlan, J., & Mullen, M. (2008). Evaluating model fit: a synthesis of the structural equation modelling literature. *7th European Conference on research methodology for business and management studies*, (pp. 195-200).
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*, 6(1), 1-55.
- Hu, L.-T., & Bentler, P. M. (1995). Evaluating model fit. In R. H. (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. p. 76–99). Sage Publications, Inc.
- Humayun, S., Herlitz, L., Chesnokov, M., Doolan, M., Landau, S., & Scott, S. (2017). Randomized controlled trial of Functional Family Therapy for offending and antisocial behavior in UK youth. *Journal of child psychology and psychiatry*, 58(9), 1023-1032.
- Jackson, D. L. (2003). Revisiting sample size and number of parameter estimates: Some support for the N: q hypothesis. *Structural equation modeling*, 10(1), 128-141.

- Jöreskog, K. G., & Sörbom, D. (1989). *LISREL 7: A guide to the program and applications*.
Spss.
- Kaplan, D. (2008). *Structural Equation Modeling: Foundations and Extensions (2nd ed.)*.
SAGE.
- Kelloway, E. K. (2014). *Using Mplus for structural equation modeling: A researcher's guide*.
Sage Publications.
- Khan, L., Parsonage, M., & Stubbs, J. (2015). *Investing in children's mental health. A
Review of Evidence on the Costs and Benefits of Increased Service Provision*. London:
Center for Mental Health.
- Kihlberg, J. K., Herson, J. H., & Schotz, W. E. (1972). Square root transformation revisited.
Journal of the Royal Statistical Society: Series C (Applied Statistics), 21(1), 76-81.
- Kline, R. B. (2015). *Principles and practice of structural equation modeling*. Guilford
publications.
- Koehler, J. A., Lösel, F., Akoensi, T. D., & Humphreys, D. K. (2013). A systematic review and
meta-analysis on the effects of young offender treatment programs in Europe. *Journal
of Experimental Criminology*, 9(1), 19-43.
- Landsheer, J. A., & Hart, H. T. (1999). Age and adolescent delinquency: The changing
relationship among age, delinquent attitude, and delinquent activity. *Criminal Justice
and Behavior*, 26(3), 373-388.
- Lerner, J. S., Li, Y., Valdesolo, P., & Kassam, K. S. (2015). Emotion and decision making.
Annual review of psychology, 66, 799-823.

- Leschied, A., Chiodo, D., Nowicki, E., & Rodger, S. (2008). Childhood predictors of adult criminality: A meta-analysis drawn from the prospective longitudinal literature. *Canadian Journal of Criminology and Criminal Justice*, 50(4), 435-467.
- Leys, C., Ley, C., Klein, O., Bernard, P., & Licata, L. (2013). Detecting outliers: Do not use standard deviation around the mean, use absolute deviation around the median. *Journal of Experimental Social Psychology*, 49(4), 764-766.
- Lynam, D. R., Caspi, A., Moffit, T. E., Wikström, P. O., Loeber, R., & Novak, S. (2000). The interaction between impulsivity and neighborhood context on offending: the effects of impulsivity are stronger in poorer neighborhoods. *Journal of abnormal psychology*, 109(4), 563.
- Loeber, R., & Hay, D. (1997). Key issues in the development of aggression and violence from childhood to early adulthood. *Annual review of psychology*, 48(1), 371-410.
- Mak, A. S. (1990). Testing a psychosocial control theory of delinquency. *Criminal Justice and Behavior*, 17(2), 215-230.
- Messer, S. C., Angold, A., Costello, E. J., & Loeber, R. (1995). Development of a short questionnaire for use in epidemiological studies of depression in children and adolescents: factor composition and structure across development. 5: 251-62.
- Mills, J. F., Loza, W., & Kroner, D. G. (2003). Predictive validity despite social desirability: Evidence for the robustness of self-report among offenders. *Criminal Behaviour and Mental Health*, 13(2), 140-150.
- Mooney, C. Z. (1997). *Monte carlo simulation (Vol. 116)*. Sage Publications.

- Mordre, M., Groholt, B., Kjelsberg, E., Sandstad, B., & Myhre, A. M. (2011). The impact of ADHD and conduct disorder in childhood on adult delinquency: A 30 years follow-up study using official crime records. *BMC psychiatry*, 11(1), 57.
- Morizot, J., & Kazemian, L. (2014). *The development of criminal and antisocial behavior*. New York: Springer.
- Mulder, E., Brand, E., Bullens, R., & Van Marle, H. (2010). A classification of risk factors in serious juvenile offenders and the relation between patterns of risk factors and recidivism. *Criminal Behaviour and Mental Health*, 20(1), 23-38.
- Muthén, B. O., Muthén, L. K., & Asparouhov, T. (2017). *Regression and mediation analysis using Mplus*. Los Angeles, CA: Muthén & Muthén.
- Muthén, L., & B.O., M. (2017). *Mplus: User's guide. Eight Edition*. Los Angeles, CA.
- National Statistics. (2018). *Youth Justice Statistics: 2016 to 2017. England and Wales*. Statistics bulletin.
- NICE. (2013). *Antisocial behaviour and conduct disorders in children and young people: recognition and management*. Standard no. CG158.
- O'hara, R. B., & Kotze, D. J. (2010). Do not log-transform count data. *Methods in ecology and Evolution*, 1(2), 118-122.
- Patterson, G. R., DeBaryshe, B. D., & Ramsey, E. (2017). *A developmental perspective on antisocial behavior*. In *Developmental and Life-course Criminological Theories*. (pp. 29-35): Routledge.

- Paulhus, D. L., & Vazire, S. (2007). The self-report method. In R. W. Robins, R. C. Fraley, & R. F. Krueger, *Handbook of research methods in personality psychology* (pp. 224-239). Guilford Press.
- Rhemtulla, M., Brosseau-Liard, P. É., & Savalei, V. (2012). When can categorical variables be treated as continuous? A comparison of robust continuous and categorical SEM estimation methods under suboptimal conditions. *Psychological methods*, 17(3), 354.
- Rhew, I. C., Simpson, K., Tracy, M., Lymp, J., McCauley, E., Tsuang, D., & Vander Stoep, A. (2010). Criterion validity of the Short Mood and Feelings Questionnaire and one-and two-item depression screens in young adolescents. *Child and adolescent psychiatry and mental health*, 4(1), 8.
- Rohrer, J. M. (2018). Thinking clearly about correlations and causation: Graphical causal models for observational data. *Advances in Methods and Practices in Psychological Science*, 1(1), 27-42.
- Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of psychological research online*, 8(2), 23-74.
- Schwarz, N. (2000). Emotion, cognition, and decision making. *Cognition & Emotion*, 14(4), 433-440.
- Shader, M. (2001). *Risk factors for delinquency: An overview*. Washington, DC: US Department of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention.

- Simourd, D. J. (1997). The Criminal Sentiments Scale-Modified and Pride in Delinquency scale: Psychometric properties and construct validity of two measures of criminal attitudes. *Criminal Justice and Behavior*, 24(1), 52-70.
- Skeem, J., Johansson, P., Andershed, H., Kerr, M., & Louden, J. E. (2007). Two subtypes of psychopathic violent offenders that parallel primary and secondary variants. *Journal of abnormal psychology*, 116(2), 395.
- Skilling, T. A., & Sorge, G. B. (2014). Measuring antisocial values and attitudes in justice-involved male youth: Evaluating the psychometric properties of the Pride in Delinquency Scale and the Criminal Sentiments Scale-Modified. *Criminal Justice and Behavior*, 41(8), 992-1007.
- Skrondal, A., & Rabe-Hesketh, S. (2014). Structural equation modeling: categorical variables. *Wiley StatsRef: Statistics Reference Online*.
- Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research*, 25, 173-180.
- Suh, Y. (2015). The performance of maximum likelihood and weighted least square mean and variance adjusted estimators in testing differential item functioning with nonnormal trait distributions.
- Tarry, H., & Emler, N. (2007). Attitudes, values and moral reasoning as predictors of delinquency. *British Journal of Developmental Psychology*, 25(2), 169-183.
- Thornberry, T. P., Lizotte, A. J., Krohn, M. D., Farnworth, M., & Jang, S. J. (1994). Delinquent peers, beliefs, and delinquent behavior: A longitudinal test of interactional theory. *Criminology*, 32(1), 47-83.

- Uggen, C., Manza, J., & Behrens, A. (2004). 'Less than the average citizen': stigma, role transition and the civic reintegration of convicted felons. In A. Behrens, *After crime and punishment: Pathways to offender reintegration* (p. 261).
- Ward, T., & Beech, A. (2006). An integrated theory of sexual offending. *Aggression and violent behavior*, 11(1), 44-63.
- West, S. G., Finch, J. F., & Curran, P. J. (1995). Structural equation models with nonnormal variables: Problems and remedies. In R. H. Hoyle, *Structural equation modeling: Concepts, issues, and applications* (pp. 56–75). Sage Publications, Inc.
- White, J. L., Moffitt, T. E., Earls, F., Robins, L., & Silva, P. A. (1990). How early can we tell?: Predictors of childhood conduct disorder and adolescent delinquency. *Criminology*, 28(4), 507-535.
- Wolf, E. J., Harrington, K. M., Clark, S. L., & Miller, M. W. (2013). Sample size requirements for structural equation models: An evaluation of power, bias, and solution propriety. *Educational and psychological measurement*, 73(6), 913-934.
- Young, S., Taylor, E., & Gudjonsson, G. (2016). Childhood predictors of criminal offending: results from a 19-year longitudinal epidemiological study of boys. *Journal of attention disorders*, 20(3), 206-213.
- Zhang, Q., Loeber, R., & Stouthamer-Loeber, M. (1997). Developmental trends of delinquent attitudes and behaviors: Replications and synthesis across domains, time, and samples. *Journal of Quantitative Criminology*, 13(2), 181-215.
- Zimmerman, G. M. (2010). Impulsivity, offending, and the neighborhood: Investigating the person–context nexus. *Journal of Quantitative Criminology*, 26(3), 301-332.

Part III: Critical Appraisal

This critical appraisal presents some key reflections on my experience of the research process as a whole. Thus, I opened with a brief recount of my background, in the attempt to contextualise these reflections and experiences. I followed with highlighting personal and professional challenges, reflections and learning points that arose at each stage of the research process. This might hopefully help others who are considering or are about to embark on a similar journey to be pre-empt the challenges and rewards that they might encounter. I concluded with reflections arising from the gained appreciation of a field of study and clinical work which I would have otherwise not had experience of if I had not had the chance to work on this research process and to undertake the wider Doctorate in Clinical Psychology.

Background

I am originally from a Mediterranean European country and it was only after having obtained my Master's degree in "Psychology of Cognitive Processes" that I moved to the UK. The degree aimed to teach about cognitive and social psychology and could probably be equated to a Master's of Research here in the UK because of its strong research focus, yet it was taught and examined in my native language with little to no components being taught or examined in English. In fact, I moved to London for an internship within academia, specifically within a department that researched Eating Disorders. At the time, my proficiency in the English language, knowledge of Britain's culture and systems as well as my personal and professional development were unsuited to pursue a career in Clinical Psychology in the UK. This might have set me at a different starting position when compared to other possible candidates, though my journey progressed fairly similarly to many others in the field. I have endeavoured tirelessly, and without a salary in the beginning, within the NHS as an assistant psychologist in a wide range of services and settings (e.g. Eating Disorders, IAPT, Older Adults, Neuropsychology). As a result, I felt equipped with a helpfully varied amount of life, research and clinical experience when I started the Clinical Doctorate.

The thesis process

Project choice

Thinking about a potential project could be a worrisome choice because of the number of implications that such choice will have in the ensuing years both during and after training. This was especially a concern to me because I did not have an area of study which I was especially passionate about. On the other hand, I maybe had more of an idea of the type of project I would be interested in working on. Specifically, I always wanted to learn more advanced statistical methods and working on large datasets, although I unfortunately never had the chance to do so as most projects that I had worked on involved small samples. I hoped that doing my Clinical Doctorate at UCL would have provided me with a choice of such projects. When SB presented our cohort with the possibility of carrying out a secondary analysis on a large dataset studying the link between antisocial beliefs and attitudes and criminal behaviour, I had no doubt about wanting to take the project. I had worked in research before and I was aware of the added difficulties of having to collect large enough samples and having to spend many hours testing participants. I was hoping to be able to spend my time learning about advanced statistical methods and coding instead. This area of research was also novel to me yet one that I had a coveted interest in. In fact, I alongside asked and was granted the chance to work on a forensic placement for six months during training. Being given the chance to learn about an area of interest both academically and clinically really provided me with a sense of coherence between the two aspects of training which are sadly often disjointed and can cause at times some sense of loss of process.

Project proposal

For a project like a secondary data analysis, the proposal is key. Disruption to a solid plan should be minimal due to the availability of the dataset, or so I thought, which motivated

me to work hard and come up with a fully fleshed proposal of how I intended to carry out the study. Based on a personal predisposition, I thoroughly enjoyed the creative aspect of devising a proposal. Also, because I was far from being an expert in either the field of study, the statistical methods or the dataset, I had frequent meetings with a number of members of staff which helped me tailoring my ideas to the practical limitations of the dataset or the statistical methodology. Despite this “perfect” fit, which is something that I have noticed myself often striving to find, SB left UCL which cast uncertainty on the future of the project. After the initially frustrating news of having to choose another project, I was very relieved that staff at UCL trusted me to continue working on the project with SB as a second supervisor. Apparently, I had shown enough interest, willingness and basic understanding of the project itself that I was trusted with being able to carry out this project despite the change in supervisory arrangements. In hindsight, I can see how this could have gone very differently, and I am very glad it did not. Not only I was able to continue working on a project which I felt very passionate about and had worked hard in devising, but I also felt a stronger sense of faith in the staff at UCL overall following these meetings. They had heard my concerns and even trusted me maybe more than I was trusting myself at the time with being able to complete this project. I think this moment would stay with me and make me more likely to passionately defend something I believe in while also seeing colleagues and managers as supportive allies. At the end of this process, I was rewarded by the feedback on my proposal which commented on the unusual thoroughness of this and suggested that, based on what was written, I should have been well-able to complete the project successfully.

Data processing

At this stage, supervisory arrangements had changed with MT having become my primary supervisor and SB having agreed to remain involved a second supervisor. Due to my lack of prior experience with the statistical method of choice, RS, another supervisor at UCL

with considerable experience in modelling techniques, agreed to consult and advice on the analyses. It was difficult for me to face a change in arrangements at what could be considered a “later” stage in a research process, although I felt reassured by what it looked like a solid network of support.

A secondary data analysis does not require data collection meaning that all my efforts were dedicated to learning about the new statistical method and becoming familiar with a dataset I was not familiar. This required ongoing consultations with MT and RS as well as frequent liaison with the post-doctoral researchers responsible for the database to which I requested access. Despite all being highly responsive and certainly available, there were many times in which I found myself dependent on others to guide me in the right direction or provide the right reference or dataset for a specific measure. I noticed a marked tendency to feel “lost” in moments in which I cannot see all the steps of the way, which is definitely a feeling I had to grow acquainted with. It would have also been helpful to rely less on expert advice at proposal stage but to familiarise with the dataset and measures more. This process of becoming more familiar with the actual dataset, and its limitations, did not result in having to change the research hypotheses although, as I was learning more about the data at our disposal, I had to reconsider some measures that I intended to include at first.

At this stage, it has also been invaluable for me to attend formal training on structural equation modelling to familiarise with the procedures and implications of this method of analysis. I would recommend doing so to anyone embarking on a similar journey because it not only helps with making an unknown method of analysis a more tangible procedure but also because it has a far-reaching impact on how more accessible it felt to link the hypothesised model to the observed data. Unfortunately, I had not realised at the time that I had attended the training too early because I only made my first analyses about half a year later. Struggling to maintain a sense of continuity between several aspects of personal life, clinical work and

deadlines for other academic milestones was maybe the single biggest struggle rippling throughout all stages of the research project. Ensuring continuity between training and analysis would have surely helped in this regard.

Analysis

The analysis phase is certainly the most key, challenging and rewarding experience for a secondary analysis project. This stood even more true as one of the reasons for choosing the project was that I had no prior knowledge of the statistical methods involved. The training I attended was helpful in providing a sense of direction, although learning the theory and the coding necessary to modelling was mostly carried out via consultation with RS, reading handbooks, online forums and many iterative instances of trial-and-error. It was at this stage that the practical limitation of what remains an incredibly flexible statistical method became apparent. The method is as flexible as it is mathematically complex and despite not having to actually compute those calculations by hand, choosing a specific line of coding to deal with non-normal distributions, outliers and methods of estimation requires a deep theoretical understanding which I simply did not have. As a result, the sheer complexity of statistical method appeared at times prohibitive. Fortunately, I found that liaising regularly with RS and tirelessly consulting online forums and statistical handbooks helped clarifying that at time there is no “perfect” solution for some statistical dilemmas. Where this might be clearer when dealing with methodological and practical barriers, as one might have limited resources or limited capacity to manipulate a certain variable, I maybe hoped that statistical and mathematical methods would have been more able to, somehow, provide a single best possible solution to problems. Upon realising there was no perfect answer to the statistical issues I encountered, I felt more able to address the issue by employing a range of non-optimal solutions, all of these with pros and cons, and look at them as a whole. This led to the inclusion of sensitivity analyses described in the methodology and analysis’ sections of my empirical paper.

Writing

As previously mentioned, English is not my first language. Approaching the writing phase of my research journey exposed me to a range of concerns and fears about the quality of my academic writing, which have not abated to this date. On one hand, I have come to terms with the fact that despite my utmost efforts, I will always feel unsure about the quality of my writing and I will invariably fall short on some grammatical forms or my stylistic eloquence. On the other hand, formal writing and dissemination are judged by readers' standards, rather than my own, and I am aware that others might not feel as kind towards my grammatical slips or misplaced pronouns, as I have learned to do. With this in mind, and the fact that writing up the empirical paper coincided with a pandemic and the ensuing world-wide lockdown, writing has been particularly challenging for me. In these circumstances, my social network and access to many coping strategies that had made dealing with challenges and difficulties associated with both aspects of the clinical and academic work, became mostly out of reach or unavailable. Surprisingly, writing up the empirical paper seemed to flow better than other stages of the process, possibly due to the systematic nature of its content and structure. It was only at this stage that I realised how not being able to estimate how long a certain process would take, for example researching the literature for the first chapter or overcoming a specific statistical challenge, placed me under a considerable amount of stress. I noticed this worsening when other competing demands were swaying my attention away from thesis. The recent circumstances and lockdown-imposed restriction forced me at home with minimal to no distraction, making it so that the previously experienced lack of continuity and time to dedicate on thesis was not an issue anymore. In fact, prior to this time, I had found that taking a week off for study leave or, sadly, annual leave, allowed me to consistently work on my thesis and churn away substantial amounts off my to do list. Having an extended dedicated amount of time also allowed me to allow creativity and motivation, with their ebbing and flowing nature,

to make their course and carry me through the process. Whilst making amendments to the various drafts, I cannot stress how beneficial the responsive and thorough contribution of both MT and RS has been. I will definitely try to surround myself with colleagues with their professionalism and passion in the future.

Reflections

Having dedicated a substantial amount of time studying the determinants for criminal behaviour in adolescents and working clinically in forensic services sparked a range of reflections.

First, I realised that I tend to gravitate towards positivistic ideas (Comte, 1975) and hard evidence when working both in research and in clinical practice. With time, I began to notice that people's life stories and idiosyncrasies were often lost within this paradigm, due to the necessity of the quantitative statistical methods to aggregate the observed data, and I gradually developed a moral obligation of wanting to counterbalance this numeric description by exploring more narrative and person-centred approaches. In my research, I could neither shift the focus of my project nor include qualitative methods of analysis due to having to work within the constraints of time and resources. In future, I would cherish the opportunity of carrying out qualitative research to widen my skills in clinical research and to experience first-hand the added value of transposing participants' voices directly into the evidence base. Within clinical practice, I endeavoured to include of systemic therapy's (Hayes, 1991) approaches and methods (Burnham, 1992) in my work. As I researched the evidence for those approaches that bring more attention to the life stories and strengths of people (e.g. narrative approaches (Adshead, 2011; Youngs & Canter, 2012)) I learned that these person-centred methods seem also to provide more space for a discourse of socio-economic and cultural determinants of

antisocial behaviour which I feel I will want to include even further in my future clinical practice, especially with populations of offenders.

In line with this reflection, I found myself challenged by an ethical dilemma about the implications of my research. The most central finding evidenced by my study pertained to the fact that higher antisocial beliefs lead to a higher risk of recidivism in young offenders. This stood true even when two young offenders were matched up for frequency of prior offending. The finding has clear positive implications if thought within the context of the rehabilitation of young offenders. Antisocial beliefs and attitudes are a dynamic, as opposed to crystallised, risk factor (Gendreau, Little, & Goggin, 1996) and are therefore subject to change and could be targeted directly by interventions such as offender rehabilitation programs (Bernfeld, Farrington, & Leschied, 2003). Nonetheless, as I was writing about this, concerns around its controversiality surfaced. There is evidence that perceived stigma leads to internalised stigma in offenders (Moore, Tangney, & Stuewig, 2016) which made me reflect that findings in support of differences between offenders and the general public might indeed have the potential to exacerbate such stigma (Anderson, Vostanis, & Spencer, 2004; Uggen, Manza, & Behrens, 2004). As the difference exposed here is a dynamic risk factors, there is the possibility that it would be less likely to bring about permanent changes in people's sense of identity when compared to crystallised risk factors such as demographics and prior offending. However, risk factors in criminology have been often mistaken for causes of certain phenomena (Farrington, 2000), despite the relationship remaining purely correlational. There have even been instances in which a decontextualized consideration of risk factors for offending has led to a simplistic operationalisation of scientific findings into rehabilitation programs (O'mahony, 2009). When rewriting the manuscript for dissemination, I will make sure that my advice against equating a risk factor to an inherent and unchangeable characteristic about a person is clear.

Finally, throughout the research process I have become aware of my preference for tackling tasks quickly in order to avoid having to hold them in mind lest they cause me added worry. It goes without saying that such an attitude did not fit with a three-year long process such as a doctoral thesis. With tasks such as this, where there is no single effort or session of hard work that could complete it, a greater focus on breaking the task in smaller steps, setting deadlines as well as breaks in between stages, might help me in the future.

Conclusion

As a disclaimer, I think that the current circumstances, as dictated by the global pandemic and the major call to psychological resilience that these times have demanded, made me lean more towards a critical appraisal that allowed me to reflect but also celebrate what it has been achieved in the last three years. As a result, this section has maybe focused less than it could have on implications and limitations of my research which I feel are already satisfactorily expounded in the empirical paper chapter. In conclusion, I feel that this journey through the Doctorate in Clinical psychology has enriched me beyond any other prior academic experience as I learned about a new field of study and clinical work, interpretative theories, technical skills, statistical methods and even some life lessons along the way.

References

- Adshead, G. (2011). The life sentence: using a narrative approach in group psychotherapy with offenders. *Group Analysis*, 44(2), 175-195.
- Anderson, L., Vostanis, P., & Spencer, N. (2004). Health needs of young offenders. *Journal of Child Health Care*, 8(2), 149-164.
- Bernfeld, G. A., Farrington, D. P., & Leschied, A. W. (2003). *Offender rehabilitation in practice: Implementing and evaluating effective programs*. John Wiley & Sons.
- Burnham, J. (1992). Approach-method-technique: Making distinctions and creating connections. *Human Systems*, 3(1), 3-26.
- Comte, A. (1975). *Auguste Comte and positivism: The essential writings*. Transaction Publishers.
- Farrington, D. P. (2000). Explaining and preventing crime: The globalization of knowledge - The American Society of Criminology 1999 presidential address. *Criminology*, 38(1), 1-24.
- Gendreau, P., Little, T., & Goggin, C. (1996). A meta-analysis of the predictors of adult offender recidivism: What works! *Criminology*, 34(4), 575-608.
- Hayes, H. (1991). A Re-Introduction to Family Therapy Clarification of Three Schools. *Australian and New Zealand Journal of Family Therapy*, 12(1), 27-43.
- Moore, K. E., Tangney, J. P., & Stuewig, J. B. (2016). The self-stigma process in criminal offenders. *Stigma and health*, 1(3), 206.

- O'mahony, P. (2009). The risk factors prevention paradigm and the causes of youth crime: A deceptively useful analysis? *Youth justice*, 9(2), 99-114.
- Uggen, C., Manza, J., & Behrens, A. (2004). 'Less than the average citizen': stigma, role transition and the civic reintegration of convicted felons. In A. Behrens, *After crime and punishment: Pathways to offender reintegration* (p. 261).
- Youngs, D., & Canter, D. V. (2012). Narrative roles in criminal action: An integrative framework for differentiating offenders. *Legal and Criminological Psychology*, 17(2), 233-249.

Appendix A – Inclusion and exclusion criteria for the START study

The inclusion criteria for the study were:

- Age 11-17 years.
- Adequate family involvement for MST to be delivered.
- No other agency involvement that could interfere with MST provision.
- Presenting with antisocial behaviour including at least one of the following criteria:
 - Persistent (weekly) and enduring (6 months or longer) violent and aggressive interpersonal behaviour;
 - A significant risk of harm to self or to others (for example, self-harming, substance misuse, sexual exploitation, absconding);
 - At least one conviction and three warnings, reprimands or convictions in the past 18 months;
 - Current diagnosis of an externalising disorder and a record of unsuccessful outpatient treatment;
 - Permanent school exclusion.

The exclusion criteria for the study were:

- History or current diagnosis of psychosis.
- Generalised learning problems (clinical diagnosis) as indicated by intelligence quotient (IQ) below 65.
- Identified serious risk of injury or harm to a therapist or researcher.
- Presenting issues for which MST has not been empirically validated (i.e., substance abuse in the absence of criminal conduct or sex offending as the sole presenting issue).

Appendix B – Antisocial Beliefs and Attitudes Scale (ABAS)

(Butler, Leschied, & Fearon, 2007; Butler, Parry, & Fearon, 2015)

BELIEFS AND ATTITUDES SCALE				
INSTRUCTIONS: Listed below are statements about people's beliefs and attitudes. Please circle whether you <i>AGREE</i> (A) are <i>NOT SURE</i> (NS) or <i>DISAGREE</i> (D) with each statement.		Agree	Not Sure	Disagree
1	It's fun and exciting to belong to a gang. (PR-R)	A	NS	D
2	I'd feel pretty bad if I broke the rules at my school. (NC)	A	NS	D
3	It's none of parents' business what a young person does after school. (NC-R)	A	NS	D
4	Fighting is cool when you're with a group of teenagers. (PR -R)	A	NS	D
5	I don't like having to obey all the rules at home and school. (NC-R)	A	NS	D
6	Blaming other teenagers is a good way to avoid getting into trouble. (PR -R)	A	NS	D
7	I'm afraid to hang around with young people who get into trouble. (NC)	A	NS	D
8	It's OK to walk away from a fight. (PR)	A	NS	D
9	Being in a gang stops you from getting picked on. (PR -R)	A	NS	D
10	I respect teenagers who listen to their parents. (NC)	A	NS	D
11	Some young people deserve to be picked on. (PR -R)	A	NS	D
12	Students shouldn't talk answer the teacher back. (NC)	A	NS	D
13	You have to hurt the other person before he hurts you. (PR -R)	A	NS	D
14	It's no big deal to skip a few lessons. (NC-R)	A	NS	D
15	Teenagers feel better when they know they can win a fight. (PR -R)	A	NS	D
16	A lot of teachers bother young people too much. (NC-R)	A	NS	D
17	Fighting is wrong, even when somebody is really bothering you. (PR)	A	NS	D
18	Parents should know when their teenagers hang around with "bad" friends. (NC)	A	NS	D

NC = *NON-COMPLIANCE* factor; **PR** = *PEER CONFLICT* factor; **R** = *REVERSED* item

Appendix C – Short Mood and Feelings Questionnaire (SMFQ)

(Messer, Angold, Costello, & Loeber, 1995)

Short Mood and Feelings Questionnaire

This form is about how you might have been feeling or acting recently.

For each question, please check how much you have felt or acted this way *in the past two weeks*.

If a sentence was true about you most of the time, check TRUE.

If it was only sometimes true, check SOMETIMES.

If a sentence was not true about you, check NOT TRUE.

	NOT TRUE	SOMETIMES	TRUE
1. I felt miserable or unhappy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I didn't enjoy anything at all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I felt so tired I just sat around and did nothing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I was very restless	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I felt I was no good any more	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I cried a lot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I found it hard to think properly or concentrate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I hated myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I was a bad person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I felt lonely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. I thought nobody really loved me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I thought I could never be as good as other kids	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I did everything wrong	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Copyright Adrian Angold & Elizabeth J. Costello, 1987; Developed Epidemiology Program, Duke University
Reproduced with permission from developer, may be reproduced for use with one's own patients.

Appendix D – Strength and Difficulties Questionnaire (SDQ)

(Goodman, 1997; Goodman, Meltzer, & Bailey, 1998)

Strengths and Difficulties Questionnaire

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain or the item seems daft! Please give your answers on the basis of how things have been for you over the last six months.

Your Name Male/Female
 Date of Birth

	Not True	Somewhat True	Certainly True	
I try to be nice to other people. I care about their feelings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I am restless, I cannot stay still for long	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<- Hyperactivity
I get a lot of headaches, stomach-aches or sickness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<- Emotional Symptoms
I usually share with others (food, games, pens etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I get very angry and often lose my temper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I am usually on my own. I generally play alone or keep to myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I usually do as I am told	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I worry a lot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<- Emotional Symptoms
I am helpful if someone is hurt, upset or feeling ill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I am constantly fidgeting or squirming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<- Hyperactivity
I have one good friend or more	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I fight a lot. I can make other people do what I want	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I am often unhappy, down-hearted or tearful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<- Emotional Symptoms
Other people my age generally like me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I am easily distracted, I find it difficult to concentrate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<- Hyperactivity
I am nervous in new situations. I easily lose confidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<- Emotional Symptoms
I am kind to younger children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I am often accused of lying or cheating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other children or young people pick on me or bully me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I often volunteer to help others (parents, teachers, children)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I think before I do things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<- Hyperactivity (Reversed)
I take things that are not mine from home, school or elsewhere	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I get on better with adults than with people my own age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I have many fears, I am easily scared	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<- Emotional Symptoms
I finish the work I'm doing. My attention is good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<- Hyperactivity (Reversed)

Your signature

Today's date

Thank you very much for your help

© Robert Goodman, 1997

Appendix B Provisional banding of self-report SDQ scores

These bands, which have not been adjusted for age or gender, have been chosen so that roughly 80% of 11–16 year olds in the community are normal, 10% are borderline and 10% are abnormal.

	Normal	Borderline	Abnormal
Total Difficulties Score	0–15	16–19	20–40
Emotional Symptoms Score	0–5	6	7–10
Conduct Problems Score	0–3	4	5–10
Hyperactivity Score	0–5	6	7–10
Peer Problems Score	0–3	4–5	6–10
Prosocial Behaviour Score	6–10	5	0–4

Appendix E – Factor Loadings of Confirmatory Factor Analysis

Antisocial Beliefs

Table 1. Factor loadings for Antisocial Beliefs latent factor

Noncompliance (ABAS)	Estimate	Standard Error	<i>p</i> -value
Item 1	0.644	0.038	<0.001
Item 2	0.550	0.040	<0.001
Item 3	0.596	0.039	<0.001
Item 4	0.404	0.046	<0.001
Item 5	0.491	0.041	<0.001
Item 6	0.426	0.043	<0.001
Item 7	0.634	0.036	<0.001
Item 8	0.528	0.044	<0.001
Item 9	0.393	0.044	<0.001
Peer Conflict (ABAS)	Estimate	Standard Error	<i>p</i> -value
Item 1	0.673	0.034	<0.001
Item 2	0.685	0.034	<0.001
Item 3	0.467	0.044	<0.001
Item 4	0.475	0.043	<0.001
Item 5	0.444	0.043	<0.001
Item 6	0.519	0.044	<0.001
Item 7	0.594	0.037	<0.001
Item 8	0.573	0.041	<0.001
Item 9	0.611	0.038	<0.001

Attentional difficulties

Table 2. Factor loadings for Attentional difficulties latent factor

Hyperactivity (SDQ)	Estimate	Standard Error	<i>p</i> -value
Item 1	0.759	0.035	<0.001
Item 2	0.774	0.036	<0.001
Item 3	0.725	0.039	<0.001
Item 4	0.559	0.045	<0.001
Item 5	0.427	0.051	<0.001

Emotional difficulties

Table 3. Factor loadings for Emotional difficulties latent factor

Emotional symptoms (SDQ)	Estimate	Standard Error	<i>p</i> -value
Item 1	0.759	0.035	<0.001
Item 2	0.774	0.036	<0.001
Item 3	0.725	0.039	<0.001
Item 4	0.559	0.045	<0.001
Item 5	0.427	0.051	<0.001
SMFQ	Estimate	Standard Error	<i>p</i> -value
Item 1	0.664	0.029	<0.001
Item 2	0.580	0.034	<0.001
Item 3	0.482	0.037	<0.001
Item 4	0.477	0.036	<0.001
Item 5	0.841	0.018	<0.001
Item 6	0.771	0.026	<0.001
Item 7	0.667	0.028	<0.001
Item 8	0.868	0.018	<0.001
Item 9	0.699	0.026	<0.001
Item 10	0.814	0.021	<0.001
Item 11	0.841	0.019	<0.001
Item 12	0.830	0.020	<0.001
Item 13	0.790	0.021	<0.001

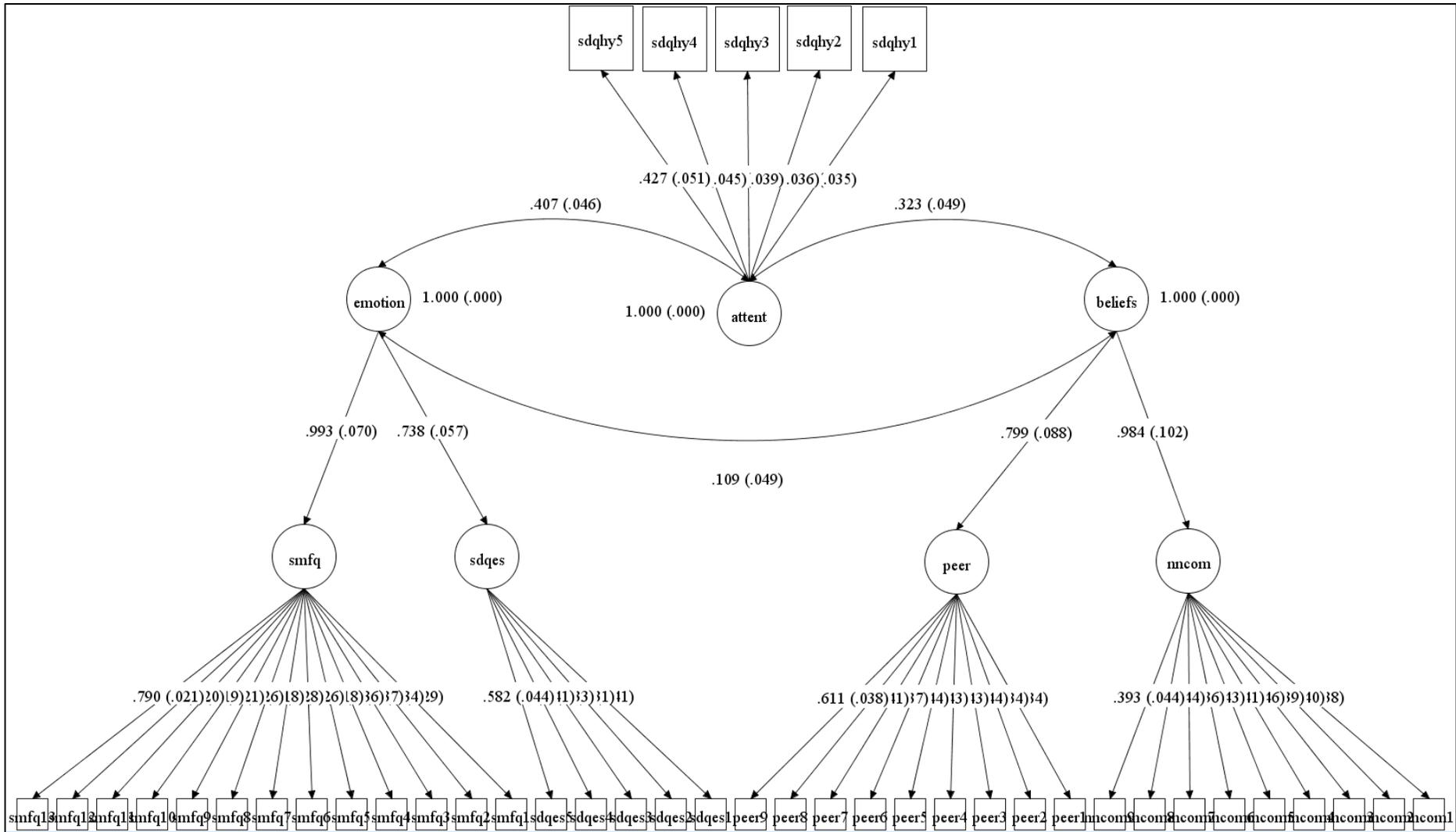


Figure 1. Mplus visual output for latent factors CFA

Appendix F – Mplus Visual Output for Nested Models

Nested model 1 (M1)

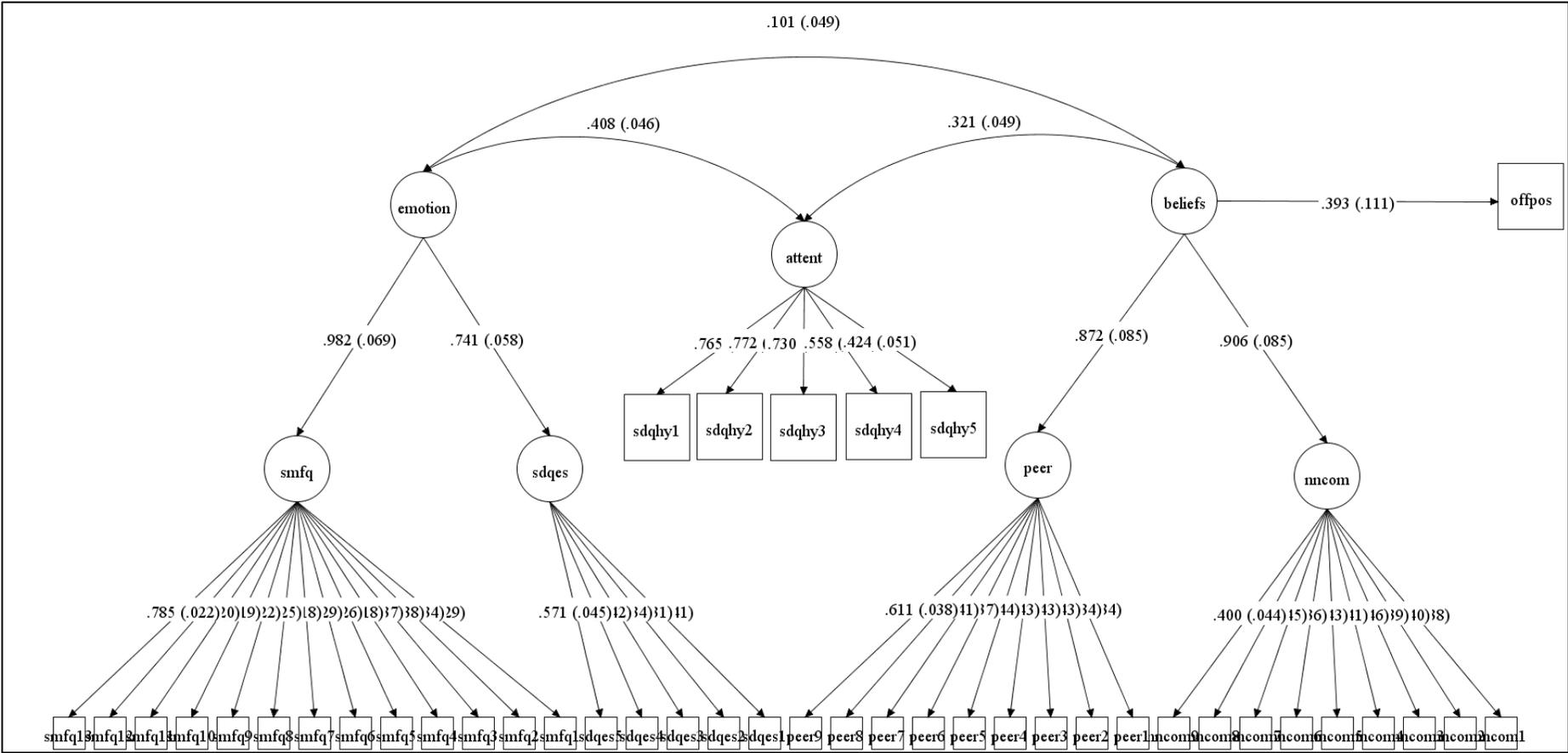


Figure 2. Mplus visual output for structural model 1

Nested model 2 (M2)

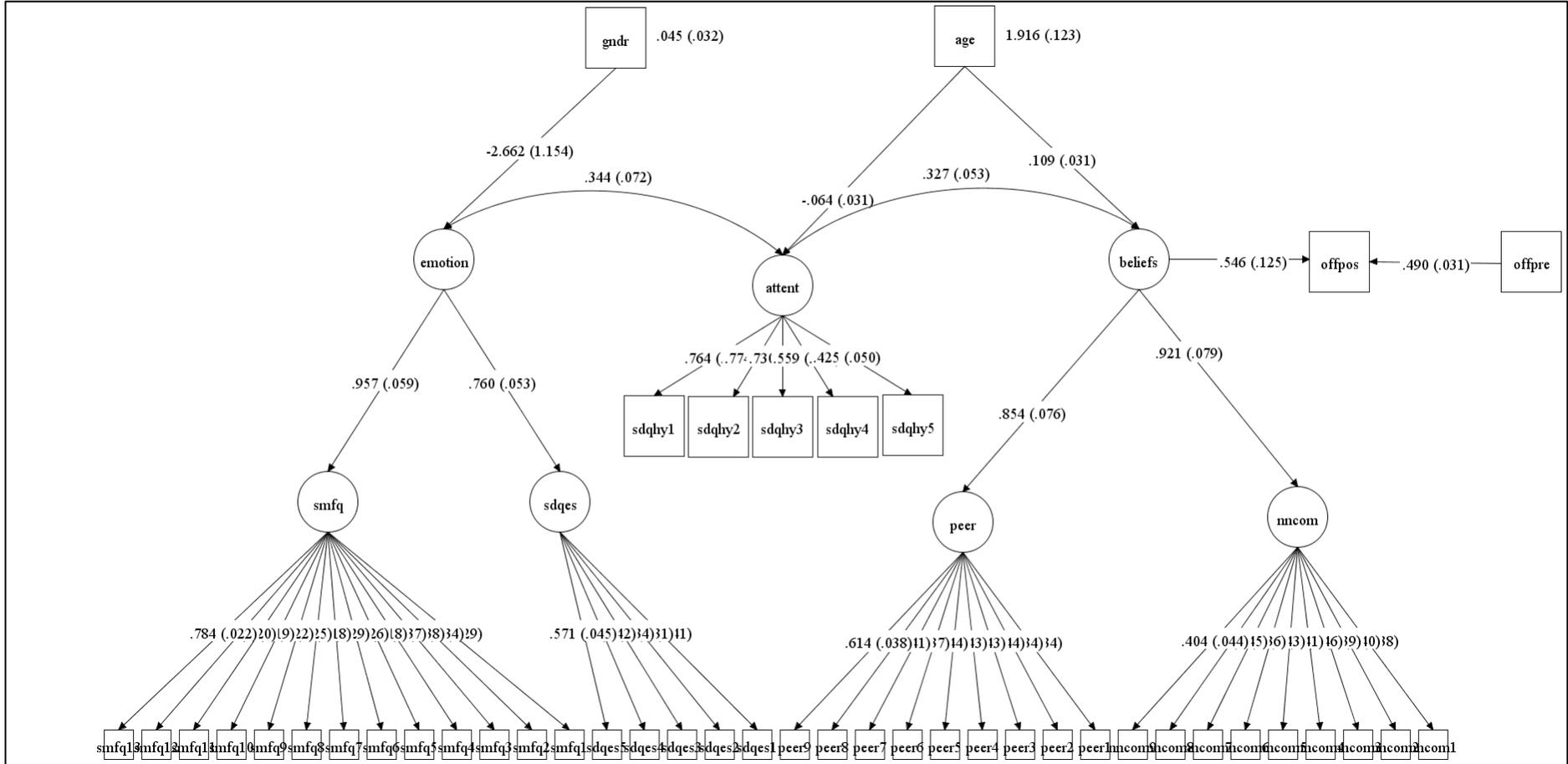


Figure 3. Mplus visual output for structural model 2

Nested model 3 (M3)

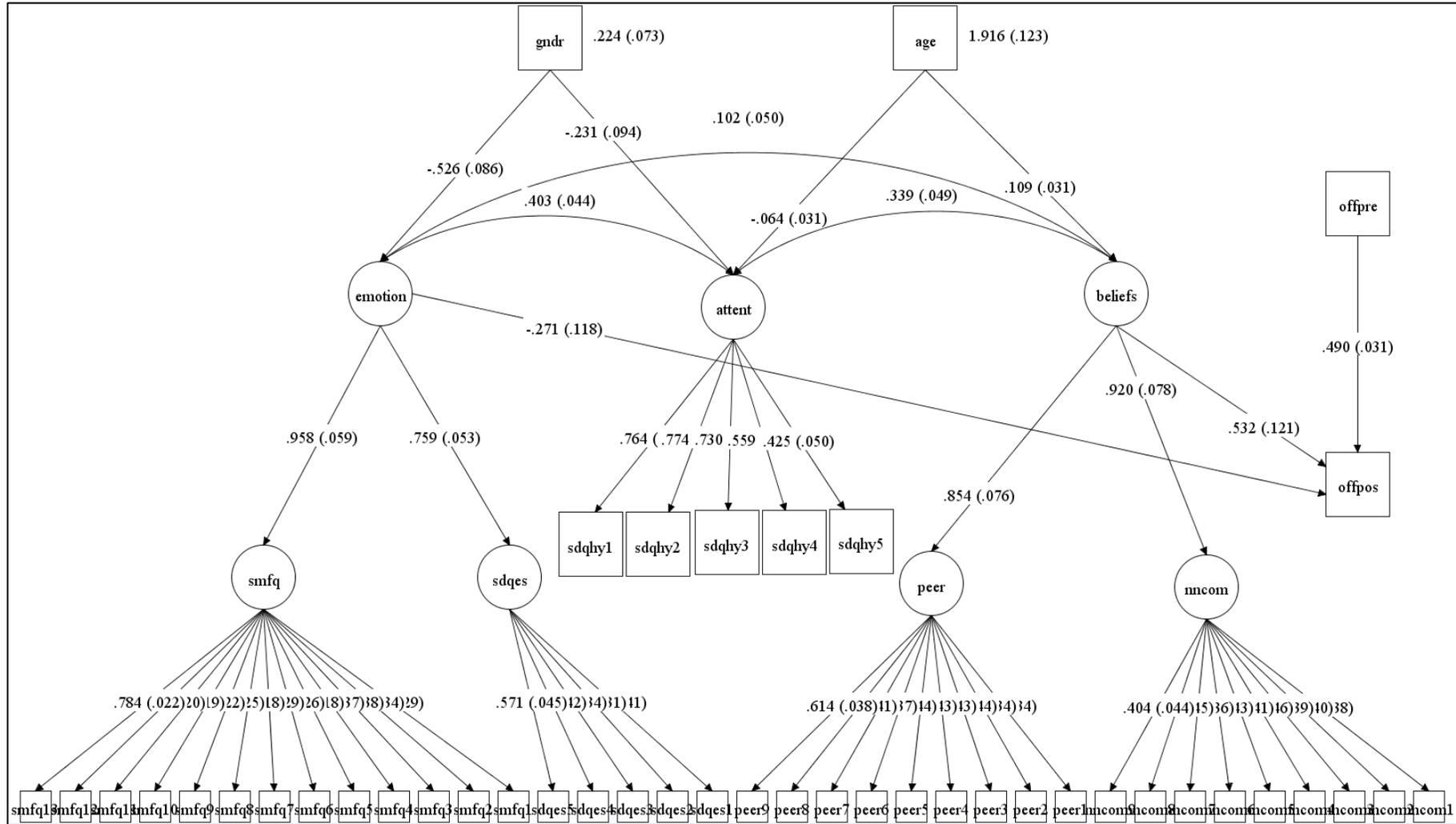


Figure 4. Mplus visual output for structural model 3

Appendix G – Summary of Sensitivity Analyses

Summary of model fit indices

Table 4. Model fit indices for sensitivity analyses

Model	Parameters	X ₂	df	P-Value	CFI	RMSEA	SRMR
Square Rooted	148	2206.91	930	<0.001	0.908	0.042	0.078
No Outliers	148	1937.83	930	<0.001	0.912	0.041	0.076

Summary of correlations, covariates and main effects

Table 5. Correlations, covariates and main effects for M3 with Square Rooted offending variables

	Correlation coefficients (r)			Covariate Coefficients (β)		Main Effect (β)
	AS Beliefs	Attention	Emotions	Age	Gender	Later Offending
AS Beliefs		0.340***	0.110*	0.103***	-0.099	0.193***
Attention			0.412***	-0.071*	-0.232*	0.011
Emotions				-0.001	-0.480***	-0.108*
	Covariate Coefficients (β)					
		Age		Gender		Prior Offending
Later Offending		-0.026		0.157*		0.456***

Table 6. Correlations, covariates and main effects for M3 without outliers

	Correlation coefficients (r)			Covariate Coefficients (β)		Main Effect (β)
	AS Beliefs	Attention	Emotions	Age	Gender	Later Offending
AS Beliefs		0.323***	0.118*	0.102***	-0.090	0.288***
Attention			0.412***	-0.066*	-0.202*	0.114
Emotions				0.007	-0.457***	-0.275*
	Covariate Coefficients (β)					
		Age		Gender		Prior Offending
Later Offending		0.002		0.475*		0.518***