Specialized and Versatile Antisocial Behavioral Profiles in Preschoolers: Associations with the Persistence of Antisocial Behaviors from Preschool to Preadolescence

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A Thesis

In the Department

Of Psychology

Presented in Partial Fulfillment of the Requirements

For the Degree of

Master of Arts (Psychology) at

Concordia University

Montréal, Québec, Canada

August 2020

CONCORDIA UNIVERSITY
School of Graduate Studies

This is to certify that the thesis prepared

By: Marie-Pier Paré-Ruel
Entitled: **Specialized and Versatile Antisocial Behavioral Profiles in Preschoolers: Associations with the Persistence of Antisocial Behaviors from Preschool to Preadolescence**

and submitted in partial fulfillment of the requirements for the degree of

MASTER OF ARTS (PSYCHOLOGY)

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Abstract

Specialized and Versatile Antisocial Behavioral Profiles in Preschoolers: Associations with the Persistence of Antisocial Behaviors from Preschool to Preadolescence

Marie-Pier Paré-Ruel

Developmental psychologists have often demonstrated that childhood antisocial behaviors (ABs) are important precursors of offending. However, our ability to identify children with the worst prognoses for later behavioral problems remains limited. In adolescent and adult samples, offense specialization and versatility are reliable predictors of recidivism (i.e., persistence) or the lack thereof. Assuming that specialization and versatility arise during childhood, studying these patterns should prove informative regarding the persistence and transience of ABs in children. Accordingly, our objective was to determine whether subsets of preschoolers specialized in certain subtypes of ABs, with their proclivity predicting different rates of transitions into groups that presented ABs at later developmental stages. To assess the theoretical validity of the results pertaining to these subsets, we included parenting behaviors and children's temperamental characteristics as predictors. The sample consisted of 525 children assessed at ages 3-5, 6-8, and 10-12. The study variables were measured via mother-rated questionnaires (e.g., Child Behavior Checklist, Parenting Dimensions Inventory). Through latent transition analysis, we derived latent profiles at each timepoint using four indicators: aggression, opposition, property violations, and status offenses. At Time 1, the analyses yielded normative, aggression specialists, property violations specialists, and severe generalists subsets. At Times 2 and 3, normative, non-aggressive generalists, and severe generalists subsets emerged. 89.5% of preschoolers classified as aggression specialists and severe generalists belonged to the non-aggressive or severe generalists subsets in preadolescence, while only 40% of property violations specialists did. Such results suggest that specialization modulates the persistence and transience of ABs during childhood. The association between the

covariates and the latent profiles were in the expected directions, highlighting the theoretical validity of our findings. By shedding new light upon the subtypes of antisocial behaviors that likely distinguish persistent and transient developmental trajectories of ABs, results from the present study enriched our understanding of the development of ABs in childhood and improved our ability to make accurate prognoses for children with behavioral problems.

Keywords: Antisocial Behaviors, Specialization, Versatility, Childhood, Persistence, Desistance.

ACKNOWLEDGMENTS

"I began to realize how important it was to be an enthusiast in life.

[…] if you are interested in something, no matter what it is,

go at it at full speed ahead. Embrace it with both arms, hug it, love it and above all

become passionate about it. Lukewarm is no good."

−Roald Dahl, My Uncle Oswald

A master's thesis is merely a stepping stone towards greater things. Yet, the learning opportunities and challenges that come along with the endeavor are strikingly different across individuals. I count myself amongst the lucky ones. From the beginning, I received unwavering support from my supervisors, Drs. Dale Stack and Lisa Serbin. While Dr. Stack acknowledged that my ideas and plans for the thesis were likely too ambitious, she never flinched or expressed any doubts as to my ability to finish on time or handle the technicalities inherent to my objectives. When I myself doubted, she reminded me of what I had accomplished thus far and told me I was on track. More importantly, I was entrusted with the time and space to hone my ideas and acquire the skills necessary to make them come to fruition. As an aspiring researcher, I am infinitely grateful for the flexibility and guidance I received from Dr. Stack over the last two years. Similarly, I wish to recognize the invaluable assistance of Dr. Alexandre J.S. Morin in regard to my statistical analyses. And, undeniably, to Madeleine, whose heart always sees in me the things I cannot recognize myself. The last few years (and months) would not have been as carefree and fulfilling without you.

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Antisocial behaviors, ranging from bursts of anger to thefts and assaults, engender substantial financial costs for society (Park, Lee, Bolland, Vazsonyi, & Sun, 2008; Patterson, DeBaryshe, & Ramsey, 2017; Rivenbark et al., 2017). These costs arise primarily from criminal activities, which generate more than $150 billion in yearly government expenditures in the United States (McCollister, French, & Fang, 2010). Individuals who exhibit antisocial behaviors before the age of 10 and maintain them throughout their development are responsible for more than 50% of these crimes (Dodge, 2008; Farrington, Ttofi, & Coid, 2009; Kratzer & Hodgins, 1999; Patterson, Forgatch, Yoerger, & Stoolmiller, 1998; Rivenbark et al., 2017; Stattin, Kerr, & Bergman, 2010), but represent only 5 to 9 % of the population (Vaughn et al., 2011; Vaughn, Salas-Wright, DeLisi, & Maynard, 2014). Generally referred to as “early starters”, these boys and girls often contend with a host of deleterious consequences over their lifespan, including substance abuse (Moffitt, Caspi, Harrington, & Milne, 2002), mental and physical illnesses (Odgers et al., 2007; Piquero, Daigle, Gibson, Piquero, & Tibbetts, 2007; Pulkkinen, Lyyra, & Kokko, 2009), as well as educational and professional failures (Huesmann, Dubow, & Boxer, 2009; Jennings, Rocque, Hahn Fox, Piquero, & Farrington, 2016). Considering the prognostic significance of childhood antisocial behaviors for later adjustment, understanding this phenomenon is deemed a high priority for children’s mental health and psychosocial functioning (Burt, Donnellan, Slawinski, & Klump, 2016; Eme, 2010). In order to identify the developmental pathways leading to these deleterious outcomes, we must hone our ability to recognize preschoolers who are most at risk of engaging in persistent antisocial behaviors (Eme, 2010; Keenan & Wakschlag, 2002). Accordingly, the primary objective of the present study was to

identify subsets of children who are most likely to exhibit stable or escalating patterns of antisocial behaviors from preschool to preadolescence.

Persistence and Transience of Antisocial Behaviors in Early Starters

Over the last three decades, numerous studies have examined childhood antisocial behaviors and established their relationship with the persistence and increasing severity of behavioral problems over time (Farrington, 2003; Loeber & Hay, 1997; Moffitt, Caspi, Dickson, Silva, & Stanton, 1996; Shaw & Gross, 2008; Staff, Whichard, Siennick, & Maggs, 2015; Tremblay, 2013; Wallinius et al., 2016). Interestingly, these studies rarely delve into what happens during childhood, instead favoring the comparison of early starters with individuals whose antisocial behaviors appear during adolescence and dissipate before adulthood (Donnellan, Ge, & Wenk, 2000; Jolliffe, Farrington, Piquero, Loeber, & Hill, 2017; Moffitt & Caspi, 2001; Piquero et al., 2007; Raine et al., 2005; Shaw & Gross, 2008). Typically, such investigations rely upon Moffitt's (1993) seminal taxonomy, which labels these subsets of individuals as "life-course persistent" (i.e., early starters) and "adolescence-limited" offenders. According to this theoretical framework, the latter endorse antisocial behaviors transiently in an attempt to become more autonomous. The results of many studies are consistent with this taxonomy (Eme, 2009; Jennings & Reingle, 2012; Moffitt & Caspi, 2001; Moffitt, 2017; Raine et al., 2005), systematically highlighting its contributions to the advancement of research pertaining to the development of antisocial behaviors. However, the disproportionate attention that has been directed towards contrasting life-course persistent and adolescence-limited offenders has left a number of gaps in our knowledge. Notably, most of these studies have overlooked potential individual differences in the inception and stability of antisocial behaviors over the childhood years. This represents a serious oversight, as most children who manifest

antisocial behaviors do not go on to pursue criminal careers (Maughan, Pickles, Rowe, Costello, & Angold, 2000). By attempting to differentiate these individuals from those maintaining norm-violating behaviors until the end of childhood, the present study was designed to provide novel insights into the persistence of antisocial behaviors.

Coincidentally, Moffitt's dual taxonomy had to be reformulated to account for a subset of individuals who endorse antisocial behaviors as children, but cease to exhibit such behaviors before entering adolescence (Fergusson, Horwood, & Nagin, 2000; Fontaine, Carbonneau, Vitaro, Barker, & Tremblay, 2009; Maughan et al., 2000; Odgers et al., 2008; Xie, Drabick, & Chen, 2011). Labelled as a "childhood-limited" trajectory, this subset consistently arises in studies concerned with the developmental trajectories of antisocial behaviors, with several investigations suggesting that desistance – not persistence – is the norm amongst early starters (Barker & Maughan, 2009; Nagin & Tremblay, 1999; Odgers et al., 2007, 2008). These results are consistent with the notion of multifinality, which contends that initial behavioral configurations and vulnerabilities lead to widely dissimilar outcomes in distinct subsets of children as a result of intervening factors (Cicchetti & Rogosch, 1996; Cicchetti & Valentino, 2006; Jaffee & Maikovich-Fong, 2013). In other words, the ubiquity of the childhood-limited subset bespeaks of potential variations in the individual characteristics and environmental factors that foster childhood antisocial behaviors. Albeit few and far between, several studies have highlighted such differences between children engaging into chronic antisocial behaviors and those qualifying as desisters (Byrd, Hawes, Loeber, & Pardini, 2018; Gutman, Joshi, & Schoon, 2019; Odgers et al., 2007). Formally identifying these dissimilarities should facilitate the detection of children who are most likely become life-course persisters.

Versatile and Specialized Antisocial Behaviors as Predictors of Persistence

In criminological research, the prediction of later offending and recidivism appears to be contingent upon specialization and versatility in antisocial behaviors (Moffitt, 1993; Nijhof, de Kemp, Engels, & Wientjes, 2008; Paternoster, Brame, Piquero, Mazerolle, & Dean, 1998; Wiesner, Yoerger, & Capaldi, 2019; Yonai, Levine, Glicksohn, 2013). Specialization refers to the tendency to repeatedly exhibit the same subtype(s) of antisocial behaviors, whereas versatility is defined as the indiscriminate endorsement of many or most forms of antisocial behaviors (Mazerolle & McPhedran, 2018; Nieuwbeerta, Blokland, Piquero, & Sweeten, 2010). Although information pertaining to specialization and versatility is useful when it comes to predicting later offending and informing policies or interventions (Farrington, Snyder, & Finnegan, 1988; Piquero et al., 1999), these concepts remain severely understudied in children. This is a key limitation, as versatility is related to severe and persistent antisocial behaviors in adolescent and adult samples (Mazerolle, Brame, Paternoster, Piquero, & Dean, 2000; McGloin, Sullivan, Piquero, & Pratt, 2007; Moffitt et al., 2002; Nijhof et al., 2008; Sullivan, McGloin, Pratt, & Piquero, 2006), and may thus help differentiate children with stable antisocial behaviors from those desisting before adolescence. Hence, the present study was designed to determine whether these phenomena are involved in the persistence and transience of antisocial behaviors over the childhood years. While doing so, it is essential to consider differences between the subtypes of antisocial behaviors endorsed by children, as they vary in their stability, but are generally overlooked in favor of broadband assessments of antisocial behaviors.

Perhaps by virtue of their stability (Côté, Vaillancourt, LeBlanc, Nagin, & Tremblay, 2007; Kokko, Pulkkinen, Huesmann, Dubow, & Boxer, 2009; Piquero, Carriaga, Diamond, Kazemian, & Farrington, 2012; Tremblay, 2000), childhood aggressive behaviors are amongst the strongest predictors of persistent antisocial behaviors (Olweus, 1979; Huesmann et al., 2009;

Juon, Doherty, & Ensminger, 2006; Simonoff et al., 2004), over and above age-of-onset and other subtypes of antisocial behaviors (Hyde, Burt, Shaw, Donnellan, & Forbes, 2015; Klahr & Burt, 2014). Such findings signal that chronic and transient antisocial behaviors are likely predicted by the types of antisocial behaviors exhibited by children. Even though subtypes of antisocial behaviors arise at distinct childhood developmental stages and display considerable differences in stability (Burt, 2012; Bongers, Koot, van der Ende, & Verhulst, 2004; Moffitt, 2003; Frick et al., 1993), their co-occurrence is the rule, not the exception (DeLisi & Piquero, 2011a; Klein, 1984; Tumminello, Edling, Liljeros, Mantegna, & Sarnecki, 2013; Vaughn, DeLisi, Beaver, & Howard, 2008). Using a person-centered analytic strategy to capture this co-occurrence (versatility) or lack-thereof (specialization; McGloin, Sullivan, & Piquero, 2009), the current study seeks to identify subsets of children who are distinguished by their inclination towards certain form(s) of antisocial behaviors. These subsets were then compared to pinpoint the patterns of antisocial behaviors that are most conducive to the persistence and transience of antisocial behaviors in early starters. Prior findings suggest that versatility and specialization towards aggressive behaviors will be associated with the highest rates of persistence between preschool and preadolescence (*Hypothesis 1*).

Time-Specificity of Specialized and Versatile Antisocial Behaviors across Development

When studying specialization and versatility, developmental timing should be considered. As mentioned earlier, generalized and specialized antisocial behaviors are severely understudied in childhood. While attempts at detecting generalists and specialists from a developmental standpoint are not unheard of (Ang, et al., 2019; Connell, Cook, Aklin, Vanderploeg, & Brex, 2011; Cook, Pflieger, Connell, & Connell, 2015; Kuny et al., 2013; Lacourse et al., 2010; Li & Lee, 2010; Nock, Kazdin, Hiripi, & Kessler, 2006; Wojciechowski, 2020), these studies were

mostly conducted with adolescents. As far as we know, only Wojciechowski (2020) explicitly looked at versatility and specialization in children. However, this investigation was retrospective rather than prospective, with participants reporting their engagement (or lack-thereof) in five different antisocial behaviors prior to reaching the age of 11. The fact that most studies were conducted with adolescents complicates matters when it comes to determining whether specialization and versatility are to be anticipated at each of the developmental periods covered by the present study (3-5, 6-8, and 10-12 years old), as the results of prior investigations are not directly applicable to these age ranges, and retrospective reports are likely to be impacted by current levels of involvement, thus resulting in inflated rates of stability.

In older samples, versatility appears to be the norm; that is, most offenders are generalists (DeLisi, 2003; DeLisi et al., 2011b; Klein, 1984; Piquero, Farrington, & Blumstein, 2003; Piquero, Jennings, & Barnes, 2012; Jennings, Zgoba, Donner, Henderson, & Tewksbury, 2014). Because versatility arises consistently regardless of the age of the participants, there are grounds to anticipate the presence of versatile subsets at all childhood periods. In stark contrast, specialization is not systematically observed from study to study (Gottfredson & Hirschi, 2016; Mazerolle & McPhedran, 2018). In fact, several investigations suggest that specialization fluctuates in its prevalence as development progresses (Armstrong, 2008; Nieuwbeerta et al., 2010; Yonai, Levine, & Glicksohn, 2010; Piquero et al., 1999). These findings indicate that specialization does not consistently occur across developmental periods, highlighting the possibility that similar changes transpire during childhood. The theoretical perspective elaborated to justify the presence of specialization and versatility in older offenders contain clues as to what is potentially happening over the childhood years.

From a criminological perspective, the processes behind specialization and versatility are generally described by two competing models. In Gottfredson and Hirschi's (1986, 1990) general theory of crime, specialization is considered a rare occurrence contingent upon key life events (e.g., marriage). These milestones are speculated to orient versatile offenders towards more specialized offending patterns (Gottfredson, 2005; McGloin et al., 2007). In contrast, versatility is considered the default mode for most offenders, with fluctuations in self-control underlying changes in rates of offending over time. Put differently, this framework suggests that most criminals lack self-control, which prevents them from differentiating criminal opportunities and pushes them towards versatile offending (Gottfredson, 2005). This theory is consistent with results from developmental studies indicating that lack of self-control is associated with higher rates and stability of antisocial behaviors in children of all ages (DeLisi, 2013; Fergusson, Boden, & Horwood, 2013; Moffitt et al., 2011; Vaughn, DeLisi, Beaver, & Wright, 2009). Considering these results as well as those revealing that self-control is highly stable during childhood and over the lifespan (Beaver & Wright, 2007; Coyne & Wright, 2014; DeLisi, 2013), we anticipate that versatile subsets will be observed at each of the developmental periods examined in the present study (*Hypothesis 2*).

The evidence supporting offense specialization is based upon entirely different assumptions. Over the last three decades, the rational choice perspective has been at the forefront of research justifying the presence of specialization in offenders (Jennings & Beaudry-Cyr, 2014; Pratt, Cullen, Blevins, Daigle, & Madensen, 2006), with several studies corroborating its premises along the way (e.g., Blackwell, Grasmick, & Cochran, 1994; Bouffard & Niebuhr, 2017; Guerrette, Stenius, & McGloin, 2005; Piquero & Tibbetts, 1996; Hochstetler, DeLisi, & Puhrmann, 2007; Nagin & Paternoster, 1993; Tibbetts & Herz, 1996). The core assumption of

this framework is that criminals specialize in certain types of crimes by making rational choices "based on analyses of [the] anticipated costs and benefits" associated with offending opportunities (Cornish & Clarke, 1986, p. 5). Given that the capacity to make complex future-oriented decisions improves progressively over the course of childhood and adolescence (Crone & van der Molen, 2004; Garon & Moore, 2007; Huizenga, Crone & Jansen, 2007; Kerr & Zelazo, 2004), children are unlikely to engage in a decision-making process as sophisticated as that of juvenile or adult offenders. If specialization were to occur in children, it seems reasonable to believe that its underlying developmental processes would differ from those observed in older individuals.

From a developmental perspective, meta-analytical and empirical evidence indicates that childhood antisocial behaviors are highly heritable (DiLalla & Gottesman, 1989; Eley, Lichtenstein, & Moffitt, 2003; Rhee & Waldman, 2002), as are the individual characteristics (e.g., cognitive functioning, self-control, callous-unemotional traits) commonly associated with them (Baker, Bezdjian, & Raine, 2006; Bezdjian, Baker, & Tuvblad, 2011; Beaver & Connolly, 2013; Edmonds et al., 2008; Moore et al., 2017; Scott et al., 2016; Scourfield, Martin, Lewis, & McGuffin, 1999; Stoel, De Geus, & Boomsma, 2006). These results suggest that children are differentially susceptible to antisocial behaviors in part owing to genotypic differences, which are likely reflected through individual variations in these characteristics (Baker et al., 2006; Goldman & Fishbein, 2000). In turn, such inter-individual disparities likely dispose children towards using certain form(s) of antisocial behaviors over others, thereby fostering specialization. This assumption is supported by years of empirical research revealing that distinct subtypes of antisocial behaviors are differentially associated with cognitive functioning (Barker et al., 2007, Fontaine, 2006; McEachern & Snyder, 2012), emotion or self-regulation (Del Bove,

Caprara, Pastorelli, & Paciello, 2008; Frick, O'Brien, Wootton, & McBurnett, 1994; Kimonis & Frick, 2011; Koolen, Poorthuis, & van Aken, 2012), and other temperamental characteristics (Becht, Prinzie, Deković, van den Akker, & Shiner, 2016; Kazdin, 1992; Snyder, Schrepferman, McEachern, & Deleeuw, 2010). What remains to be determined is whether specialization occurs throughout childhood or is, on the contrary, age-specific.

As mentioned previously, rates of specialization change over time. For instance, specialization is observed at the beginning of adolescence, but seems to be replaced by versatile patterns of antisocial behaviors over the following years (Nieuwbeerta et al., 2010). Considering that children adopt novel and increasingly severe forms of antisocial behaviors as a result of interactions with peers (Boxer, Guerra, Huesmann, & Morales, 2005; Dishion and Tipsord, 2011; Pettit, 1997; Snyder, Schrepferman, Bullard, McEachern, & Patterson, 2012; Werner & Crick, 2004), it is conceivable that some preschoolers may initially specialize in certain subtypes of antisocial behaviors, only to diversify their arsenal afterwards through increasing levels of interactions with peers once entering school. This would be in line with results indicating that increased contact with peers pushes individuals towards adopting more versatile patterns of antisocial behaviors, whereas isolation promotes specialization (Thomas, 2016). Along similar lines, specialization likely occurs by "default" in preschoolers as a result of cognitive immaturity. More specifically, Tremblay (2010) argued that property violations and status offenses (covert antisocial behaviors) are relatively rare in younger children owing to cognitive abilities that have not sufficiently developed yet. This pre-requisite is reflected in the tendency of such behaviors to emerge 1 to 3 years after the beginning of elementary school, while aggression and opposition are prevalent during preschool (Frick et al., 1993). Typically, children gradually hone their cognitive control as part of their normative development (Diamond, 2013; Prencipe et

al., 2011), signalling that younger children are less likely to engage in covert antisocial behaviors due to lower cognitive abilities. As such, we believed that specialization would arise during preschool, but not at later childhood periods (*Hypothesis 3*).

Methodological Considerations in Studies of Specialization and Versatility

Although numerous studies have uncovered patterns of specialization in a minority of offenders (Lussier, McCuish, Deslauriers-Varin, & Corrado, 2017; Osgood & Schreck, 2007; Piquero, 2005; Sullivan et al., 2006), the existence of meaningfully distinct subsets of criminals remains contentious (Gottfredson & Hirschi, 2016; Mazerolle & McPhedran, 2018). Several researchers have argued that suboptimal choices in analytical and methodological approaches hinder the detection of specialists across studies (e.g., McGloin et al., 2009; Sullivan et al., 2006; Sullivan, McGloin, Ray, & Caudy, 2009). To overcome these difficulties, McGloin and colleagues (2009) recommend using *Latent Transition Analysis* (LTA) to capture specialists at specific timepoints. This analytical technique is ideal to account for the shifts between specialization and versatility observed in offenders (in the case of our study, children with antisocial behaviors) over time (Francis, Soothill, & Fligeltstone, 2004; McGloin et al., 2007; McGloin et al., 2009). Examining such shifts is informative as to the persistence and transience of antisocial behaviors, as it enables us to determine the number of children that remain in antisocial subsets from preschool to preadolescence. As we anticipated shifts in the patterns of antisocial behaviors observed in children, LTA seemed ideal to test our primary hypotheses.

Furthermore, to avoid biases towards detecting versatility, specialization must be properly operationalized. Oftentimes, specialization is described as the repeated perpetration of a narrowly defined crime, with offenders rarely or never engaging in other crimes. This definition is restrictive, as it assumes that committing closely related crimes such as theft and robbery

denotes versatility rather than specialization (Trojan & Salfati, 2010). Moreover, this approach overlooks the co-occurrence and similarities between norm-violating behaviors that likely underlie the same theoretical construct (Salfati & Taylor, 2006). Fortunately, this oversight is easily corrected by defining specialization as the tendency to commit "thematically" similar crimes (Eker & Mus, 2016; Paternoster et al., 1998). In children, this translates as the propensity to endorse thematically similar antisocial behaviors (e.g., property violation) without engaging in other forms of antisocial behaviors (e.g., aggression). The present study was thus based upon four clusters of antisocial behaviors that have been meta-analytically validated in children and adolescents (Frick et al., 1993).

The taxonomy validated by Frick and colleagues (1993) comprises four forms of antisocial behaviors conceptualized along two orthogonal dimensions: covert/overt and non-destructive/destructive. The intersection of these dimensions yields clusters of antisocial behaviors that are classified into those inflicting immediate harm to people (*aggression*) or property (*property violations*) and those disregarding the limits imposed by others (*opposition*) or society (*status offenses*). By yielding four norm-violating behaviors that are aligned with clinical and legal definitions of antisocial behaviors (American Psychiatric Association, 2013; Frick et al., 1993), the intersection of these two dimensions is particularly useful when it comes to deriving preliminary practical implications. Moreover, these clusters surface at separate timepoints during childhood, with several studies revealing that their developmental trajectories are dissimilar (Alink et al., 2006; Bongers, Koot, van der Ende, & Verhulst, 2008; Frick et al., 1993; Koot, van den Oord, Verhulst, & Boomsma, 1997). Selecting these clusters enabled us to investigate age appropriate antisocial behaviors while capturing the developmental changes that naturally occur in manifestations of antisocial behaviors from preschool to preadolescence.

Individual and Parental Predictors as Means to Validate Subsets

A last issue to consider while investigating specialization and versatility is the exploratory nature of person-centered analyses such as LTA (Meyer & Morin, 2016). Although theory can help to guide the selection of an optimal solution, latent profiles are derived directly from the data independently of theoretical considerations. Thus, the subsets obtained when using this family of statistical analyses are potentially spurious (Bauer, 2007), making replication and construct validation crucial to validating the profiles observed in particular sample (Morin, Bujacz, & Gagné, 2018). In the present study, this criterion was met by considering three time points (i.e., longitudinal replication) and including well-established covariates of antisocial behaviors as predictors of profile membership and transitions over time.

Excluding childhood antisocial behaviors, the temperamental characteristics of children, along with parenting behaviors, likely represent the best established predictors of concurrent and future antisocial behaviors (e.g., Carlo, Roesch, Melby, 1998; Rubin, Burgess, Dwyer, & Hastings, 2003; Eme, 2018; Patterson et al., 2017; Kawabata, Alink, Tseng, Van Ijzendoorn, & Crick, 2011; Pajer et al., 2008; Pardini, Fite, & Burke, 2008; van der Voort et al., 2013; Veenstra, Lindenberg, Oldehinkel, De Winter, & Ormel, 2006). Accordingly, parenting behaviors (i.e., positive, harsh, and permissive) and temperamental characteristics (emotional lability, activity levels, and shyness) were deemed appropriate to evaluate the theoretical meaningfulness of the subsets derived at each timepoint. Due to the lack of studies pertaining to specialized and versatile patterns of antisocial behaviors in children, we could not formulate detailed hypotheses as to the relations between these covariates and latent profiles or transitions. This situation often arises in person-centered research due to “a lack of previous empirical and theoretical guidelines” (Morin et al., 2018). However, broader hypotheses can be inferred from

studies investigating antisocial behaviors by means of other person-centered analyses. Similarly, results from studies pertaining to the associations between these covariates and childhood antisocial behaviors can be drawn upon to inform our predictions.

First and foremost, studies estimating group-based trajectory models consistently identify children who manifest low levels of antisocial behaviors throughout their development (e.g., Côté, Zoccolillo, Tremblay, Nagin, & Vitaro, 2001; Di Giunta et al., 2010; Maughan et al., 2000; Miller, Malone, Dodge, & Conduct Problems Prevention Research Group, 2010). Typically, this subset includes the majority of participants in a particular sample. Furthermore, such analyses generally lead to the identification of a small subset (±5%) of children who manifest severe and stable levels of antisocial behaviors (e.g., Côté et al., 2001; Di Giunta et al., 2010; Maughan et al., 2000; Miller et al., 2010). On the basis of these results, it is reasonable to believe most participants will land in a normative profile at all timepoints, with a small minority presenting severe and versatile antisocial behaviors (*Hypothesis 4*). The majority of participants found within both subsets should remain in the same type of profile throughout childhood (*Hypothesis 5*). Even though we surmised that specialization patterns would arise in preschoolers, we reserved judgment as to the shape and size of these hypothetical profiles.

Assuming the profiles obtained in the present study are theoretically meaningful, the selected covariates should differentiate the profiles in a manner consistent with results for developmental research. For instance, positive parenting and shyness were expected to increase the likelihood of belonging to the normative profile at each timepoint, but diminish the probability of belonging to the antisocial subsets (*Hypothesis 6*). This assumption is in line with studies revealing that these covariates are associated with lower levels of childhood antisocial behaviors (e.g., Acar et al., 2018; Chronis et al., 2007; Eisenberg et al., 2005; Gryczkowski,

Jordan, & Mercer, 2010). In contrast, harsh and permissive parenting, emotional lability, and higher activity levels were expected to decrease the likelihood of belonging to the normative profile at each timepoint, but increase the probability of belonging to the antisocial subsets (*Hypothesis 7*). This prediction is based upon studies linking these factors to elevated levels of antisocial behaviors (e.g., Honomichl & Donnellan, 2011; Kawabata et al., 2011; Nigg, 2006; Pevalin, Wade, & Brannigan, 2003; Schaffer, Clark, & Jeglic, 2009; van Goozen, 2015). As demonstrated earlier, lack of self-control is predictive of versatility in adolescent and adult offenders. Accordingly, higher levels of emotional lability were anticipated to increase the likelihood of belonging to versatile profiles when compared to specialized profiles (*Hypothesis* 8). Owing to a lack of empirical and theoretical precedents in studies of childhood antisocial behaviors, we reserved judgment as to the effects of these predictors on the probabilities of transitioning across types of profiles over time.

The Present Study

Adapting principles from criminological research to the investigation of the persistence and transience of antisocial behaviors from developmental psychopathology perspective, the main objective of the present study was to identify subsets (i.e., profiles) of children who are distinguished by their inclination towards certain form(s) of antisocial behaviors. These subsets were then compared to pinpoint the patterns of antisocial behaviors that are most conducive to the persistence and transience of antisocial behaviors in children with antisocial behaviors. Particular attention was directed towards the relative persistence of specialization and versatility patterns throughout childhood. In order to evaluate the validity of the profiles derived from the LTA, the temperamental characteristics of children and parenting behaviors were included as predictors of profile membership and transitions. The eight hypotheses were assessed for

accuracy using an aggregated sample of children who were followed at three waves of data collection (preschool: 3-5 years old; beginning of primary school: 6-8 years old; and preadolescence: 10-12 years old).

Method

Participants

A sample of 556 participants was obtained by integrating three Canadian samples. Participants were assessed at 3 to 5 (M = 3.51, SD =.71), 6 to 8 (M = 7.76, SD =.95), and 10 to 12 years old (M = 10.83, SD =.68). From this point forward, Sample 1 is labelled as *The Shame in Childhood Study* (SCS) sample, Sample 2 is labelled as *The Daycare and Preschool Adjustment Study* (DPAS) sample, and Sample 3 is labelled as The Concordia Longitudinal Research Project (Concordia Project) sample. On average, the SCS sample was significantly older than the DPAS sample at Time 3 $t(89.77) = 2.057$, $p = .04$, but not earlier. Along similar lines, SCS participants were older than Concordia Project participants at Time 1 $t(78.57) = 12.211$, $p < .000$, Time 2 $t(128.962) = 13.681$, $p < .000$, and Time 3 $t(115.008) = 2.479$, $p = .015$. Finally, the DPAS sample was significantly older than the Concordia Project sample at Time 1 $t(175) = 8.697$, $p < .000$, and Time 2 $t(178) = 9.457$, $p < .000$, but not Time 3. Demographic characteristics for each sample and for the integrated sample are reported in Table 1.

The Shame in Childhood Study (SCS) sample (N=241).

The SCS sample is a community sample that includes 241 English-speaking children and their parents. Winnipeg families with children that were born between June 1, 1999 and May 31, 2000 were invited to participate in the SCS study by a letter of invitation. A total of 3500 families were contacted after a random selection was made out of a sample of 6358 families residing in Winnipeg, Manitoba. Each family received details about the study, with an invitation

to return an enclosed stamped postcard. 254 families chose to participate. Most participants were Caucasian (94%) of European ancestry (74%). Mothers completed the instruments for the present study, reporting their own characteristics as well as those of their child.

The Daycare and Preschool Adjustment Study (DPAS) sample (N=133).

The DPAS sample includes 133 families from the greater metropolitan Montreal area. These participants were recruited via targeted advertisement directed towards the parents of children at low risk or at risk for anxiety problems. Half of the families spoke English as a first language. In 37 households, at least one of the two parents spoke French; the remaining families spoke neither French nor English as their native language. 70% of the sample was Caucasian. The other participants were of Asian, Caribbean, African, Indian, or Hispanic ethnicities. Mothers and fathers rated the characteristics of their child as well as their own by completing the questionnaires administered for the present study.

The Concordia Longitudinal Research Project sample (N=126).

The Concordia Longitudinal Research Project (Concordia Project) sample was recruited as part of an intergenerational study that began in 1976. At the time, the main objective of the study was to trace the developmental trajectories of social withdrawal and aggression. During the initial phase of recruitment (1976 to 1978), 1770 French-speaking children attending primary school were selected to participate in the study. These children were predominantly from lower income neighbourhoods in Montreal, Quebec. Now in their forties and fifties, most of these participants have themselves become parents, with their children being progressively integrated into the sample. Amongst the 700 participants who took part in the latest phase of the ongoing Concordia Project, 126 agreed to participate with their children, a sample that represents approximately 78% of eligible families. 95% of the families were Caucasian; the remaining 5%

comprised individuals from African and Hispanic ethnicities. The parents involved in the present study were not substantially different from the original sample or the ongoing sample in terms of their sociodemographic and behavioral characteristics. Their children represent the second generation of the Concordia Project and were assessed on a host of individual characteristics, including those examined in this study. The instruments that were used in the present study were completed by the mothers of the participants.

Between-sample Heterogeneity

Owing to disparities in recruitment strategies across samples, the likelihood of developing antisocial behaviors or being exposed to poverty and harmful parenting behaviors differed between participants (Mills et al., 2011). Notably, the DPAS and Concordia Project samples are considered at higher risk for externalizing problems, including aggression. Moreover, the DPAS sample was screened to include individuals at greater risk for anxiety. In contrast, the SCS sample is a community sample that was recruited without using their exposure to risk factors as a selection criterion. As such, SCS participants are less likely to experience adjustment problems. This heterogeneity constitutes a potential advantage when it comes to the generalizability of our results, as the aggregated sample is more representative of the population than individual samples. However, adversity and adjustment problems within the DPAS and Concordia Project samples are likely to be higher, meaning these participants could disproportionately contribute to our findings. To ensure sample heterogeneity did not have an undue influence upon our results, we inspected sample differences and estimated measurement models using a multi-groups approach. These procedures are detailed in the analysis section.

Measures

The main challenge of integrative data analysis – the merging of data from several samples for analytical purposes – is to build appropriate measures for the aggregated sample while establishing measurement invariance across individual samples (Mills et al., 2011). This difficulty arises when measures differ from one sample to another. In the present study, antisocial behaviors and social problems were assessed with identical instruments across samples and timepoints. However, distinct measures were administered to measure parenting behaviors and children's temperament. Although integrative data analysis is challenging, this strategy was successfully executed in prior studies conducted by senior researchers involved in the current investigation (e.g., Hastings et al., 2011; Hastings et al., 2015; Mills et al., 2011).

When the measures did not overlap across samples, we developed parallel scales using items that reflected the same constructs, but were worded differently. In some instances, the items had dissimilar scales (3- 4- 5-point versus 7-point scales), prompting us to convert the values of the smaller scales into those of the larger scales. To preserve distributional properties, this conversion was conducted using graduated constants (0 = 1, 2 = 4, 3 = 7; 1 = 1, 2 = 2.5, 3 = 4, 4 = 5.5, 5 = 7; 0 = 1, 1 = 3, 2 = 5, and 3 = 7). Our decision to implement graduated constants rather than transformations (e.g., creating z-scores) was made in order to avoid alterations in data distributions that often ensue from transforming data. Avoiding such circumstances is crucial, as changes in data distributions sometimes modify relations amongst variables and impede the detection of developmental differences (e.g., Cudeck, 1989).

For parenting behaviors and temperament, we identified parallel items that had the potential to yield aggregated scales that were consistent across samples. The content of the items formed the basis for this preliminary selection. Following the identification of the candidate items, we consulted the descriptive statistics and scales of the items in an iterative process

designed to single out optimal sets of items. At this stage, the primary objective was to obtain reliability indexes as high as possible for the aggregated scales. These reliability indexes were computed for the integrated sample using data that was centered within each sample. Centering ensured maintained within-sample variances while controlling for the between-sample variance. This procedure enabled us to create subsets of items that appeared to represent the same constructs across samples, as reflected by acceptable internal consistency for the integrated sample. We tested this assumption more rigorously by performing multiple-group confirmatory factor analyses in which we included the original within-sample means, thereby assessing scale unidimensionality across samples. The steps are further detailed in the analysis section. The items selected for each scale are listed in Tables 3 to 8, with factor loadings for the aggregated sample. The reliability coefficients for the aggregated sample are reported in Table 9.

Children's Antisocial Behaviors and Temperament

The Child Behavior Checklist. The Child Behavior Checklist (CBCL) was available in all three samples. The CBCL comprises 113 items designed to detect emotional and behavioral difficulties in children and adolescents. Regarding the scales created for the aggregated sample, several CBCL items were selected as measures of emotional lability. Antisocial behaviors were reported via the CBCL version for 4 to 18 year olds (Achenbach & Rescorla, 2001). This instrument is particularly useful for studying the multidimensional nature of antisocial behaviors, as it encompasses items describing behaviors that almost perfectly overlap with those that served to meta-analytically validate Frick et al. (1993; also see Burt et al., 2016) multidimensional framework of antisocial behaviors (i.e., aggression, opposition, property violations, status offenses). Klahr and Burt (2014) recommend using the CBCL when examining subtypes of antisocial behaviors, as it is widely utilized in clinical practice with children. In addition, the

CBCL generally yields elevated reliability estimates, and demonstrates adequate construct, convergent and discriminant validity (e.g., Bingham, Loukas, Fitzgerald, & Zucker, 2003; Dedrick, Greenbaum, Friedman, & Whetherington, 1997; Grigorenko, Geiser, Slobodskaya, & Francis, 2010; Nakamura, Ebesutani, Bernstein, & Chorpita, 2009; Tehrani-Doost, Shahrivar, Pakbaz, Resaie, & Ahmadi, 2011). The aggression and rule-breaking subscales of the CBCL include a total of 35 items, most of which were selected to create scales assessing aggression, opposition, property violations, and status offenses. The content of these items as well as their factor loadings for the aggregated sample are reported in Table 2.

The Children's Behavior Questionnaire. Several items from the Children's Behavior Questionnaire (CBQ; Rothbart, Ahadi, Hershey, & Fisher, 2001) were used to measure children's temperament. The CBQ was administered to the SCS and DPAS samples, but was not available for participants of the Concordia Project. Completion of the CBQ is achieved by informants reporting whether the described reaction to a specific situation is typical of their child. Answers are provided using a 7-point scale ranging from 1 (extremely untrue) to 7 (extremely true). The CBQ possesses adequate to strong psychometric properties (e.g., Putnam & Rothbart, 2010; Lim & Bae, 2015), and appears to maintain the same factor structure across cultures (Sleddens, Kremers, Candel, De Vries, & Thijs, 2011).

The Emotionality, Activity, and Sociability Temperament Survey. Selected items from the Emotionality, Activity, and Sociability Temperament Survey (EAS; Buss & Plomin, 1984) were included to assess the emotional lability, shyness, and activity scales for the aggregated sample. The EAS was administered at Times 2 and 3 in the SCS sample, Time 2 in the DPAS sample, and Times 1 and 2 in the Concordia Project sample. The EAS is made of 20 items measured using a 5-point scale that indicates whether the behavior described is not

characteristic or typical (1) to very characteristic or typical (5) of a child. The EAS is considered reliable, with scores remaining relatively stable in young children (Bould, Joinson, Sterne, & Araya, 2013; Mathiesen & Tambs, 1999). Lastly, it demonstrates adequate to excellent structural, predictive, and concurrent validity (e.g., Boer & Westenberg, 1994; Spence, Owens, & Goodyer, 2013; Walker, Ammaturo, & Wright, 2017).

The Social Skills Rating System. The Social Skills Rating System (SSRS; Gresham & Elliott, 1990) provides a comprehensive assessment of social behaviors in children. The measure encompasses several items that were included in the scales created to evaluate temperament in the aggregated sample. The SSRS was completed by mothers at Times 2 and 3 in the SCS and DPAS samples, but solely at Time 3 in the Concordia Project sample. This instrument includes 39 items rated using a 3-point scale ranging from 0 (never) to 2 (very often). Psychometric studies have provided evidence of the reliability as well as the structural and convergent validity of the SSRS (e.g., Fagan & Fantuzzo, 1999; Flanagan, Alfonso, Primavera, Povall, & Higgins, 1996; Gamst-Klaussen, Rasmussen, Svartdal, & Strømgren, 2016; Gresham, Elliott, Vance, and Cook, 2011; Van der Oord et al., 2005; Walthall, Konold, & Pianta, 2005).

The Matson Evaluation of Social Skills with Youngsters. The Matson Evaluation of Social Skills with Youngsters (MESSY; Matson, Rotatori and Helsel, 1983) is a 64-item measure designed to assess social skills in 4 to 18 year olds. Socially appropriate and inappropriate behaviors were reported by mothers using a 5-point Likert scale with scores ranging from 1 (not at all) to 5 (very much). The MESSY was administered to the Concordia Project sample at Time 3, and several items were selected for inclusion in the shyness and emotional lability scales. It has strong scale score reliability, inter-rater reliability, and adequate convergent and divergent validity (Matson et al., 2010; Matson, Horowitz, Mahan, and Fodstad, 2013).

A summary of the items used to assess temperament across all three samples, together with the factors loadings obtained in the aggregated sample, are reported in Tables 6 (Time 1), 7 (Time 2) and 8 (Time 3).

Parenting Variables

Parenting Stress Index – Short Form. The Parenting Stress Index Short Form (PSI-SF; Abidin, 1995) assesses the stress experienced by parents owing to their own characteristics and those of their children. A handful of items (out of the 36 included in the questionnaire) from the PSI-SF were included in the scales we built to evaluate parenting behaviors in the aggregated sample. This questionnaire was administered at Times 1 and 3, but solely in the Concordia Project sample. These items are rated on a 5-point Likert scale, with scores of 1 (strongly agree) and 5 (strongly disagree) being indicative of strong agreement and disagreement, respectively. The PSI-SF is internally consistent and demonstrates adequate structural, convergent, and predictive validity (e.g., Barroso, Hungerford, Garcia, Graziano, & Bagner, 2016; Hasket, Ahern, Ward, & Allaire, 2006; McKelvey et al., 2009; Reitman, Currier, & Stickle, 2002).

Parenting Dimensions Inventory. The Parenting Dimensions Inventory (PDI; Slater & Power, 1987) is a self-report questionnaire comprising 36 items rated on a 6-point scale, with answers covering the continuum between *not at all like me* (1) to *exactly like me* (6). The PDI assesses several facets of parenting, including nurturance and control. In the Concordia Project sample, the PDI was administered at Times 1, 2, and 3. The PDI is internally consistent, with empirical evidence suggesting it has adequate construct, concurrent, and predictive validity (e.g., Ellenbogen & Hodgins, 2004, 2009; Slater, 1987). A prior study has demonstrated the concurrent and predictive validity of the PDI within the Concordia Project sample (Stack et al., 2012).

Parenting Styles and Dimensions Questionnaire. The Parenting Styles and Dimensions Questionnaire (PSDQ; Robinson, Mandleco, Olsen, & Hart, 2001) is a 32-item self-report questionnaire that assesses authoritative, authoritarian, and permissive parenting. Responses to these items range from 1 (never) to 5 (always). The PSDQ was administered in the SCS sample at each wave of data collection. Although the reliability and validity of the PSDQ have not been thoroughly studied yet (Tagliabue, Olivari, Bacchini, Affuso, & Confalonieri, 2014), it shows adequate internal consistency and appears to be structurally valid (e.g., Kern & Jonyniene, 2012; Lee & Brown, 2018; Morowatisharifabad et al., 2016), with available evidence supporting its convergent validity (Yaffe, 2018).

Parenting Scale. The Parenting Scale (PS; Arnold, O'Leary, Wolff, & Acker, 1993) is a 30-item instrument that assesses parental discipline. Items are rated on a 7-point scale with polar opposite answers being represented by scores at both extremes. For instance, when parents are asked to describe the promptness of their reaction to their children misbehaviors, the answer associated with a value of 1 is "I do something right away", whereas an answer of 7 reflects "I do something about it later". The PS was administered to the Concordia Project sample at Time 1. Several items from the PS were used to build the parenting variables in the aggregated sample. Extant research has established the structural, convergent and divergent validity of the PS, and suggests it has adequate to excellent scale score reliability (Arney, Rogers, Baghurst, Sawyer, & Prior, 2008; Reitman et al., 2001; Rhoades & O'Leary, 2007; Salari, Terreros, Sarkadi, 2012).

Child-Rearing Practices Report. The Child-Rearing Practices Report (CRPR; Block, 1965; Block, 1980) assesses the values, attitudes, and goals of parents as to the education of their children. It comprises 91 items relating various parenting practices, with parents indicating on a 7-point Likert scale whether various statements are least (coded 1) to most (coded 7) descriptive

of their parenting habits. This instrument was administered in the DPAS sample during the first wave of data collection. For the present study, specific items from this instrument were selected to create the parenting scales for the aggregated sample. The CRPR possesses strong psychometric properties that were established over at least two decades (Locke & Prinz, 2002).

Responses to Child Emotions Questionnaire. The Responses to Child Emotion Questionnaire (RCE; O'Neal & Magai, 2005) is a 15-item questionnaire that assesses the socialization strategies that are used by parents in response to their children's emotion. Items are rated using a 5-point scale ranging from 1 (never) to 5 (very often). The RCE was administered to the DPAS sample at Time 1. Several items from this scale were chosen to build the parenting measures for the current study. The RCE shows adequate to excellent internal consistency and appears to be structurally valid (Ersay, 2014). Although the psychometric properties of the RCE should be assessed more extensively, this instrument has been used in prior studies by the present team of researchers, consistently demonstrating its usefulness in predicting children's characteristics and behaviors (e.g., Hastings et al., 2011; Hastings et al., 2015; Mills et al., 2011).

A summary of the items used to assess parenting across all three samples, together with the factors loadings obtained in the aggregated sample, are reported in Tables 3 (Time 1), 4 (Time 2) and 5 (Time 3).

Analysis

Model Estimation and Missing Data

The analyses were conducted in *Mplus* 8.2 (Muthén & Muthén, 2018) using the Maximum Likelihood Robust estimator (MLR), which is robust to non-normality. To deal with missing data, we relied on Full Information Maximum Likelihood (FIML). By using FIML, we were able to estimate each model without relying on the suboptimal exclusion of participants

who had only taken part in a subset of data collection points. FIML has been shown to outperform most alternative techniques for handling missing data under Missing at Random (MAR) assumptions, allowing missing data to be conditioned on all variables included in the model, including the variables themselves at previous time points (Enders, 2010; Enders & Bandalos, 2001; Newman, 2003). The performance of FIML is comparable to that of multiple imputation (MI), while being more efficient (Enders, 2010; Graham, 2009). By reducing the biases created by missing data, FIML corrects for the systematic attrition that often occurs when conducting longitudinal studies (Asendorpf, van de Schoot, Denissen, & Hutteman, 2014). Because M.I is not recommended for mixture models such as LTA (Enders, 2010), FIML was implemented to handle attrition in the aggregated sample.

Preliminary Analyses

Validation of Scales via Confirmatory Factor Analyses

In the preliminary phase of the analyses, we validated the scales for the predictors and indicators in the SCS, DPAS, and CP samples using confirmatory factor analyses (CFAs) (e.g., Little, 2013). We evaluated the fit of the measurement models for the scales included in the present study by examining the Comparative Fit Index (CFI), The Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA) using previously validated interpretation guidelines (Hu & Bentler, 1999; Marsh, Hau, & Grayson, 2005). RMSEA values below .08 are indicative of an acceptable fit, whereas values smaller than .06 denote excellent fit. The CFI and TLI share their conventional thresholds, with values above .90 and .95 reflecting acceptable and excellent fit, respectively.

Following validation of the scales in the individual samples, we performed multi-group CFAs to gauge the ability of the items to function similarly in the SCS, DPAS, and CP samples,

as well as across timepoints (i.e., tests of measurement invariance; Millsap, 2011). Traditionally, these analyses are conducted by sequentially constraining elements of the measurement model to be equivalent across groups (and timepoints), starting with the configuration of the model (configural invariance), before also constraining the factor loadings (weak invariance), intercepts (strong invariance), uniquenesses (strict invariance), latent variances and covariances, and latent means to equality. However, due to the constraints associated with integrative data analysis, we derived latent variables using disparate items across samples and timepoints. Under these circumstances, invariance of these specific measurement parameters was not required nor anticipated (Bentler, 2004; Byrne, Shavelson, & Muthén, 1989; Mills et al., 2011; Putnick & Bornstein, 2016), and equivalent associations between the latent variables became the primary criterion for establishing the equivalence in the meaning of the estimated latent constructs (e.g., Mills et al., 2011). Assuming that this requirement is met, it is safe to conclude that the scales built for the aggregated sample reflect similar constructs across samples and timepoints (Nesselroade, Gerstorf, Hardy, & Ram, 2007). Because the scores for the subtypes of antisocial behaviors were derived using the same items across samples and timepoints, we evaluated the invariance of these scales conventionally, applying constraints sequentially to specific parts of the measurement models (Millsap, 2011). All multi-group models were compared using the RMSEA, CFI, and TLI to ensure that the inclusion of different sets of constraints did not substantially worsen model fit. Decreases of .01 or more in the CFI and TLI and increases of .015 or more in the RMSEA are considered reliable indicators of lack of invariance (Cheung & Rensvold, 2002; Chen, 2007). Given their oversensitivity to sample size and minor model misspecifications, chi-square tests of exact fit and chi square difference tests will be reported, but not interpreted (e.g., Brannick, 1995; Chen, 2007; Marsh et al., 2005).

Latent Profile Analyses

Latent Profiles Analyses (LPAs) were conducted to derive time-specific profiles of the participants. We used standardized ($M = 0$, $SD = 1$) scores for aggression, opposition, property violations, and status violations as indicators. At Time 1, the status violations scale was not included as an indicator, since frequencies for most of these behaviors were close to zero. This situation was anticipated, as such behaviors are rarely observed in children before middle childhood (Frick et al., 1993). Although LTA is generally conducted using an identical number of indicators and profiles across timepoints, it is flexible enough to accommodate models that do not match this description (Morin, McLarnon, & Litalien, 2020; Nylund-Gibson, Grimm, Quirk, & Furlong, 2014). The main consequence of not meeting this requirement is the inability to evaluate the similarity of the profiles for the timepoints concerned, as it does not apply to such cases. That being said, the same procedure should be followed to identify the most optimal solution at each timepoint. Following Nylund and colleagues' (2007) recommendations, we first estimated a one-profile solution, then sequentially increased the number of profiles until we reached a maximum of six. In these solutions, the means of profiles indicators were allowed to differ across profiles. Despite the advantages of estimating profiles in models allowing for the means and variances of the indicators to be freely estimated across profiles (Peugh & Fan, 2013), these alternative models converged on improper solutions or not at all, supporting the value of our more parsimonious models (Chen, Bollen, Paxton, Curran, & Kirby, 2001).

To ensure that these analyses did not converge on a local maximum, each model was estimated using 100 iterations of 5000 random sets of start values and retained the best 250 solutions for final optimization (McLachlan & Peel, 2000; Morin, McLarnon, & Litalien, 2020; Shireman, Steinley, & Brusco, 2016). To compare these alternative solutions, the Bayesian

Information Criterion (BIC; Schwartz, 1987), the Sample-Size Adjusted BIC (ABIC; Sclove, 1987), the Akaike Information Criterion (AIC; Akaike, 1987), and the Consistent AIC (CAIC; Bozdogan, 1987) were relied upon. Better-fitting solutions yield lower information criteria (IC) values. In addition to the IC, the Lo-Mendell-Rubin Adjusted Likelihood Ratio Test (LMR-LRT; Lo, Mendell, & Rubin, 2001) and Bootstrap Likelihood Ratio Test (BLRT; McLachlan & Peel, 2000) were consulted when comparing solutions. The BLRT and LMR-LRT compare a model with k profiles to a model with $k - 1$ profiles, with significant p-values signalling the least parsimonious model (k) should be retained (Nylund, et al., 2007). When selecting time-specific solutions, we prioritized those that were supported by the BIC, ABIC, CAIC, and BLRT, as results from several studies demonstrate their usefulness, but not that of the AIC and LMR-LRT (Diallo, Morin, & Lu, 2016, 2017; Nylund et al., 2007; Peugh & Fan, 2013; Tein, Coxe, & Cham, 2013; Tofighi & Enders, 2008). Because these indices remain heavily dependent on sample size, they often fail to clearly converge on an optimal solution (Marsh, Luedtke, Trautwein, & Morin, 2009). When this happens, recommendations are to use elbow plots (a graphical display of the value of the information criteria) (e.g., Morin et al., 2011). In these plots, the point at which the decrease in the value of these indices reaches a plateau can be used to suggest a possible optimal solution. In addition to these indices, model selection should also be guided by inspection of substantive meaning, theoretical conformity, and statistical adequacy of the profiles (Marsh et al., 2009; Muthén, 2003). Following the selection of the most optimal time-specific solutions, we converted the selected Time 2 and 3 solutions (based on the same indicators) into a longitudinal LPA to evaluate profile similarity across Times 2 and 3.

Tests of Profile Similarity

Profile similarity was assessed by implementing the sequential procedure described in Morin, Beyer, Creusier, and Biétry (2016). This analytical strategy was recently adapted for longitudinal data (Morin & Litalien, 2017), and was followed closely for the remainder of the present analyses. First, we ascertained whether the same number of profiles emerged at Times 2 and 3. This test of configural similarity was conducted by comparing the results of time-specific LPAs. When the same number of profiles is found at each timepoint, the time-specific solutions are turned into a single longitudinal LPA, and equality constraints are applied sequentially. Following the assessment of configural similarity, the means of the profile indicators were constrained to equality across timepoints, thereby allowing us to evaluate structural similarity. When structural similarity holds, the estimated profiles preserve the same shape over time. Next, we applied equality constraints to the variances of the profile indicators across Times 2 and 3, testing for dispersion similarity. Tests of dispersion similarity indicate whether the inter-individual differences between participants belonging to a particular profile are stable over time. Finally, we assessed distributional similarity by constraining the class probabilities to be equal over time, thereby revealing whether the size of the profiles remained identical across timepoints. These models were compared using the BIC, ABIC, and CAIC. When at least two of these indices are lower for the model with more constraints, similarity is supported (Morin et al., 2016). We also retained this selection criterion for the models estimated in the main analyses.

Main Analyses

Latent Transition Analyses

In accordance with the results of the longitudinal LPAs, the most similar (i.e., dispersion similarity in this study) model was retained for the next phase of the analyses. This model was converted into a Latent Transition Analysis (LTA; Collins & Lanza, 2009) by following the

manual three-step procedures outlined in Morin and Litalien (2017). This strategy solves difficulties related to shifts in profile definition or size that sometimes arise when models are turned into an LTA by relying on the starts values obtained from the final longitudinal LPA model and turning off the random start function. Although more complex procedures are required when distributional similarity holds, this was not the case in the present study. Importantly, this LTA solution incorporated the Time 1 profiles, in addition to those obtained at Time 2 and Time 3 as part of the dispersion similarity longitudinal LPA solution.

Integration of Control Variables and Predictors

Prior to entering the predictors, the demographic characteristics of the participants were incorporated into the LTA model as control variables. More precisely, we controlled for sex (0 = Boys; 1 = Girls), age, socioeconomic status, and occupational prestige. In order to evaluate the influence of the control variables on profile membership and transitions, we estimated and compared three different models, following the steps described in Morin and Litalien (2017). To begin, the effects of the control variables were freely estimated across Time 1 profiles and timepoints. Allowing for the effects of these variables to vary as a function of Time 1 profiles makes it possible to directly assess the extent to which these predictors influence specific profile-to-profile transitions over time. Subsequently, the effects of these control variables were freely estimated across timepoints, but were not allowed to vary as a function of Time 1 profiles. Finally, the interrelations between controls variables and profile membership were constrained to equality across Times 2 and 3. This last model assesses predictive similarity for the similarly defined profiles. When predictive similarity is supported, the effects of the control variables are considered to be equal across timepoints (Morin & Litalien, 2019). In addition to estimating these models, we estimated a null effects model in which the effects of the control variables on

profile membership were fixed to zero. By doing so, we were able to determine whether including the control variables improved model fit. We reproduced these steps when directly integrating the predictors into the LTA. The control variables and predictors were directly integrated to the model using a multinomial logistic regression link function.

Results

Descriptive Statistics and Bivariate Correlations

The descriptive statistics and bivariate correlation coefficients for the predictors and indicators are reported in Tables 10 and 11, respectively. On the whole, the bivariate associations were in the direction anticipated based on prior studies. Namely, subtypes of antisocial behaviors were moderately to highly related, with coefficients for concurrent associations ranging between .28 and .61. Along similar lines, positive parenting was negatively associated with antisocial behaviors, and such interrelations appeared to be stronger for aggression. Harsh and permissive parenting were positively associated with antisocial behaviors, but the strength of the associations remained relatively similar across subtypes. Regarding the measures of temperament, emotional lability maintained positive associations with antisocial behaviors, irrespective of subtypes. Higher activity levels were related to aggression, but were not associated with other forms of antisocial behaviors. Finally, no statistically significant associations emerged for shyness. This observation was not particularly surprising, as results suggesting that shyness protects children against engaging in antisocial behaviors are few and far between. While shyness was included in later analytical steps, it was excluded from the final analysis because it was not related to latent profiles.

Confirmatory Factor Analyses

The fit indices obtained as part of the CFA conducted on each scale are reported in Table 12. The factor loadings are included in Tables 3 to 8. For each measure, RMSEA, CFI, and TLI values were within acceptable range. These results support the factorial validity of the scales within the individual samples. Following the validation of the scales within the individual samples, we performed multi-groups CFAs to ensure that the measures captured similar underlying constructs across samples and timepoints. The fit indices associated with these models are reported in Table 13. The measures of antisocial behaviors proved to be fully equivalent across samples and time points. For the remaining measures, we observed no differences in the associations between the latent variables across samples or timepoints, with the models constraining these associations to equality consistently fitting the data better than those freely estimating them. Taken together, these findings suggest that our scales measured equivalent underlying constructs across samples, despite the inclusion of items that were worded differently or rated using scales of varying ranges.

Latent Profile Analyses and Tests of Profile Similarity

Table 14 includes the fit indices for the LPA models estimated at each timepoint, which are graphically displayed (elbow plots) in Figures 1 to 3. In 3 to 5 year olds, the fit indices clearly supported a solution that comprised 4 profiles. As reported in Table 14, the BIC, ABIC, and CAIC were at their lowest for the 4-profile solution, although the BLRT rather suggested a 5-profile solution. Nonetheless, we examined the 3-profile and 5-profile solutions to ensure the selected model yielded meaningfully distinct and decently sized profiles ($n \geq 20$ or 3.5% of the sample) when compared to adjacent solutions. Adding a fourth profile resulted in a substantial improvement, as the fourth subset was quantitatively and qualitatively distinct from the others, and comprised 10.3% of the sample. Entropy for this model was 0.95, signalling a solution with

a high level of classification accuracy (i.e., well-defined subsets; Wang, Deng, Bi, Ye, & Yang, 2017). In contrast, the inclusion of a fifth profile led to the division of the smallest profile (4.7%) into two smaller subsets that were not meaningfully different. For these reasons, the 4-profile solution was retained at Time 1.

At Times 2 and 3, the BIC, aBIC, and CAIC kept decreasing until the last solution, whereas the failed to converge on any specific solution. Examination of the elbow plots revealed a plateau at the 5-profile solution at Time 2, and two plateau at Time 3: One associated with the 3-profile solution, although another marked decrease also occurred after 5-profiles. It should be noted that the solutions comprising the same number of profiles were highly similar across Times 2 and 3, suggesting that configural similarity would likely be upheld at later steps. As such, we inspected the 3- 4- 5- and 6-profile models to determine which solution seemed most optimal at both timepoints, while keeping in mind the possibility of configural similarity. Ultimately, the only model that did not yield excessively small profiles (< 2%) or subsets that seemed to be distinguished solely upon negligible quantitative differences was the 3-profile solution. Accordingly, we retained this solution at Times 2 and 3. Afterwards, we merged the time-specific solutions into a single LTA, and conducted tests of profile similarity across Times 2 and 3.

The fit indices associated with these tests are reported in Table 14. The model of structural similarity yielded lower aBIC, BIC, and CAIC values than the configural similarity model, thereby suggesting that profiles for Times 2 and 3 had the same structure. Moreover, our results supported the dispersion similarity model, demonstrating that within-profile variability was identical across Time 2 and Time 3. In contrast, the distributional similarity model was related to higher fit indices values, indicating that the relative size of the profiles changed

between Times 2 and 3. On the basis of these results, the dispersion similarity model was retained for interpretations and for the next phase of the analyses. The latent profiles obtained at Time 1, as well as those obtained at Time 2 and 3 (i.e., dispersion similarity), are respectively illustrated in Figures 4 and 5.

When we considered the nature of the identified profiles at each time points, consistent with our third hypothesis, specialization was observed in preschoolers, but not at later developmental stages. Although the majority of 3 to 5-year olds (77.9%) belonged to a *normative* subset that rarely exhibited antisocial behaviors, 7.1% of children specialized in aggression (*aggression specialists*), and 10.3% primarily endorsed property violations (*property violations specialists*). In addition, a small subset of children (4.7%) displayed antisocial behaviors indiscriminately and at the highest rates, thereby belonging to the *severe generalists* profile. At Times 2 and 3, the analyses again yielded a large *normative* profile (Time 2: 59.0%, Time 3: 68.0%) and a *severe generalists* profile (Time 2: 8.5%, Time 3: 5.8%). Interestingly, the third subset (Time 2: 32.5%, Time 3: 26.1%) displayed moderate levels of opposition and covert antisocial behaviors, but was below average for aggressive behaviors. As the endorsement of three forms of antisocial behaviors hardly fits the definition of specialization, this subset was labelled *non-aggressive generalists*. In line with our second and fourth hypothesis, *normative* and *severe generalists* profiles arose at all timepoints, and were the largest and smallest subsets, respectively. After establishing these profiles, we converted the dispersion similarity model to a LTA to examine latent transitions.

Latent Transitions

To begin, we assessed whether belonging to a particular profile at Time 1 predicted membership at Time 3 over and above that observed at Time 2 (second-order effect). As reported

in Table 15, including a second-order effect improved model fit. In other words, profile membership during preschool directly predicted the patterns of antisocial behaviors exhibited by children 5 to 7 years later, in addition to predicting their pattern of antisocial behaviors exhibited 3 years later. The transition probabilities between adjacent timepoints are reported in Table 16. Unsurprisingly, the *normative* subset proved relatively stable over time, with only 40.3% transitioning into the *non-aggressive generalists* or *severe generalists* profiles between Times 1 and 2. Similarly, only 20.9% of those belonging to the *normative* subset at Time 2 transferred into the *non-aggressive generalists* or *severe generalists* profiles at Time 3, suggesting that the stability of this profile might increase with age. These results are consistent with our fifth hypothesis, which stated that most children belonging to the normative subset would remain in this profile from preschool to preadolescence. Because specialization profiles were unique to Time 1, the assessment of stability was not directly feasible for specialists. When referring to these subsets, stability is conceptualized as the endorsement of antisocial behaviors at later timepoints, with transitions towards the *non-aggressive generalists* or *severe generalists* subsets indicating increased versatility or severity in their antisocial behaviors. When transitioning to elementary school, 69.7% of *aggression specialists* and 63.1% of *property violations specialists* remained within antisocial subsets, partially supporting our hypothesis that preschoolers who favored aggressive behaviors were more likely to exhibit stable or worsening patterns of antisocial behaviors over time. It should nonetheless be noted that a greater percentage of *property violations specialists* moved to the *severe generalists* profile (24.5% versus 15.7% of *aggression specialists*) between Times 1 and 2. Lastly, *severe generalists* showed the most maladaptive transition patterns, with 66% and 92.6% of the subset belonging to the *non-aggressive generalists* or *severe generalists* profiles at Times 2 and 3, respectively. Such results

support our first and fifth hypothesis stating that children who exhibit severe and versatile antisocial behaviors would maintain elevated levels of behavioral problems over time.

While inspecting transition probabilities between adjacent timepoints is informative, the examination of transition probabilities between Times 1 and 3 profiles is more straightforward when assessing the persistence of antisocial behaviors from preschool to preadolescence. Accordingly, the transition probabilities between Times 1 and 3 are reported in Table 17. As anticipated, most preschoolers belonging to the *normative* subset at Time 1 were still in the *normative* subset at Time 3, with only 23.5% and 2.6% landing in the *non-aggressive generalists* and *severe generalists* subsets in preadolescence. Interestingly, 89.5% of *aggression specialists* – but only 40% *property violations specialists* – belonged to the antisocial profiles at Time 3. Finally, those who belonged to the *severe generalists* subset at Time 1 were more likely to land within the *non-aggressive generalists* (14.8%) or *severe generalists* (77.8%) subsets at Time 3. These results support our first and fifth hypotheses, as children belonging to the most versatile or aggressive profiles at Time 1 maintained moderate or severe levels of antisocial behaviors in much greater proportion than those who did not.

Control Variables Predicting Profile Membership

To ascertain whether demographic variables or sample membership should be entered as control variables in subsequent analyses, we included sample, biological sex, age, and family socioeconomic status as predictors of profile membership in the LTA model of dispersion similarity. The fit indices for the four models estimated while including these controls are detailed in Table 17. The null effects model yielded the lowest values for the information criteria, denoting a lack of association between the control variables and profile membership at each timepoint. None of the parameters estimates obtained in the other models reached statistical

significance, further supporting this conclusion. Consequently, we excluded these variables from the subsequent analyses.

Predictors of Profile Membership

An initial run of these analyses revealed that the inclusion of shyness decreased model fit, thereby revealing that it was not predictive of profile membership or transitions, and resulted in estimation difficulties (improper solutions). Thus, shyness was excluded from the final analyses. Table 16 includes the fit indices values associated with the final set of models (excluding shyness) that we estimated to assess the effects of parenting and temperament on profile membership and transitions. The results revealed that most predictors were associated with profile membership at one or several timepoints (i.e., the null effects model was not supported), but were not predictive of profile transitions. More precisely, the results supported the model of predictive similarity, which resulted in the lowest value on the information criteria. This model was thus retained for interpretation.

The logistic regression coefficients and odds ratios reflecting the associations of these predictors with profile membership are reported in Table 18. For the sake of brevity, we discuss the results most relevant to assessing the validity of our original hypotheses. At Time 1, participants who were exposed to more positive parenting behaviors were more likely to be in the *normative* subset relative to the *property violations specialists* subset, but not compared to the other profiles. There were no other statistically significant differences related to positive parenting at Time 1. This only partially supported our sixth hypothesis, as we expected positive parenting behaviors to be higher in parents of children who did not endorse antisocial behaviors when compared to those who did, regardless of the preference of the latter for certain subtypes of antisocial behaviors. In line with our seventh hypothesis, harsh parenting decreased the

likelihood of being in the *normative* and *property violations specialists* profiles when compared to the *severe generalists* subset, but no differences were observed between the latter and *aggression specialists*. Lastly, permissive parenting increased the likelihood of belonging to the *property violations specialists* subset relative to the *normative* profile.

Along similar lines, certain facets of temperament were predictive of profile membership in preschoolers. Notably, emotional lability increased the likelihood of belonging to the *aggression specialists* or *severe generalists* subsets when compared to the *normative* profile. Emotionally labile children were less likely to end up in the *property violation specialists* profile relative to the *severe generalists* subset, but no differences emerged between the latter and *aggression specialists*. Children who were more active were more likely to be found within the *severe generalists* profile when compared to the *normative*, *aggression specialists*, and *property violations specialists* subsets. No other statistically significant effects were found in relation to the levels of activity of the participants.

Inasmuch as predictive similarity was held across Times 2 and 3 for each predictor excluding emotional lability, the results described in the following sentences apply to both timepoints, unless otherwise stated. In line with our expectations, children who were exposed to more positive parenting were more likely to be in the *normative* or *non-aggressive generalists* subsets relative to the *severe generalists* profile. When parents showed higher levels of harsh parenting, children were less likely to belong to the *normative* profile in comparison to the *severe generalists* subset, but there was no difference between the latter and *non-aggressive generalists*. Finally, permissive parenting increased the likelihood of being in the *non-aggressive generalists* or *severe generalists* subsets when compared to the *normative* subset. However, it did not appear to differentiate the antisocial profiles.

Temperament was similarly predictive of profile membership at Times 2 and 3. More specifically, those displaying higher emotional lability were less likely to land into the *normative* or *non-aggressive generalists* profiles when compared the *severe generalists* subset. Such results support our eighth hypothesis, which claimed that children exhibiting severe and versatile antisocial behaviors would display greater emotional lability than their peers throughout childhood. Lastly, activity levels were not associated with profile membership at Times 2 and 3.

Discussion

The primary objective of our study was to determine whether specialized and versatile patterns of antisocial behaviors emerged in children, with intra-individual proclivities towards certain subtypes of antisocial behaviors predicting the persistence and transience of behavioral problems from preschool to preadolescence. Consistent with several of our hypotheses, specialization was fairly common in preschoolers, whereas versatility was predominantly found at later developmental periods. More importantly, the subsets that arose at the first wave of data collection showed vastly disparate rates of persistence over time. For instance, a staggering 89.5% of *aggression specialists* became *moderate* or *severe generalists* by preadolescence, compared to only 28.4% of *property violations specialists*. In other words, destructive behaviors directed towards others (aggression) promoted the persistence of antisocial behaviors, while destructive behaviors that targeted objects (property violations) predicted desistance. In addition, the analyses that comprised the covariates revealed that parenting behaviors and child temperament distinguished the antisocial and normative subsets at all timepoints. Moreover, *severe generalists* experienced lower levels of positive parenting and higher levels of harsh parenting, and exhibited more emotional lability than other subsets. These results strengthen the theoretical validity of the latent profiles derived with the aggregated sample, as the observed

relationships are consistent with prior findings. It should nevertheless be noted that none of the predictors were associated with transitions probabilities, suggesting that parenting and child temperament are better indicators of current antisocial behaviors than of eventual changes in their frequency or expression. Taken together, these findings address the shortcomings of prior developmental research by showing that specialization occurs in children, thereby highlighting new avenues of research with the potential to enhance our understanding of the persistence and transience of antisocial behaviors in children.

Interrelations with Past Developmental Studies and Novelty of the Results

The implementation of latent transition analysis was instrumental in making these contributions, as it enabled us to capture antisocial behavioral patterns at several developmental stages, mapping out changes in their nature and prevalence as children advanced in years. As expected, the *normative* and *severe generalists* profiles emerged at each timepoint, representing the largest and smallest subsets, respectively. These results are consistent with those of studies suggesting that most children do not exhibit antisocial behaviors, while a minority of individual displays severe and versatile antisocial behaviors throughout their lives (Côté et al., 2001; Di Giunta et al., 2010; Maughan et al., 2000; Miller et al., 2010). Although there is a substantial overlap between our results and those of past developmental studies, the present study was the first to formally investigate the possibility that distinct subsets of children endorse varying combinations of antisocial behaviors, with their inclinations fluctuating in frequency and versatility as time goes on. This innovative direction allowed us to build upon earlier findings by demonstrating that specialization morphs into versatility when children with antisocial behaviors begin elementary school. Such results are in line with claims that versatility is ubiquitous amongst individuals with antisocial behaviors, whereas specialization occurs only at certain

periods of life (Armstrong, 2008; Yonai et al., 2010; Piquero et al., 1999). In other words, the inferences made using older samples appear to apply to children as well. Future studies should investigate the developmental processes that underlie the time-specificity of specialization and transitions towards versatility, as several interpretations are tenable from a theoretical standpoint.

The Time-Specificity of Specialization and Constancy of Versatility

For most children, the beginning of elementary school is associated with exposure to a variety of novel experiences. This includes more frequent interactions with peers of their age, which typically leads to friendships. Insofar as children with antisocial behaviors are concerned, these social interactions often become learning spaces that facilitate the acquisition of various forms of antisocial behaviors, fostering increases in both severity and versatility (Boxer et al., 2005; Dishion & Tipsord, 2011; Pettit, 1997; Snyder et al., 2012; Werner & Crick, 2004). Given that preschoolers are not as likely to encounter others on a daily basis or in much the same ways as older children, it is more difficult for them to acquire such behaviors, unless their family member manifest antisocial behaviors. More importantly, Thomas (2016) showed that increased contact with peers pushes individuals towards adopting more versatile patterns of antisocial behaviors, whereas isolation promotes specialization. Taken together, these results suggest that peer influence at least partially explains the time-specificity of specialization and transitions towards versatility. It should nonetheless be noted that many preschoolers attend daycare, pre-kindergarten, and kindergarten, thereby encountering their peers on a daily basis, signalling that other developmental processes are likely at play (e.g., negative interactions with parents, bad influence of siblings, differences in cognitive functioning).

In a compelling review of the developmental trajectories of disruptive behavior problems, Tremblay (2010) argued that rule-breaking, which comprises both property violations and status

offenses, is relatively rare in children due to developmental requirements that have not been met. Namely, the execution of covert antisocial behaviors requires higher cognitive control than that of overt antisocial behaviors. This pre-requisite is reflected in the tendency of these behaviors to emerge – on average – 1 to 3 years after the beginning of elementary school, whereas overt antisocial behaviors are already prevalent during preschool (Frick et al., 1993). Typically, children gradually hone their cognitive control as part of their normative development (Diamond, 2013; Prencipe et al., 2011), signalling that younger children are less likely to engage in covert antisocial behaviors due to lower cognitive capabilities. From this perspective, specialization seems to occur by "default" in preschoolers with antisocial behaviors, as most of them do not possess the cognitive (and likely physical) capabilities to engage in versatile patterns of antisocial behaviors. Accordingly, the higher prevalence of specialization we observed in preschoolers conceivably reflects this lack of cognitive maturity. As time goes by, *property violations specialists* and *aggression specialists* should achieve greater cognitive control, allowing them to become more versatile in their displays of antisocial behaviors. However, this interpretation is not without shortcomings, as it does not constitute a tenable explanation for the presence of a *severe generalists* subset at Time 1. This claim is based upon results revealing that individuals with elevated and stable levels of antisocial behaviors exhibit more cognitive deficits than their peers (Moffitt, 2006; Oliver, Barker, Mandy, Skuse, & Maughan, 2011; Piquero & White, 2003; Raine, Yaralian, Reynolds, Venables, & Mednick, 2002), sometimes as early as the age of 3 years old (Raine et al., 2002). Such conclusions indicate that gains in cognitive control cannot by themselves account for versatility. Individual variations in the number of contextual opportunities available to engage in various forms of antisocial behaviors likely constitutes a

stronger explanation for the fluctuations in the prevalence of specialization and versatility throughout childhood.

Historically, criminological theorists have framed specialization as a by-product of constraints within the environment of offenders (Colvin & Pauly, 1983; Cornish & Clarke, 1986; DeLisi et al., 2011). Namely, several researchers have argued that changes in routine are responsible for intra-individual shifts between specialization and versatility (Laub & Sampson, 2003; Farrington, 2005; Osgood et al., 1996; Warr, 1998; Wright & Cullen, 2004). Along these lines, McGloin and colleagues (2007) showed that life changes leading to routines that limit offending opportunities (e.g., getting married) are associated with decreases in offense versatility, suggesting that surges in contextual opportunities promote versatility. To our knowledge, the scientific community has not yet examined this phenomenon in children. That being said, the beginning of elementary school undoubtedly alters children's routines, potentially providing them with novel opportunities to engage in various forms of antisocial behaviors. For instance, examinations and participation in academic and athletic competitions create opportunities for cheating, whereas increased exposure to objects that one covets but does not own likely motivates stealing. Corresponding opportunities are scarce for preschoolers, who either remain at home or spend most of their days in environments that are more heavily supervised than schools and generally organize children into smaller groups. This indicates that lack of opportunities to engage in certain norm-violating behaviors potentially underlies the prevalence of specialization amongst preschoolers with antisocial behaviors. Assuming these constraints are relaxed following regular attendance to elementary school, pupils should be prone to versatility, as was the case in the current sample. Since these assumptions are extrapolated from criminological research, future developmental studies must assess whether alterations in

routine truly engender shifts between specialization and versatility from preschool to preadolescence.

Severe Generalists, Temperament, and Exposure to Greater Adversity

Given that 4.7% of preschoolers exhibited severe and versatile antisocial behaviors, this interpretation has similar limitations as those previously stated. However, the results of several studies suggest that *severe generalists* are not necessarily submitted to as many environmental constraints as other preschoolers. Starting from an exceedingly early age, individuals displaying stable and severe antisocial behaviors experience significantly more adversity than their peers (Craig, Piquero, Farrington, & Ttofi, 2017; Fox, Perez, Cass, Baglivio, & Epps, 2015). These negative circumstances are characterized by parental antisocial behaviors, poor supervision, child maltreatment, and family dysfunction (Campbell et al., 2010; Ehrensaft et al., 2003; Fairchild, van Goozen, Calder, & Goodyer, 2013; Nagin & Tremblay, 2001; Tremblay et al., 2004; Veenstra, Lindenberg, Verhulst, & Ormel, 2009). In other words, some preschoolers – perhaps including *severe generalists* – are raised in contexts conducive to versatility owing to a lack of structure and disciplinary measures as well as exposure to role models that endorse various forms of norm-violating behaviors. It should nonetheless be noted that developmental and criminological research strongly suggest that individual characteristics are the primary driver of severity and versatility.

When Gottfredson and Hirschi (1986, 1990) argued for the ubiquity of versatility amongst offenders, self-control was described as the main factor underlying antisocial behaviors. As mentioned earlier, the inverse relation between self-control and versatility is well established in developmental and criminological research, and appears to arise consistently from childhood to adulthood (e.g., DeLisi, 2013; Fergusson et al., 2013; Moffitt et al., 2011; Pratt & Cullen,

2000; Vaughn, et al., 2009). In the present study, we assessed children's emotional lability as an indicator of their ability (or the lack thereof) to control their emotions, thereby indirectly capturing their capacity for self-control. Our analyses revealed that *severe generalists* exhibited higher levels of emotional lability when compared to other participants, regardless of the developmental period under scrutiny. Moreover, *severe generalists* were more active than other subsets of preschoolers, suggesting these children had relatively difficult temperaments compared to their peers. These results are consistent with studies showing that chronic and severe antisocial behaviors are related to neuropsychological deficits that foster difficult temperaments in young children (Baglivio, Wolff, DeLisi, Vaughn, & Piquero, 2016; Caspi, Moffitt, Newman, & Silva, 1996; DeLisi & Vaughn, 2014; Lahey et al., 2008; van Goozen, 2015). As it happens, *severe generalists* exhibited the highest propensity for persistence and emotional lability, lending further credence to the possibility that lack of self-control drove versatility in preschoolers. While we discussed developmental maturity, contextual opportunities, and variations in individual characteristics as isolated contributors to specialization and versatility, these factors likely work in unison to promote the development of childhood antisocial behaviors. Researchers attempting to replicate the results of the current study should investigate these determinants simultaneously as a means to evaluate their relative contributions and joint effects upon specialization and versatility throughout childhood.

Persistence and Desistance throughout Childhood

Identifying the factors and processes that underlie changes and transitions between specialization and versatility seems particularly critical when considering the transitions probabilities that we observed in the present sample. As anticipated, most participants belonged to the *normative* subset consistently throughout childhood. Similarly, *aggression specialists* and

severe generalists displayed elevated rates of stability, defined in the present study as the continued endorsement of antisocial behaviors from preschool to preadolescence. In contrast, 60% of *property violations specialists* had desisted entirely from antisocial behaviors by Time 3. This wide disparity in the transition probabilities of the specialization profiles is particularly striking when comparing the (in)stability of antisocial behaviors at the two transition points. Namely, the rates of persistence of *aggression specialists* and *property violations specialists* were extremely similar as children transitioned to elementary school. That is, most *property violations specialists* desisted sometimes between the age of 8 to 10 rather than over the first years of elementary school. Taken together, these results suggest that aggression and versatility are stronger predictors of the persistence of antisocial behaviors than inclinations towards property violations, at least as far as children are concerned.

Aggression as the Primary Driver of Persistence

While such findings are in line with our hypotheses, the persistence rates of *aggression specialists* and *severe generalists* were strikingly similar. In samples of offenders, versatility appears to be associated with higher rates of recidivism (Yonai et al., 2013), thereby suggesting that generalists are more likely to engage in persistent antisocial behaviors. However, the adoption of severe forms of antisocial behaviors (i.e., violence/aggression) is endemic amongst versatile offenders (McGloin et al., 2007; Monahan & Piquero, 2009; Piquero et al., 2007), signalling that versatility potentially acts as a proxy for the stabilizing effects of aggressive behaviors. As mentioned earlier, childhood aggressive behaviors are important precursors of later antisocial behaviors (Bergman & Andershed, 2009; Huesmann, Eron, & Dubow, 2002; Huesmann.et al., 2009; Hyde et al., 2015). This is not particularly surprising, as aggression is highly stable (Côté et al., 2007; Kokko et al., 2009; Piquero et al., 2012; Tremblay, 2000), and

should thereby foster the persistence of antisocial behaviors. From a practical standpoint, identifying the primary behavioral marker (i.e., aggression versus versatility) of persistent antisocial behaviors is not essential, as such results indicate that *aggression specialists* and *severe generalists* rarely qualify as desisters between preschool and preadolescence, and should be targeted by prevention and intervention measures. Be that as it may, answering this quandary should narrow the scope for studies geared towards establishing effective interventions. By comparing the rates of persistence of *non-aggressive generalists* and *severe generalists* over longer periods of time, researchers should be able to formulate preliminary conclusions as regards the potential of versatility as a catalyst for the persistence of antisocial behaviors. Our results do not enable us to draw such conclusions, as the rates of persistence of the aforementioned subsets – which are primarily distinguished by the presence or absence of aggression – are similar between Times 2 and 3, but potentially differ at developmental stages that are not covered by the present study.

Differences in the Persistence Rates of Specialized Subsets

In contrast to the similarities between *aggression specialists* and *severe generalists*, the disparities between specialization profiles could not have been anticipated based on prior studies. To our knowledge, specialization profiles have never been identified in preschoolers until now. The transitions probabilities of both subsets revealed that 60% of *property violations specialists* desisted from antisocial behaviors by preadolescence, whereas only 10% of *aggression specialists* qualified as desisters. The (in)stability of both subtypes constitutes the simplest explanation for the differences hereby observed. More specifically, it is believed that aggression crystallizes sometimes between the age of 8 and 10 (Clarizio, 1997; Eron, 1990; Shaw, Hyde, & Brennan, 2012), proving relatively resistant to interventions after the first years of elementary

school (Bjorklund & Hawley, 2014; Cook et al., 2008; Rose & Swenson, 2009). In contrast, rule-breaking (i.e., property violations and status offenses) is only moderately stable (Burt, 2012; Moffitt, 2003; Stanger, Achenbach, & Verhulst, 1997). The rates of persistence of the specialization profiles are consistent with these results, as children specializing in relatively transient forms of antisocial behaviors were not as persistent as those exhibiting aggressive behaviors. By highlighting these differences, the present investigation made strides towards refining our ability to differentiate eventual desisters from eventual persisters quite early in their development. This contribution is by no means negligible, as preschoolers benefit the most from interventions targeting antisocial behaviors (Garcia, Rouchy, Soulet, Meyer, & Michel, 2019), but do not always receive such services due to the financial constraints faced by the organizations in charge of them. Inasmuch as practitioners are obligated to prioritize certain individual over others, developing accessible scientifically based tools to pinpoint those with worse prognoses remains necessary. In order to gain deeper insights into the processes that underlie the persistence and transience of antisocial behaviors in children, the scientific community should strive to identify the factors that differentiate the specialized subsets as many determinants are likely involved in propelling children towards specific patterns of antisocial behaviors.

Notably, the heritability estimates associated with distinct subtypes of antisocial behaviors are important to consider when investigating the persistence of antisocial behaviors. On the whole, behavioral genetics studies indicate that antisocial behaviors are highly heritable (Baker, Jacobson, Raine, Lozano, & Bezdjian, 2007; Mason & Frick, 1994; Niv, Tuvblad, Raine, & Baker, 2013; Porsch et al., 2016), with meta-analytic results revealing that aggression yields stronger heritability estimates than rule-breaking (Burt, 2009). These results suggest that

environmental factors play a greater role in the development of rule-breaking than in the development of aggressive behaviors. More importantly, these subtypes of antisocial behaviors do not share much of their genetic variance (Burt, 2013), signalling that disparate genetics factors are involved in their development. The aforementioned etiological disparities are likely reflected through inherited differences in cognitive, behavioral, and emotional characteristics, which propel children towards adopting specific forms of antisocial behaviors. In line with this notion, *aggression specialists* and *severe generalists* displayed higher levels of emotional lability than other subsets, the latter maintaining this trait throughout childhood. As lack of self-control is related to the persistence of antisocial behaviors and is highly heritable (Pulkkinen et al., 2009; Vazsonyi & Huang, 2010; Veenstra et al., 2009), it follows that these subsets were not as likely to desist as *property violations specialists*.

Various factors that were not assessed in the present sample should be studied as potential distinguishing characteristics between the specialization subsets. Notably, individual variations in cognitive control likely differentiate *aggression specialists* from *property violations specialists*. This inference is based upon results revealing that executive functions and verbal IQ are negatively associated with aggression, but positively related to theft (Barker et al., 2007; Barker et al., 2011), the latter belonging to the property violations cluster. Such findings suggest that *property violations specialists* potentially possess stronger cognitive abilities than *aggression specialists*. Seeing as individuals with higher cognitive abilities are less likely to engage in persistent antisocial behaviors (Ge, Donnellan, & Wenk, 2001; Piquero & White, 2003; Raine et al., 2005), individual variations in cognitive functioning provide a plausible explanation for differences in the rates of persistence of the specialization subsets. As means to identify pathways towards persistence and desistance, future studies should investigate cognitive

functioning and other individual characteristics (e.g., impulsivity, callous-unemotional traits, sensation-seeking) as potential differentiators of *aggression specialists* and *property violations specialists*.

Undoubtedly, identifying the predictors associated with the persistence and transience of antisocial behaviors remains essential when it comes to refining our comprehension of these phenomena. Nevertheless, framing the correlates of antisocial behaviors as predictors disregards the potential dynamicity of the associations being investigated. As underscored by the developmental psychopathology framework (Calkins & Keane, 2009; Hinshaw & Beauchaine, 2015; Cicchetti & Rogosch, 1996), the individual characteristics presented by children are often involved in transactional processes with environmental factors. For example, children with difficult temperaments and antisocial behaviors generally elicit negative reactions from their parents, teachers, and peers, creating adverse social environments that exacerbate behavioral problems (e.g., Burke, Pardini, & Loeber, 2008; Chen, Drabick, & Burgers, 2015; Larsson, Viding, Rijsdijk, & Plomin, 2008; Leflot, van Lier, Verschueren, Onghena, & Colpin, 2011; Lengua & Kovacs, 2005; Olson & Lunkenheimer, 2009; Pardini et al., 2008; Stoltz, Cillessen, van den Berg, & Gommans, 2016). Although *property violations specialists* frequently engaged in antisocial behaviors, their temperament did not significantly differ from that observed for the *normative* subset. In contrast, *aggression specialists* exhibited higher rates of emotional lability than *property violation specialists* and those belonging to the *normative* profile. These results suggest that *aggression specialists* possess relatively challenging temperaments, whereas *property violations specialists* do not. Accordingly, the former likely prompt frequent negative reactions from their social environments, triggering the transactional processes implicated in the persistence of antisocial behaviors. Owing to their relatively leveled temperaments, such

difficulties should not be as prevalent amongst *property violations specialists*. This conclusion is partially supported by our results revealing that *aggression specialists* and *severe generalists* experienced higher levels of harsh parenting than *property violations specialists*, the latter not differing from the *normative* subset in their levels of exposure to negative parenting behaviors.

Taken together, these results suggest that disparities in the rates of persistence of the specialization subsets occur as a result of dissimilarities in their individual characteristics as well as in their exposure to negative, harsh, or coercive parenting. As we did not investigate transactional processes, we cannot exclude the possibility that *property violations specialists* prompt maladaptive parenting practices or disciplinary responses in their parents. However, this issue was beyond the scope of the present investigation. Therefore, future studies should examine the transactional processes between antisocial behavioral profiles and parenting behaviors. In doing so, researchers will perhaps identify transactional processes unique to a particular profile, thereby paving the way for novel interventions that may break the chain of events leading to the stabilization of antisocial behaviors.

Theoretical Validity: Parenting Behaviors and Children's Temperament as Predictors

In the earlier sections, we highlighted the theoretical validity of the latent profiles by relating the results of the present study to available developmental research. Notably, we discussed the higher levels of emotional lability observed in *severe generalists* throughout childhood, and their relation to the versatility and persistence of antisocial behaviors. Along similar lines, we argued that the differences found between the specialization subsets in terms of harsh parenting and emotional lability were consistent with results suggesting that these factors underlie persistent antisocial behaviors (e.g., Honomichl & Donnellan, 2011; Kawabata et al., 2011; van Goozen, 2015). More importantly, most of our hypotheses pertaining to the effects of

the factors upon profile membership were supported by our results. As an illustration, positive parenting reduced the likelihood of belonging to antisocial subsets throughout childhood, whereas permissive and harsh parenting behaviors, emotional lability, and elevated activity levels increased the likelihood of belonging to these profiles. The only factor that was not associated with the latent profiles was shyness. However, only one study has assessed the potential of shyness as a protective factor against the development of antisocial behaviors (i.e., Acar et al., 2018). More studies are required to clearly define the interrelation between this factor and antisocial behaviors. Interestingly, *severe generalists* were more likely to be exposed to harsh parenting when compared to *property violations specialists* at Time 1, and to *non-aggressive generalists* at Times 2 and 3. When compared to other subsets with antisocial behaviors, *severe generalists* consistently showed the highest likelihood of exhibiting difficult temperamental characteristics. Such results are in line with studies revealing that individuals displaying the highest and most stable levels of antisocial behaviors are not necessarily exposed to a greater number of risk factors than those with milder behavioral problems, but are forced to contend with them to a higher degree than others (Assink et al., 2015; Fairchild et al., 2013). Taken together, these findings strongly support the theoretical validity of the profiles that were found in the present study, thereby suggesting that these subsets capture meaningful differences that likely exist in the population.

Strengths and Limitations

By using a prospective longitudinal design, the present study generated new insights into the development and persistence of antisocial behaviors during childhood. Notably, we were able to identify shifts in the prevalence of specialization and versatility over time. Moreover, marked disparities in intra-individual transitions seemed to arise as a function of the antisocial behavioral

patterns that children exhibited between the age of 3 and 5. To our knowledge, prior studies have not investigated such patterns of associations in children, making our results unique. The ability to capture inter-individual differences in intra-individual changes is amongst the greatest strengths of longitudinal research (Baltes & Nesselroade, 1979), as highlighted by the current investigation. Along similar lines, the strategy chosen to analyze the data was consistent with the recommendations of criminological researchers. For instance, we operationalized antisocial behaviors as subsets (or profiles) and conducted a latent transition analysis as means to investigate specialization and versatility. Both strategies are recommended to ensure appropriate conditions are reached to uncover specialization were it to occur. Following these guidelines improves the likelihood of obtaining trustworthy results, as it safeguards against biases that facilitate the detection of versatility, but hinder the detection of specialization (Eker & Mus, 2016; McGloin et al., 2009). Finally, integrative data analysis possesses several advantages, such as increased statistical power and higher heterogeneity in the demographic characteristics of the aggregated sample (Curran & Hussong, 2009), which likely improves the generazibility of our findings.

Alongside its strengths and compelling contributions, the present study is not exempt of limitations. First and foremost, the scales of the predictors had to be created using items taken from separate measures across samples and timepoints. These parallel items were matched on content, but were usually worded differently. Moreover, the response scales were dissimilar across samples. Under those circumstances, measurement imprecision for the predictors was likely greater than it would have been if identical instruments were available across samples and times (Curran & Hussong, 2009; Mills et al., 2011). However, scale score reliability was adequate for each construct, and preliminary analyses were conducted to assess whether these

scales measured similar constructs across samples and timepoints. The present team of researchers successfully applied these procedures when conducting past research (Hastings et al., 2011; Hastings et al., 2015; Mills et al., 2011), demonstrating the validity of this course of action. These preventive steps likely mitigated the repercussions of measurement heterogeneity upon our findings, but we cannot discard the possibility that our results underestimated the associations between the predictors and profile membership. As our conclusions proved consistent with the results of available studies, this does not appear to be a major concern. That being said, the lack of identical measures across samples precluded the creation of scales that contained more than 5 items, thereby narrowing the scope of our predictors. In order to overcome this limitation, future studies should include comprehensive assessments of the aforementioned covariates. Finally, the present study included reports from mothers, but not from other informants, a shortcoming that often contributes to increasing the similarity of scores across instruments. Although this limitation cannot by itself account for our findings, future studies should replicate these results using reports from multiple informants. Past research suggests that informants capture distinct facets of antisocial behaviors (Burt et al., 2016; Goodman, De Los Reyes, & Bradshaw, 2010), further highlighting the value of including teacher, father and children's (self) reports, alongside those of mothers.

Conclusion

In occidental countries, the dire consequences associated with persistent antisocial behaviors strongly affect the perpetrators, the victims, and their families. More often than not, delinquency and criminality are predated by childhood antisocial behaviors, highlighting them as strong precursors of later behavioral problems. In order to minimize the prevalence of persistent antisocial behaviors in the population, we must elaborate scientifically-based screening tools that

allow practitioners to reliably identify children who are most likely to exhibit chronic behavioral problems. Adopting analytical strategies and theoretical assumptions that were previously developed for and applied to adolescent and adult samples, we found that specialized and versatile patterns of antisocial behaviors as observed during the preschool years were related to vastly different rates of persistence throughout childhood. These results shed new light on the behaviors that potentially underlie the developmental trajectories of antisocial behaviors. By underscoring disparities in the persistence rates of the specialization profiles, the current investigation also took vital steps towards improving our ability to make accurate prognoses for children with behavioral problems. This key contribution has laid the foundations for studies highlighting the differences between *aggression specialists* and *property violations specialists*, thereby assisting future endeavors in generating results with the potential to yield novel insights into the persistence and transience of antisocial behaviors in early starters.

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Table 1

Demographic Characteristics for the Individual and Aggregated Samples.

	SCS Sample (n=257)		**DPAS Sample** (n=134)		**Concordia Project Sample** (n=175)		**Aggregated Sample** (n=566)	
Characteristics	Percentage or *M*	N or *SD*	Percentage or *M*	N or *SD*	Percentage or *M*	N or *SD*	Percentage or *M*	N or *SD*
Child Age								
Time 1	4.64	.48	4.67	.83	3.62	.61	4.51	.71
Time 2	7.12	.29	7.34	.99	5.89	.94	6.76	.95
Time 3	10.96	.40	10.75	.80	10.71	.87	10.83	.87
Child Gender								
Boys	54.4%	140	45.9%	62	48.4%	85	50.6%	286
Girls	45.6%	117	54.1%	72	51.6%	90	49.4%	280
Maternal Education								
Below High School	0.4%	1	-	-	27.0%	47	7.0%	40
Completed High School	15.4%	40	12.0%	16	39.7%	69	20.6%	117
Community College	48.1%	124	26.3%	35	24.6%	44	36.4%	205
Undergraduate Degree	32.8%	84	42.1%	57	7.9%	14	29.0%	164
Graduate Degree	3.3%	8	19.5%	26	0.8%	1	7.0%	40
Annual Family Income ($)								
0–10000	0.9%	2	-	-	7.1%	12	2.3%	13
10001–20000	8.6%	22	6.2%	8	16.7%	29	10.1%	57
20001–30000	7.3%	19	4.7%	6	15.9%	28	8.8%	50
30001–40000	10.3%	26	9.3%	13	10.3%	18	10.1%	57
40001–60000	26.3%	68	17.8%	24	28.6%	50	24.6%	139
60001–74999	14.2%	37	14.0%	19	12.7%	23	13.8%	78
75000 or more	32.3%	83	48.1%	64	8.7%	15	30.4%	172

Note. SCS = The Shame in Childhood Study, DPAS = The Daycare and Preschool Adjustment Study.

Table 2

Items Selected to Create the Clusters of Antisocial Behaviors for the Aggregated Sample, with Time-Specific Factor Loadings.

Clusters	**Child Behavior Checklist Items**	**Loadings (*S.E*)**		
		Time 1	Time 2	Time 3
Aggression	Cruelty, bullying, or meanness to others	.676 (.052)	.832 (.045)	.834 (.057)
	Gets in many fights	.766 (.034)	.736 (.064)	.860 (.042)
	Physically attack people	.850 (.055)	.819 (.046)	.837 (.054)
	Threatens people	.813 (.042)	.786 (.069)	.909 (.051)
Opposition	Argues a lot	.799 (.030)	.664 (.044)	.726 (.044)
	Disobedient at home	.824 (.036)	.808 (.042)	.818 (.046)
	Disobedient at school	-	.733 (.045)	.814 (.038)
	Stubborn, sullen, or irritable	.822 (.033)	.778 (.046)	.841 (.032)
	Sulks a lot	.731 (.031)	.614 (.053)	.708 (.051)
	Teases a lot	.819 (.031)	.484 (.050)	.746 (.055)
	Temper tantrums or hot temper	.740 (.045)	.610 (.052)	.893 (.038)
Property Violations	Cruel to animals	.551 (.053)	.815 (.088)	.471 (.089)
	Destroys his/her own things	.619 (.059)	.902 (.032)	.888 (.047)
	Destroys things belonging to his/her family or others	.802 (.079)	.871 (.046)	.932 (.042)
	Steals at home	.830 (.040)	.881 (.057)	.848 (.075)
	Steals outside the home	.866 (.041)	.956 (.042)	.737 (.090)
Status Offenses	Breaks rules at home, school, or elsewhere	-	.845 (.033)	.757 (.042)
	Lying or cheating	-	.838 (.041)	.840 (.052)
	Swearing or obscene language	-	.651 (.050)	.715 (.041)
	Truancy, skips school	-	.877 (.054)	.830 (.057)

Note. *S.E.* = Standard Error.

Table 3

Instruments and Items Selected to Create the Parenting Scales for the Aggregated Sample at Time 1, with Factor Loadings.

Parenting Variables	Sample			Loadings
	SCS	**DPAS**	**CLRP**	
Positive	**1.** I have warm and intimate times together with my child.[a]	**1.** I have warm and intimate times together with my child.[a]	**1**. I expected to have closer and warmer feelings for my child (**R**).[d]	.742 (.103)
	2. I give comfort and understanding when my child is upset.[a]	**2.** I give comfort and understanding when my child is upset.[a]	**2.** I often have the feeling I cannot handle things very well (**R).**[d]	.623 (.101)
	3. I give my child reasons for rules, talk it over when s/he misbehaves.[a]	**3.** I give my child reasons for rules, talk it over when s/he misbehaves.[a]	**3.** Talk to the child (e.g., discuss reasons for limits or demands).[e]	.417 (.077)
Harsh	**1.** Yells or shouts when child misbehaves**.**[a]	**1.** Yelled.[c]	**1.** When my child misbehaves, I raise my voice or yell.[b]	.480 (.024)
	2. Uses physical punishment as a way of disciplining child.[a]	**2.** Uses physical punishment as a way of disciplining child.[a]	**2.** When my child misbehaves, I spank, slap, grab, or hit my child.[b]	.618 (.055)
	3. When angry, I show it.[a]	**3.** When angry, I show it.[a]	**3.** When my child misbehaves, I get so angry that s/he can see it.[b]	.876 (.068)
Permissive	**1.** Sets strict, *well-established rules **(R)**.*[a]	**1.** Sets strict, *well-established rules **(R)**.*[a]	**1.** Let's child do whatever s/he wants.[b]	.635 (.022)
	2. Finds it difficult to discipline child.[a]	**2.** Finds it difficult to discipline child.[a]	**2.** When child does something I don't like, I often let it go.[b]	.484 (.055)
	3.Threatens child with punishment more often than giving it.[a]	**3.**Threatens child with punishment more often than giving it.[a]	**3**. When I give a fair threat or warning, I always do what I said (**R**).[b]	.446 (.069)
	4. Bribes child with rewards to bring about compliance.[a]	**4.** Bribes child with rewards to bring about compliance.[a]	**4.** When I want my child to stop doing something, I coax or beg.[b]	.633 (.060)

Note. SCS = The Shame in Childhood Study, DPAS = The Daycare and Preschool Adjustment Study, CLRP = The Concordia Longitudinal Risk Project sample, [a] = The Parenting Styles and Dimensions Questionnaire (PSDQ), [b] = Parenting Scale (PS), [c] = Responses to Child Emotions Questionnaire (RCE), [d] = Parenting Stress Index (PSI), [e] = Parenting Dimensions Inventory (PDI), (**R**) = Reverse Coded.

Table 4

Instruments and Items Selected to Create the Parenting Scales for the Aggregated Sample at Time 2, with Factor Loadings.

Parenting Variables	Sample			Loadings
	SCS	DPAS	CLRP	
Positive	**1.** I encourage my child to talk about his/her troubles.[a]	**1.** I encourage my child to talk about his/her troubles.[a]	**1.** I encourage my child to talk about his/her troubles.[b]	.630 (.069)
	2. I have warm and intimate times together with my child.[a]	**2.** I have warm and intimate times together with my child.[a]	**2.** My child and I have warm intimate moments together.[b]	.579 (.062)
	3. I give my child reasons for rules, talk it over when s/he misbehaves.[a]	**3.** I give my child reasons for rules, talk it over when s/he misbehaves.[a]	**3.** Talk to the child (e.g., discuss reasons for limits or demands).[b]	.641 (.077)
	4. I show respect for child's opinions by encouraging him to express them.[a]	**4.** I show respect for child's opinions by encouraging him to express them.[a]	**4.** I respect my child's opinion and encourage him/her to express it.[b]	.693 (.075)
	5. I give comfort and understanding when my child is upset.[a]	**5.** I give comfort and understanding when my child is upset.[a]	**5.** I believe it is not always a good idea to encourage child to talk about their worries because it can upset them even more (**R**).[b]	.509 (.073)
Harsh	**1.** I spank when my child is disobedient.[a]	**1.** I spank when my child is disobedient.[a]	**1.** Spanking or hitting.[b]	.847 (.029)
	2. I scold/criticize when my child's behavior didn't meet expectations.[a]	**2.** I scold/criticize when my child's behavior didn't meet expectations.[a]	**2.** Scold the child.[b]	.666 (.051)
	3. I let my child know I am ashamed /disappointed when s/he misbehaves.[a]	**3.** I let my child know I am ashamed /disappointed when s/he misbehaves.[a]	**3.** I let my child know I am ashamed /disappointed when s/he misbehaves.[b]	.557 (.071)
Permissive	**1.** I find it difficult to discipline my child.[a]	**1.** I find it difficult to discipline my child.[a]	**1.** There are times I just don't have the energy to make my child behave.[b]	.410 (.069)
	2. I state punishments to my child but do not actually do them.[a]	**2.** I state punishments to my child but do not actually do them.[a]	**2.** Once I decide how to deal with a misbehavior, I follow through (**R**).[b]	.785 (.056)
	3. Gives into child when s/he causes a commotion about something.[a]	**3.** Gives into child when s/he causes a commotion about something.[a]	**3.** My can often talk me into letting her/him off easier than I intended.[b]	.560 (.050)
	4. I threaten my child with punishment more often than actually giving it.[a]	**4.** I threaten my child with punishment more often than actually giving it.[a]	**4.** Never threatens child with punish-ment unless sure will carry it out (**R**).[b]	.620 (.055)

Note. SCS = The Shame in Childhood Study, DPAS = The Daycare and Preschool Adjustment Study, CLRP = The Concordia Longitudinal Risk Project sample, [a] = Parenting Styles and Dimensions Questionnaire (PSDQ), [b] = Parenting Dimensions Inventory (PDI), (**R**) = Reverse Coded.

Table 5

Instruments and Items Selected to Create the Parenting Scales for the Aggregated Sample at Time 3, with Factor Loadings.

Parenting Variables	Sample			Loadings
	SCS	DPAS	CLRP	
Positive	**1.** I encourage my child to talk about his/her troubles.[a]	**1.** I encourage my child to talk about his/her troubles.[a]	**1.** I encourage my child to talk about his/her troubles.[b]	.605 (.074)
	2. I have warm and intimate times together with my child.[a]	**2.** I have warm and intimate times together with my child.[a]	**2.** My child and I have warm intimate moments together.[b]	.611 (.087)
	3. I give my child reasons for rules, talk it over when s/he misbehaves.[a]	**3.** I give my child reasons for rules, talk it over when s/he misbehaves.[a]	**3.** Talk to the child (e.g., discuss reasons for limits or demands).[b]	.699 (.073)
	4. I show respect for child's opinions by encouraging him to express them.[a]	**4.** I show respect for child's opinions by encouraging him to express them.[a]	**4.** I respect my child's opinion and encourage him/her to express it.[b]	.712 (.060)
	5. I give comfort and understanding when my child is upset.[a]	**5.** I give comfort and understanding when my child is upset.[a]	**5.** I believe it is not always a good idea to encourage child to talk about their worries because it can upset them even more (**R**).[b]	.432 (.101)
Harsh	**1.** I spank when my child is disobedient.[a]	**1.** I spank when my child is disobedient.[a]	**1.** Spanking or hitting.[b]	.756 (.054)
	2. I scold/criticize when my child's behavior didn't meet expectations.[a]	**2.** I scold/criticize when my child's behavior didn't meet expectations.[a]	**2.** Scold the child.[b]	.906 (.036)
	3. I let my child know I am ashamed /disappointed when s/he misbehaves.[a]	**3.** I let my child know I am ashamed /disappointed when s/he misbehaves.[a]	**3.** I let my child know I am ashamed /disappointed when s/he misbehaves.[b]	.491 (.063)
Permissive	**1.** I find it difficult to discipline my child.[a]	**1.** I find it difficult to discipline my child.[a]	**1.** There are times I just don't have the energy to make my child behave.[b]	.492 (.056)
	2. I state punishments to my child but do not actually do them.[a]	**2.** I state punishments to my child but do not actually do them.[a]	**2.** Once I decide how to deal with a misbehavior, I follow through (**R**).[b]	.964 (.041)
	3. Gives into child when s/he causes a commotion about something.[a]	**3.** Gives into child when s/he causes a commotion about something.[a]	**3.** My can often talk me into letting her/him off easier than I intended.[b]	.550 (.065)
	4. I threaten my child with punishment more often than actually giving it.[a]	**4.** I threaten my child with punishment more often than actually giving it.[a]	**4.** Never threatens child with punish-ment unless sure will carry it out (**R**).[b]	.706 (.049)

Note. SCS = The Shame in Childhood Study, DPAS = The Daycare and Preschool Adjustment Study, CLRP = The Concordia Longitudinal Risk Project sample, [a] = The Parenting Styles and Dimensions Questionnaire (PSDQ), [b] = Parenting Dimensions Inventory (PDI), (**R**) = Reverse Coded.

Table 6

Instruments and Items Selected to Create the Temperament Scales for the Aggregated Sample at Time 1, with Factor Loadings.

Temperament Variables	Sample			Loadings
	SCS	DPAS	CLRP	
Emotional Lability	**1.** Cries a lot.[a]	**1.** Cries a lot.[a]	**1.** My child cries easily.[b]	.665 (.057)
	2. Sudden changes in mood or feelings.[a]	**2.** Sudden changes in mood or feelings.[a]	**2.** My child tends to be rather emotional.[b]	.558 (.064)
	3. Rarely cries (**R**).[c]	**3.** Rarely cries (**R**).[c]	**3.** My child often fusses and cries.[b]	.546 (.052)
	4. Easily upset by new people or situations.[a]	**4.** Easily upset by new people or situations.[a]	**4.** My child gets upset easily.[b]	.620 (.056)
	5. When angry, stays upsets.[c]	**5.** When angry, stays upsets.[c]	**5.** My child reacts intensely when upset.[b]	.439 (.053)
Activity Levels	**1.** Quickly shifts from one activity to another.[a]	**1.** Quickly shifts from one activity to another.[a]	**1.** My child is always on the go.[b]	.510 (.018)
	2. Underactive, slow moving, or lacks energy (**R**).[a]	**2.** Underactive, slow moving, or lacks energy.(**R**).[a]	**2.** When my child moves about, s/he usually moves slowly (**R**).[b]	.636 (.068)
	3. Worked up, excited, can't sit still.[c]	**3.** Worked up, excited, can't sit still.[c]	**3.** My child is off an running as soon as s/he wakes up in the morning.[b]	.592 (.095)
	4. Is full of energy, even in the evening.[c]	**4**. Can't sit still, restless or hyperactive.[a]	**4.** My child is very energetic.[b]	.628 (.086)
	5. Prefers quiet activities (**R**).[c]	**5.** Does not like quiet games.[c]	**5.** My child prefers quiet, inactive games to more active ones (**R**).[b]	.585 (.079)
Shyness	**1.** Acts very friendly and outgoing with new children (**R**).[f]	**1.** Acts very friendly and outgoing with new children (**R**).[f]	**1.** My child is very sociable (**R**).[a]	.427 (.050)
	2. Is slow to warm up to others.[f]	**2.** Is slow to warm up to others.[f]	**2.** My child takes a long time to warm up to strangers.[a]	.831 (.033)
	3. Talks easily to new people (**R**).[f]	**3.** Talks easily to new people (**R**).[f]	**3.** My child is very friendly with strangers (**R**).[a]	.779 (.026)
	4. Average of 1) Is sometimes shy even around people s/he has known a long time, and 2) Acts shy around new people.[f]	**4.** Average of 1) Is sometimes shy even around people s/he has known a long time, and 2) Acts shy around new people.[f]	**4.** My child tends to be shy.[a]	.776 (.038)

Note. SCS = The Shame in Childhood Study, DPAS = The Daycare and Preschool Adjustment Study, CLRP = The Concordia Longitudinal Risk Project sample, [a] = Child Behavior Checklist (CBCL), [b] = The Emotionality, Activity, and Sociability Temperament Survey (EAS), [c] = Child Behavior Questionnaire (CBQ), (**R**) = Reverse Coded.

Table 7

Instruments and Items Selected to Create the Temperament Scales for the Aggregated Sample at Time 2, with Factor Loadings.

Temperament Variables	Sample			Loadings
	SCS	**DPAS**	**CLRP**	
Emotional Lability	**1.** My child cries easily.[a]	**1.** My child cries easily.[a]	**1.** My child cries easily.[a]	.710 (.041)
	2. My child tends to be rather emotional.[a]	**2.** My child tends to be rather emotional.[a]	**2.** My child tends to be rather emotional.[a]	.723 (.034)
	3. My child often fusses and cries.[a]	**3.** My child often fusses and cries.[a]	**3.** My child often fusses and cries.[a]	.664 (.043)
	4. My child gets upset easily.[a]	**4.** My child gets upset easily.[a]	**4.** My child gets upset easily.[a]	.833 (.039)
	5. My child reacts intensely when upset.[a]	**5.** My child reacts intensely when upset.[a]	**5.** My child reacts intensely when upset.[a]	.699 (.043)
Activity Levels	**1.** My child is always on the go.[a]	**1.** My child is always on the go.[a]	**1.** My child is always on the go.[a]	.618 (.050)
	2. When my child moves about, s/he usually moves slowly (**R**).[a]	**2.** When my child moves about, s/he usually moves slowly (**R**).[a]	**2.** When my child moves about, s/he usually moves slowly (**R**).[a]	.541 (.062)
	3. My child is off an running as soon as s/he wakes up in the morning.[a]	**3.** My child is off an running as soon as s/he wakes up in the morning.[a]	**3.** My child is off an running as soon as s/he wakes up in the morning.[a]	.605 (.053)
	4. My child is very energetic.[a]	**4.** My child is very energetic.[a]	**4.** My child is very energetic.[a]	.873 (.055)
	5. My child prefers quiet, inactive games to more active ones (**R**).[a]	**5.** My child prefers quiet, inactive games to more active ones (**R**).[a]	**5.** My child prefers quiet, inactive games to more active ones (**R**).[a]	.522 (.062)
Shyness	**1.** My child tends to be shy.[a]	**1.** My child tends to be shy.[a]	**1.** My child tends to be shy.[a]	.608 (.068)
	2. My child makes friends easily (**R**).[a]	**2.** My child makes friends easily (**R**).[a]	**2.** My child makes friends easily (**R**).[a]	.496 (.079)
	3. My child is very sociable (**R**).[a]	**3.** My child is very sociable (**R**).[a]	**3.** My child is very sociable (**R**).[a]	.763 (.052)
	4. My child takes a long time to warm up to strangers.[a]	**4.** My child takes a long time to warm up to strangers.[a]	**4.** My child takes a long time to warm up to strangers.[a]	.630 (.060)
	5. My child is very friendly to strangers (**R**).[a]	**5.** My child is very friendly to strangers (**R**).[a]	**5.** My child is very friendly to strangers (**R**).[a]	.598 (.055)

Note. SCS = The Shame in Childhood Study, DPAS = The Daycare and Preschool Adjustment Study, CLRP = The Concordia Longitudinal Risk Project sample, [a] = The Emotionality, Activity, and Sociability Temperament Survey (EAS), (**R**) = Reverse Coded.

Table 8

Instruments and Items Selected to Create the Temperament Scales for the Aggregated Sample at Time 3, with Factor Loadings.

Temperament Variables	Sample			Loadings
	SCS	**DPAS**	**CLRP**	
Emotional Lability	**1.** My child cries easily.[a]	**1.** Cries a lot.[b]	**1.** Crying easily.[c]	.468 (.061)
	2. My child tends to be rather emotional.[a]	**2.** Sudden changes in mood or feelings.[b]	**2.** Sudden changes in mood or feelings.[b]	.746 (.042)
	3. My child often fusses and cries.[a]	**3.** Whinning.[b]	**3.** Whinning.[b]	.556 (.061)
	4. My child gets upset easily.[a]	**4.** Stubborn, sullen, or irritable[b].	**4.** Stubborn, sullen, or irritable.[b]	.772 (.043)
	5. My child reacts intensely when upset.[a]	**5.** Average score of 1) Controls temper when arguing with other children (**R**), 2) Ends disagreements with you calmly, and 3) Controls temper in conflict situations with you (**R**).[c]	**5.** Average of 1) Slaps or hits when angry, and 2) Easily becomes angry.[d]	.619 (.058)
Activity Levels	**1.** My child is always on the go.[a]	**1.** Easily changes from one activity to another.[c]	**1.** Easily changes from one activity to another.[c]	.689 (.072)
	2. When my child moves about, s/he usually moves slowly (**R**).[a]	**2.** Underactive, slow moving, lacks energy (**R**).[b]	**2.** Underactive, slow moving, lacks energy (**R**).[b]	.545 (.094)
	3. My child is very energetic.[a]	**3.** Can't sit still, restless or hyperactive.[b]	**3.** Can't sit still, restless or hyperactive.[b]	.776 (.087)
	4. My child prefers quiet, inactive games to more active ones (**R**).[a]	**4.** Daydreams or gets lost in his/her thoughts (**R**).[b]	**4.** Daydreams or gets lost in his/her thoughts (**R**).[b]	.572 (.065)
Shyness	**1.** My child tends to be shy.[a]	**1.** Shy or too timid.[c]	**1.** Shy or too timid.[c]	.616 (.072)
	2. My child makes friends easily(**R**).[a]	**2.** Makes friends easily (**R**).[c]	**2.** Not liked by other kids.[b]	.699 (.076)
	3. My child is very sociable (**R**).[a]	**3.** Would rather be alone that with others.[b]	**3.** Would rather be alone that with others.[b]	.719 (.083)
	4. My child is very friendly to strangers (**R**).[a]	**4.** Introduce him/herself to new people without being told (**R**).[c]	**4.** Friendly with new people s/he meets (**R**).[d]	.687 (.072)

Note. SCS = The Shame in Childhood Study, DPAS = The Daycare and Preschool Adjustment Study, CLRP = The Concordia Longitudinal Risk Project sample, [a] = The Emotionality, Activity, and Sociability Temperament Survey (EAS), [b] = The Child Behavior Checklist (CBCL), [c] = The Social Skills Rating System (SSRS), [d] = The Matson Evaluation of Social Skills with Youngsters (MESSY), (**R**) = Reverse Coded.

Table 9

Descriptive Statistics and Scale Score Reliability of Study Variables.

	ω	α	*M (SEM)*	*SD*	*Variance*	*Range*	*Skewness (SE)*	*Kurtosis (SE)*
Aggression – Time 1	.826	.792	.221 (.021)	.334	.112	0.000 – 1.750	1.829 (.113)	3.578 (.230)
Aggression – Time 2	.809	.803	.216 (.010)	.252	.063	0.000 – 1.750	3.094 (.125)	1.909 (.244)
Aggression – Time 3	.767	.754	.103 (.012)	.240	.058	0.000 – 1.750	2.410 (.146)	3.241 (.271)
Opposition – Time 1	.881	.856	.506 (.029)	.373	.139	0.000 – 1.580	.432 (.113)	-.392 (.234)
Opposition – Time 2	.708	.687	.545 (.024)	.396	.157	0.000 – 1.800	.499 (.126)	-.503 (.248)
Opposition – Time 3	.792	.764	.526 (.032)	.466	.217	0.000 – 2.000	.955 (.148)	.563 (.273)
Property Violations – Time 1	.772	.763	.253 (.015)	.283	.080	0.000 – 1.690	2.238 (.112)	3.555 (.238)
Property Violations – Time 2	.811	.785	.238 (.015)	.243	.059	0.000 – 1.830	2.416 (.123)	2.631 (.247)
Property Violations – Time 3	.756	.730	.214 (.013)	.219	.048	0.000 – 1.670	2.988 (.147)	2.076 (.276)
Status Offenses – Time 2	.782	.774	.287 (.027)	.319	.102	0.000 – 1.500	1.305 (.123)	1.994 (.244)
Status Offenses – Time 3	.790	.783	.214 (.023)	.290	.084	0.000 – 1.600	1.701 (.147)	3.330 (.272)
Positive Parenting – Time 1	.680	.666	6.023 (.047)	.813	.661	1.750 – 7.000	-1.356 (.118)	3.409 (.239)
Positive Parenting – Time 2	.759	.749	4.385 (.021)	.491	.241	2.400 – 5.000	-.905 (.123)	1.198 (.241)
Positive Parenting – Time 3	.780	.765	4.366 (.032)	.512	.262	2.500 – 5.000	-.720 (.142)	.064 (.270)
Harsh Parenting – Time 1	.682	.668	2.686 (.034)	.634	.402	1.000 – 5.000	.508 (.110)	1.535 (.222)
Harsh Parenting – Time 2	.743	.675	2.071 (.038)	.675	.456	1.000 – 4.630	.428 (.123)	-.056 (.244)
Harsh Parenting – Time 3	.926	.788	2.041 (.046)	.724	.524	1.000 – 5.000	.612 (.142)	.203 (.277)
Permissive Parenting – Time 1	.733	.724	2.940 (.053)	1.082	1.171	1.000 – 6.250	.424 (.116)	-.194 (.222)
Permissive Parenting – Time 2	.808	.796	2.782 (.054)	1.086	1.179	1.000 – 5.800	.493 (.129)	-.194 (.246)
Permissive Parenting – Time 3	.874	.853	2.523 (.063)	1.061	1.126	1.000 – 6.250	.750 (.143)	.362 (.271)
Emotional Lability – Time 1	.976	.976	2.786 (.055)	1.088	1.184	1.000 – 6.700	.695 (.117)	.281 (.218)
Emotional Lability – Time 2	.843	.842	3.105 (.074)	1.353	1.831	1.000 – 7.000	.493 (.124)	-.267 (.244)
Emotional Lability – Time 3	.799	.776	2.306 (.069)	1.168	1.364	1.000 – 6.700	1.115 (.133)	.949 (.266)
Activity Levels – Time 1	.733	.653	4.425 (.065)	1.430	2.045	1.000 – 7.000	-.321 (.113)	-.491 (.218)
Activity Levels – Time 2	.693	.678	3.796 (.038)	.705	.497	1.600 – 5.000	-.302 (.122)	-.106 (.247)
Activity Levels – Time 3	.919	.765	3.584 (.043)	.699	.489	1.000 – 5.000	-.494 (.138)	1.296 (.268)
Shyness – Time 1	.791	.783	3.273 (.064)	1.343	1.804	1.000 – 6.890	.376 (.114)	-.476 (.213)
Shyness – Time 2	.798	.795	2.392 (.042)	.822	0.676	1.000 – 4.600	.441 (.128)	-.290 (.242)
Shyness – Time 3	.713	.706	2.140 (.041)	.711	0.506	1.000 – 4.200	.620 (.136)	.069 (.260)

Note. ω = McDonald's Omega, α = Cronbach's Alpha, *M* = Mean, *SEM* = Standard Error of the Mean, *SD* = Standard Deviation, *SE* = Standard Error.

Table 10

Bivariate Correlation Coefficients between Antisocial Behaviors and Parenting Behaviors Variables.

Variable	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Aggr.	Time 1	-																			
	Time 2	**.33**	-																		
	Time 3	**.31**	**.33**	-																	
Opp.	Time 1	**.49**	**.26**	**.14**	-																
	Time 2	**.24**	**.40**	**.30**	**.34**	-															
	Time 3	**.23**	**.29**	**.31**	**.25**	**.57**	-														
ProV.	Time 1	**.43**	**.20**	.10	**.31**	**.20**	**.15**	-													
	Time 2	**.24**	**.55**	**.24**	**.29**	**.42**	**.29**	**.16**	-												
	Time 3	**.20**	**.29**	**.57**	**.19**	**.37**	**.51**	**.15**	**.38**	-											
StaO.	Time 2	**.28**	**.58**	**.30**	**.30**	**.54**	**.40**	**.24**	**.54**	**.28**	-										
	Time 3	**.30**	**.33**	**.60**	**.29**	**.36**	**.61**	**.18**	**.35**	**.60**	**.53**	-									
Pos.	Time 1	**-.18**	**-.21**	-0.8	**-.20**	-.03	-.02	**-.22**	**-.11**	-.01	**-.13**	**-.14**	-								
	Time 2	**-.15**	**-.29**	**-.16**	**-.17**	**-.13**	-.13	-.08	**-.21**	-.10	**-.21**	**-.16**	**.36**	-							
	Time 3	**-.13**	**-.29**	**-.13**	**-.14**	-.05	**-.16**	-.09	**-.15**	**-.13**	**-.28**	**-.22**	**.36**	**.64**	-						
Har.	Time 1	**.24**	**.29**	.10	.14	.15	**.21**	**.15**	**.19**	**.12**	**.23**	.10	**-.19**	-.10	-.10	-					
	Time 2	**.16**	**.24**	**.20**	.14	**.39**	**.32**	.12	**.26**	**.14**	**.21**	**.24**	**-.15**	**-.13**	-.11	**.26**	-				
	Time 3	**.12**	**.26**	**.18**	.12	**.31**	**.39**	.07	**.24**	**.22**	**.28**	**.29**	-.10	-.10	**-.17**	**.23**	**.61**	-			
Per.	Time 1	**.13**	**.11**	.10	**.16**	.05	.01	.09	**.18**	.08	.10	**.14**	**-.13**	-.07	-.11	**.20**	**.15**	**.25**	-		
	Time 2	**.11**	**.24**	.08	**.15**	**.31**	**.24**	.10	**.28**	.11	**.27**	**.20**	-.07	**-.16**	**-.12**	**.20**	**.26**	**.23**	**.21**	-	
	Time 3	.08	**.15**	**.14**	**.15**	**.23**	**.31**	.10	**.19**	**.17**	**.24**	**.25**	-.06	-.02	**-.26**	.06	**.28**	**.27**	**.22**	**.65**	-

Note. Aggr. = Aggression, Opp. = Opposition, ProV. = Property Violations, StaO. = Status Offenses, Pos. = Positive Parenting, Har. = Harsh Parenting, Per. = Permissive Parenting. Values that are not bolded or underlined were not statistically significant. Bolded values were statistically significant at the $p < .05$ level. Underlined and bolded values were statistically significant at the $p < .001$ level.

Table 11

Bivariate Correlation Coefficients between Antisocial Behaviors and Temperament Variables.

Variables	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Aggr.	Time 1	-																			
	Time 2	**.33**	-																		
	Time 3	**.31**	**.33**	-																	
Opp.	Time 1	**.49**	**.26**	**.14**	-																
	Time 2	**.24**	**.40**	**.30**	**.34**	-															
	Time 3	**.23**	**.29**	**.31**	**.25**	**.57**	-														
ProV.	Time 1	**.43**	**.20**	.10	**.31**	**.20**	**.15**	-													
	Time 2	**.24**	**.55**	**.24**	**.29**	**.42**	**.29**	**.16**	-												
	Time 3	**.20**	**.29**	**.57**	**.19**	**.37**	**.51**	**.15**	**.38**	-											
StaO.	Time 2	**.28**	**.58**	**.30**	**.30**	**.54**	**.40**	**.24**	**.54**	**.28**	-										
	Time 3	**.30**	**.33**	**.60**	**.29**	**.36**	**.61**	**.18**	**.35**	**.60**	**.53**	-									
Emo.	Time 1	**.25**	**.25**	**.15**	**.25**	**.40**	**.32**	**.17**	**.21**	**.21**	**.21**	**.19**	-								
	Time 2	**.21**	**.25**	**.21**	**.34**	**.48**	**.43**	**.11**	**.29**	**.20**	**.33**	**.26**	**.37**	-							
	Time 3	**.18**	**.22**	**.35**	**.23**	**.40**	**.46**	.10	**.27**	**.25**	**.33**	**.40**	**.29**	**.46**	-						
Act.	Time 1	**.14**	.03	.08	**.12**	.01	.03	.07	.02	.03	.01	.09	**.11**	.06	.01	-					
	Time 2	.04	**.11**	.10	.05	.01	.07	.04	.08	.06	.02	.08	.05	**.14**	.04	**.24**	-				
	Time 3	.01	.01	**.15**	.03	.06	**.14**	.02	.02	.08	.05	.10	.05	.02	.08	**.27**	**.23**	-			
Shy.	Time 1	-.06	.06	.01	-.06	-.03	-.05	-.09	-.01	-.03	-.06	-.01	.06	.01	.10	.06	.07	.01	-		
	Time 2	-.07	.07	.01	-.03	-.08	-.01	-.03	-.06	-.09	-.07	-.03	.06	.08	**.14**	.07	.05	.05	**.56**	-	
	Time 3	-.03	.03	.04	-.01	-.01	-.08	-.02	-.04	-.09	-.07	-.10	.03	.05	**.20**	.05	.08	.07	**.28**	**.64**	-

Note. Aggr. = Aggression, Opp. = Opposition, ProV. = Property Violations, StaO. = Status Offenses, Emo. = Emotional Lability, Act. = Activity Levels, Shy. = Shyness. Values that are not bolded or underlined were not statistically significant. Bolded values were statistically significant at the $p < .05$ level. Underlined and bolded values were statistically significant at the $p < .001$ level.

Table 12

Bivariate Correlation Coefficients between Parenting Behaviors and Temperament Variables.

Variables	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Pos.	Time 1	-																	
	Time 2	**.36**	-																
	Time 3	**.36**	**.64**	-															
Har.	Time 1	**-.19**	-.10	-.10	-														
	Time 2	**-.15**	**-.13**	-.11	**.26**	-													
	Time 3	-.10	-.10	**-.17**	**.23**	**.61**	-												
Per.	Time 1	**-.13**	-.07	-.11	**.20**	**.15**	**.25**	-											
	Time 2	-.07	**-.16**	**-.12**	**.20**	**.26**	**.23**	**.21**	-										
	Time 3	-.06	-.02	**-.26**	.06	**.28**	**.27**	**.22**	**.65**	-									
Emo.	Time 1	**-.13**	-.04	-.05	**.18**	**.22**	**.11**	**.16**	**.23**	**.23**	-								
	Time 2	-.09	**-.13**	-.07	**.14**	**.29**	**.25**	.06	**.22**	**.26**	**.37**	-							
	Time 3	-.05	-.05	**-.23**	**.15**	**.12**	**.32**	.01	**.16**	**.38**	**.29**	**.46**	-						
Act.	Time 1	**.09**	.05	-.07	**.17**	.05	.07	-.05	-.02	-.06	**.11**	.06	.01	-					
	Time 2	-.06	**.12**	-.11	.05	.02	.03	-.06	**-.11**	-.07	.05	**.14**	.04	**.24**	-				
	Time 3	.05	.05	-.12	.02	.05	**.14**	-.06	-.03	-.05	.05	.02	.08	**.27**	**.23**	-			
Shy.	Time 1	-.08	-.09	-.09	**-.11**	-.07	-.12	.13	.04	.02	.06	.01	.10	.06	.07	.01	-		
	Time 2	-.07	**-.12**	-.11	-.05	-.20	**-.12**	.05	**.10**	.08	.06	.08	**.14**	.07	.05	.05	**.56**	-	
	Time 3	-.02	-.05	-.11	-.02	-.04	**-.17**	.07	.03	**.14**	.03	.05	**.20**	.05	.08	.07	**.28**	**.64**	-

Note. Pos. = Positive Parenting, Har. = Harsh Parenting, Per. = Permissive Parenting, Emo. = Emotional Lability, Act. = Activity Levels, Shy. = Shyness. Values that are not bolded or underlined were not statistically significant. Bolded values were statistically significant at the $p < .05$ level. Underlined and bolded values were statistically significant at the $p < .001$ level.

Table 13

Results of Time-Specific Confirmatory Factor Analyses for the Aggregated Sample.

Scale		χ^2	*df*	RMSEA	RMSEA [C.I]	CFI	TLI
Antisocial Behaviors	Time 1	272.426*	87	.061	[0.052; 0.070]	.947	.937
	Time 2	293.850*	164	.037	[0.031; 0.045]	.964	.958
	Time 3	416.475*	164	.052	[0.044; 0.060]	.931	.920
Positive Parenting	Time 1	n/a	n/a	n/a	n/a	n/a	n/a
	Time 2	7.336	5	.029	[0.019; 0.039]	.983	.966
	Time 3	8.576	5	.036	[0.022; 0.050]	.980	.935
Harsh Parenting	Time 1	n/a	n/a	n/a	n/a	n/a	n/a
	Time 2	n/a	n/a	n/a	n/a	n/a	n/a
	Time 3	n/a	n/a	n/a	n/a	n/a	n/a
Emotional Lability	Time 1	.463	5	.000	[0.000; 0.023]	1.000	.000
	Time 2	1.010	5	.005	[0.000; 0.032]	.995	.976
	Time 3	5.341	5	.011	[0.000; 0.046]	.996	.990
Activity Levels	Time 1	6.875	5	.026	[0.000; 0.057]	.995	.987
	Time 2	3.731	5	.025	[0.000; 0.052]	.997	.991
	Time 3	5.110	2	.052	[0.034; 0.074]	.982	.960
Shyness	Time 1	6.152	2	.061	[0.040; 0.082]	.986	.948
	Time 2	6.249	5	.021	[0.003; 0.039]	.992	.974
	Time 3	1.975	2	.000	[0.000; 0.055]	1.000	1.000

Note. χ^2 = Value of the Chi-Square Test of Model Fit, *df* = Degrees of Freedom, RMSEA = Root Mean Square Error of Approximation, RMSEA [C.I] = 90% Confidence Interval of RMSEA, CFI = Comparative Fit Index, TLI = Tucker Lewis Index, * = p <.05. We measured several of the latent variables using only three indicators. Models including factors built upon a maximum of 3 indicators are just-identified, and do not yield values for the model fit indices. When fit indices were not available, we relied on factor loadings and residual variances as indicators of model misspecification. The decision as to the structural validity of the variables included in the present study were based almost exclusively upon the results of the multi-groups CFAs reported in Table 14.

Table 14

Results of Confirmatory Factor Analyses for Invariance Across Samples.

	χ^2	*df*	RMSEA	RMSEA [C.I]	RMSEAΔ	CFI	CFIΔ	TLI	TLIΔ
Antisocial Behaviors									
Unconstrained Longitudinal CFA	1769.260*	1270	.016	[0.013; 0.019]	n/a	.946	n/a	.942	n/a
Unconstrained Longitudinal Multiple Groups CFA	4879.770*	4022	.019	[0.015; 0.023]	n/a	.938	n/a	.936	n/a
Configural Invariance	4791.142*	3851	.021	[0.018; 0.024]	+.002	.932	-.006	.927	-.009
Weak Invariance	4936.966*	3935	.021	[0.018; 0.024]	=	.927	-.005	.924	-.003
Strong Invariance	5199.039*	4046	.022	[0.019; 0.026]	+.001	.916	-.011	.915	-.009
Strict Invariance	5433.816*	4152	.023	[0.020; 0.026]	+.001	.908	-.008	.907	-.008
Variance-Covariance Invariance	5454.627*	4224	.023	[0.019; 0.026]	=	.913	+.003	.911	+.006
Latent Means Invariance	5495.093*	4246	.023	[0.020; 0.026]	=	.912	-.001	.909	-.002
Parenting Variables									
Unconstrained Longitudinal CFA	499.151	491	.017	[0.012; 0.023]	n/a	.972	n/a	.968	n/a
Unconstrained Longitudinal Multiple Groups CFA	1750.434*	1609	.012	[0.006; 0.009]	n/a	.955	n/a	.953	n/a
Constrained Multiple Groups CFA	1789.753*	1627	.013	[0.010; 0.016]	+.001	.948	-.007	.946	-.007
Temperament Variables									
Unconstrained Longitudinal CFA	1019.328*	824	.020	[0.017; 0.023]	n/a	.965	n/a	.962	n/a
Unconstrained Longitudinal Multiple Groups CFA	2674.148*	2390	.014	[0.011; 0.017]	n/a	.959	n/a	.957	n/a
Constrained Multiple Groups CFA	2731.536*	2408	.015	[0.012; 0.018]	+.001	.954	-.005	.951	-.008

Note. χ^2 = Value of the Chi-Square Test of Model Fit, *df* = Degrees of Freedom, RMSEA = Root Mean Square Error of Approximation, RMSEA [C.I] = 90% Confidence Interval of RMSEA, CFI = Comparative Fit Index, TLI = Tucker Lewis Index, CFA = Confirmatory Factor Analysis, * $p < .05$.

Table 15

Model Fit Indices for Latent Profile Analyses and Tests of Profile Similarity.

Model	*LL*	*#fpar*	S.C.	AIC	BIC	ABIC	CAIC	Entropy	aLMR	BLRT
Latent Profile Analysis at Time 1										
1 profile	-1941.597	6	1.863	3895.194	3919.968	3900.926	3925.968	n/a	n/a	n/a
2 profiles	-1766.144	10	2.668	3552.288	3593.578	3561.841	3603.578	.953	≤.001	≤.001
3 profiles	-1663.720	14	1.780	3355.440	3413.247	3368.815	3413.247	.979	.002	≤.001
4 profiles	-1550.106	18	2.629	3136.212	3210.535	3153.408	3228.535	.993	.515	≤.001
5 profiles	-1506.329	22	2.437	3056.657	3147.496	3077.675	3169.496	.983	.112	≤.001
6 profiles	-1502.563	26	2.206	3057.126	3164.481	3081.965	3190.481	.831	.592	.500
Latent Profile Analysis at Time 2										
1 profile	-2260.623	8	1.965	4537.245	4569.157	4543.772	4577.157	n/a	n/a	n/a
2 profiles	-1983.176	13	2.651	3992.352	4044.208	4002.959	4057.208	.974	≤.001	≤.001
3 profiles	-1818.062	18	2.012	3672.124	3743.925	3686.810	3761.925	.994	.014	≤.001
4 profiles	-1587.657	23	2.765	3221.314	3313.060	3240.080	3336.060	.000	.446	≤.001
5 profiles	-1383.735	28	3.777	2823.470	2935.161	2846.316	2963.161	.000	.682	≤.001
6 profiles	-1344.176	33	3.457	2754.352	2885.987	2781.277	2918.987	.928	.212	≤.001
Latent Profile Analysis at Time 3										
1 profile	-1835.506	8	1.945	3687.012	3717.258	3691.882	3725.258	n/a	n/a	n/a
2 profiles	-1527.293	13	2.351	3080.587	3129.737	3088.502	3142.737	.991	.011	≤.001
3 profiles	-1346.776	18	2.194	2729.552	2797.605	2740.511	2815.605	1.000	.039	≤.001
4 profiles	-1307.204	23	2.141	2660.408	2747.365	2674.411	2770.365	.945	.204	≤.001
5 profiles	-1285.645	28	2.069	2627.291	2733.151	2644.338	2761.151	.932	.577	≤.001
6 profiles	-1126.845	33	2.327	2319.691	2444.455	2339.782	2477.455	.995	.203	≤.001
Latent Profile Analysis: Similarity of Times 2 and 3 profiles										
Configural Similarity	-4620.037	55	1.415	9350.074	9585.290	9410.703	9640.290	.826	n/a	n/a
Structural Similarity	-4628.083	43	1.402	9342.167	9526.062	9389.568	9569.062	.826	n/a	n/a
Dispersion Similarity	-4504.277	31	1.964	9070.554	9203.130	9104.726	9234.130	.755	n/a	n/a
Distributional Similarity	-4660.919	29	1.456	9379.839	9503.861	9411.806	9532.861	.829	n/a	n/a

Note. LL = Log Likelihood Value, *#fpar* = number of free parameters, S.C. = Scaling Correction Factor, AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion, ABIC = Sample-Size Adjusted Bayesian Information Criterion, CAIC = Consistent Akaike Information Criterion, aLMR = Lo-Mendell-Rubin Adjusted Likelihood Ratio Test, BLRT = Bootstrap Likelihood Ratio Test.

Table 16

Model Fit Indices for Latent Transition Analyses with Covariates.

Model	*LL*	*#fpar*	S.C.	AIC	BIC	ABIC	CAIC	Entropy
Conversion of Measurement Models to Latent Transition Analysis.								
Including First-Order Effects	-4763.810	17	1.001	9561.620	9634.323	9580.360	9651.323	.854
Including Second-Order Effect	-4642.562	23	0.934	9331.123	9429.486	9356.477	9452.486	.855
Inclusion of Control Variables as Covariates								
Effects free across times and profiles	-7172.548	95	0.703	14535.096	14946.588	14645.011	15041.588	.806
Effects free across times	-7195.905	53	1.006	14497.811	14727.380	14559.132	14780.380	.790
Predictive Similarity	-7198.696	47	0.995	14491.391	14694.972	14545.770	14741.072	.791
Null Effects Model	-7221.481	32	0.933	14506.962	14645.570	14543.986	14677.570	.788
Inclusion of Parenting Variables as Predictors								
Effects free across times and profiles	-10606.840	140	0.978	21493.680	22098.335	21653.911	22238.335	.789
Effects free across times	-10622.167	98	1.157	21440.333	21863.592	21552.495	21961.592	.789
Predictive Similarity: Times 2 and 3	-10627.317	92	1.174	21438.635	21835.980	21543.930	21927.980	.789
Null Effects Model	-10742.572	77	1.193	21639.144	21971.705	21727.272	22048.705	.791
Inclusion of Temperamental Facets as Predictors								
Effects free across times and profiles	-13881.731	215	1.011	28193.463	29123.200	28440.688	29338.200	.802
Effects free across times	-13903.945	187	1.088	28181.891	28990.546	28396.919	29177.546	.791
Predictive Similarity: Times 2 and 3	-13906.752	183	1.089	28179.505	28970.862	28389.933	29153.862	.789
Null Effects Model	-13923.216	179	1.102	28204.431	28978.491	28410.260	29,157.491	.788

Note. LL = Log Likelihood Value, *#fpar* = number of free parameters, S.C. = Scaling Correction Factor, AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion, ABIC = Sample-Size Adjusted Bayesian Information Criterion, CAIC = Consistent Akaike Information Criterion, aLMR = Lo-Mendell-Rubin Adjusted Likelihood Ratio Test, BLRT = Bootstrap Likelihood Ratio Test.

Table 17

Transition Probabilities for the Latent Transition Analysis Model with Predictors.

Transitions Probabilities between Time 1 and Time 2 Profiles			
	Normative	Non-Aggressive Generalists	Severe Generalists
Time 1			
Normative/Non-Antisocial	.597	.324	.079
Aggression Specialists	.303	.540	.157
Property Violations Specialists	.369	.386	.245
Severe Generalists	.106	.453	.440
Transitions Probabilities between Time 2 and Time 3 Profiles			
	Normative	Non-Aggressive Generalists	Severe Generalists
Time 2			
Normative/Non-Antisocial	.791	.189	.020
Non-Aggressive Generalists	.399	.500	.101
Severe Generalists	.440	.222	.338
Transitions Probabilities between Time 1 and Time 3 Profiles			
	Normative	Non-Aggressive Generalists	Severe Generalists
Time 1			
Normative/Non-Antisocial	.739	.235	.026
Aggression Specialists	.105	.526	.369
Property Violations Specialists	.600	.317	.083
Severe Generalists	.074	.148	.778

Table 18

Results from the Multinomial Logistic Regressions Predicting Profile Membership.

Time 1

	Profile 1 vs Profile 2		***Profile 1 vs Profile 3***		***Profile 1 vs Profile 4***		***Profile 2 vs Profile 3***		***Profile 2 vs Profile 4***	
Predictors	*Coeff (S.E)*	*OR*	*Coeff (S.E)*	*OR*	*Coeff (S.E)*	*OR*	*Coeff (S.E)*	*OR*	*Coeff (S.E)*	*OR*
Positive Parenting	.279 (.275)	1.322	.453 (.145)**	1.566	−.268 (.319)	.765	.174 (.249)	1.190	−.279 (.275)	.757
Harsh Parenting	−.396 (.453)	.673	.212 (.182)	1.236	−.784 (.209)**	.497	−.160 (.230)	.852	.170 (.243)	1.186
Permissive Parenting	−.116 (.275)	.890	−.341 (.219)*	.711	.110 (.446)	1.116	.607 (.482)	1.835	.276 (.148)	1.318
Emotional Lability	−.419 (.173)*	.658	.067 (.372)	1.069	−.593 (.212)*	.553	.783 (.194)*	2.188	−.174 (.233)	.840
Activity Levels	−1.116 (.201)*	.328	−.119 (.236)	.888	−1.371 (.183)**	.254	1.556 (.323)**	4.739	−1.437 (.267)**	.238

	Profile 3 vs Profile 4		***Profile 2 vs Profile 1***		***Profile 3 vs Profile 1***		***Profile 4 vs Profile 1***	
Predictors	*Coeff (S.E)*	*OR*	*Coeff (S.E)*	*OR*	*Coeff (S.E)*	*OR*	*Coeff (S.E)*	*OR*
Positive Parenting	.226 (.483)	1.254	−.279 (.275)	.757	−.453 (.145)**	.636	.268 (.319)	1.307
Harsh Parenting	−.736 (.172)*	.479	.396 (.453)	1.486	−.212 (.182)	.809	.784 (.209)**	2.190
Permissive Parenting	.386 (.460)	1.471	.116 (.275)	1.123	.341 (.219)*	1.406	−.110 (.446)	.896
Emotional Lability	−.549 (.198)*	.578	.419 (.173)*	1.520	−.067 (.372)	.935	.593 (.212)*	1.810
Activity Levels	1.208 (.195)*	3.348	1.116 (.201)*	3.054	.119 (.236)	1.126	1.371 (.183)**	3.938

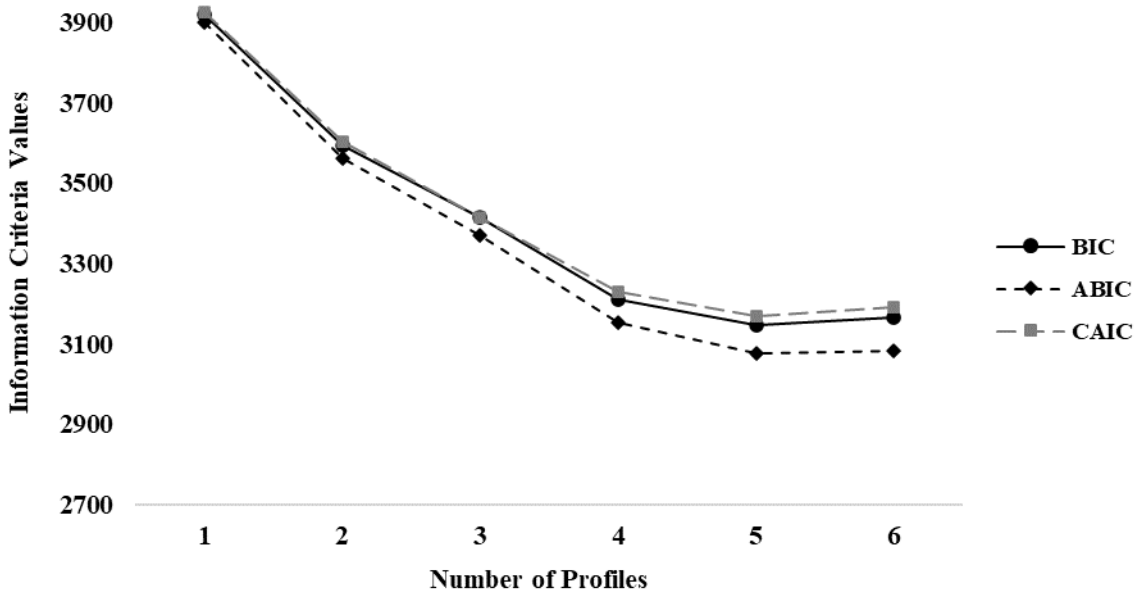
Times 2 and 3

	Profile 4 vs Profile 1		***Profile 5 vs Profile 1***		***Profile 1 vs Profile 4***		***Profile 5 vs Profile 4***	
Predictors	*Coeff (S.E)*	*OR*	*Coeff (S.E)*	*OR*	*Coeff (S.E)*	*OR*	*Coeff (S.E)*	*OR*
Positive Parenting	−.476 (.186)**	.621	−.374 (.127)	0.688	.476 (.186)**	1.609	.391 (.210)*	1.478
Harsh Parenting	.707 (.162)**	2.028	.206 (.146)	1.021	−.707 (.162)**	.493	−.228 (.249)	.796
Permissive Parenting	.350 (.217)*	1.419	.285 (.162)*	1.330	−.350 (.217)*	.705	−0.065 (.218)	.937
Emotional Lability	1.018 (.188)**	2.768	.431 (.245)	1.539	−1.018 (.188)**	.361	−.369 (.194)*	.691
Activity Levels	.167 (.348)	1.182	.367 (.221)	1.443	−.167 (.348)	.846	−0.206 (.260)	.814

Note. **: p < .001; *: p < .05. S.E. = Standard Error, OR: Odds Ratio. The coefficients and OR represent the effects of the predictors on the likelihood of membership into the first listed profile compared to the second listed profile. Profile 1 = Normative, Profile 2 = Aggression Specialists, Profile 3 = Property Violations Specialists, Profile 4 = Severe Generalists, Profile 5 = Non-Aggressive Generalists.

Figure 1

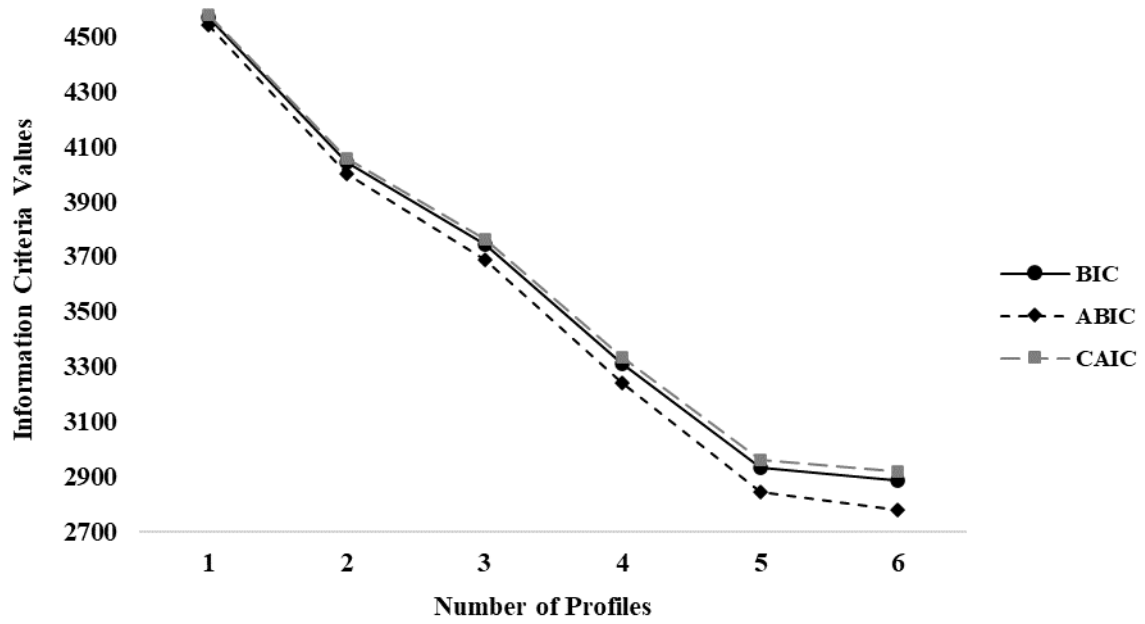
Elbow Plot of the ABIC, BIC, and CAIC at Time 1.



Note. BIC = Bayesian Information Criterion, ABIC = Sample-Size Adjusted Bayesian Information Criterion, CAIC = Consistent Akaike Information Criterion.

Figure 2

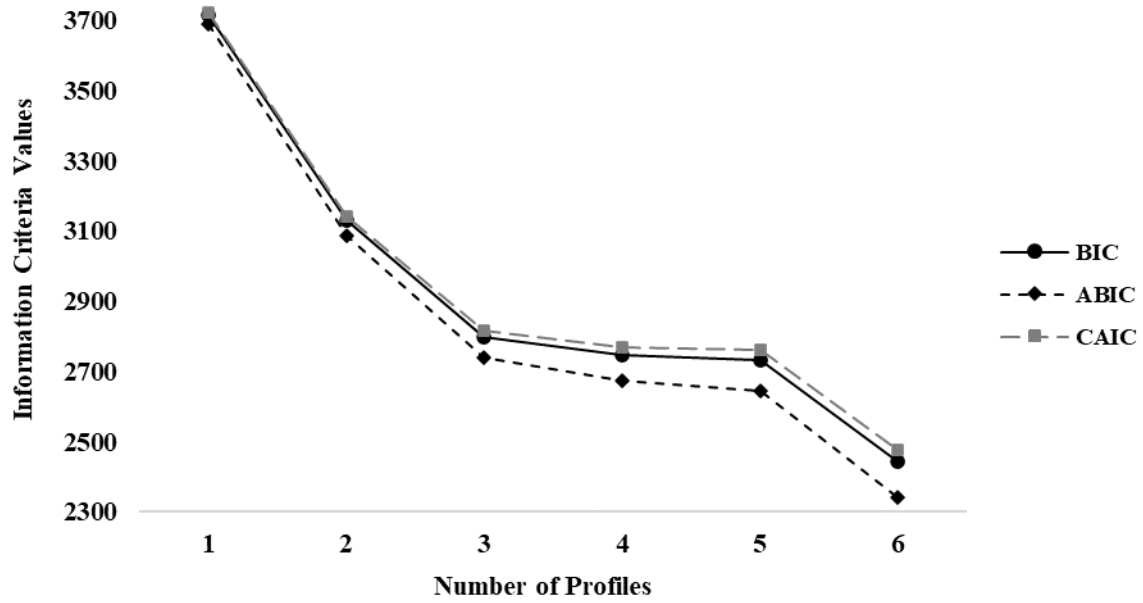
Elbow Plot of the ABIC, BIC, and CAIC at Time 2.



Note. BIC = Bayesian Information Criterion, ABIC = Sample-Size Adjusted Bayesian Information Criterion, CAIC = Consistent Akaike Information Criterion.

Figure 3

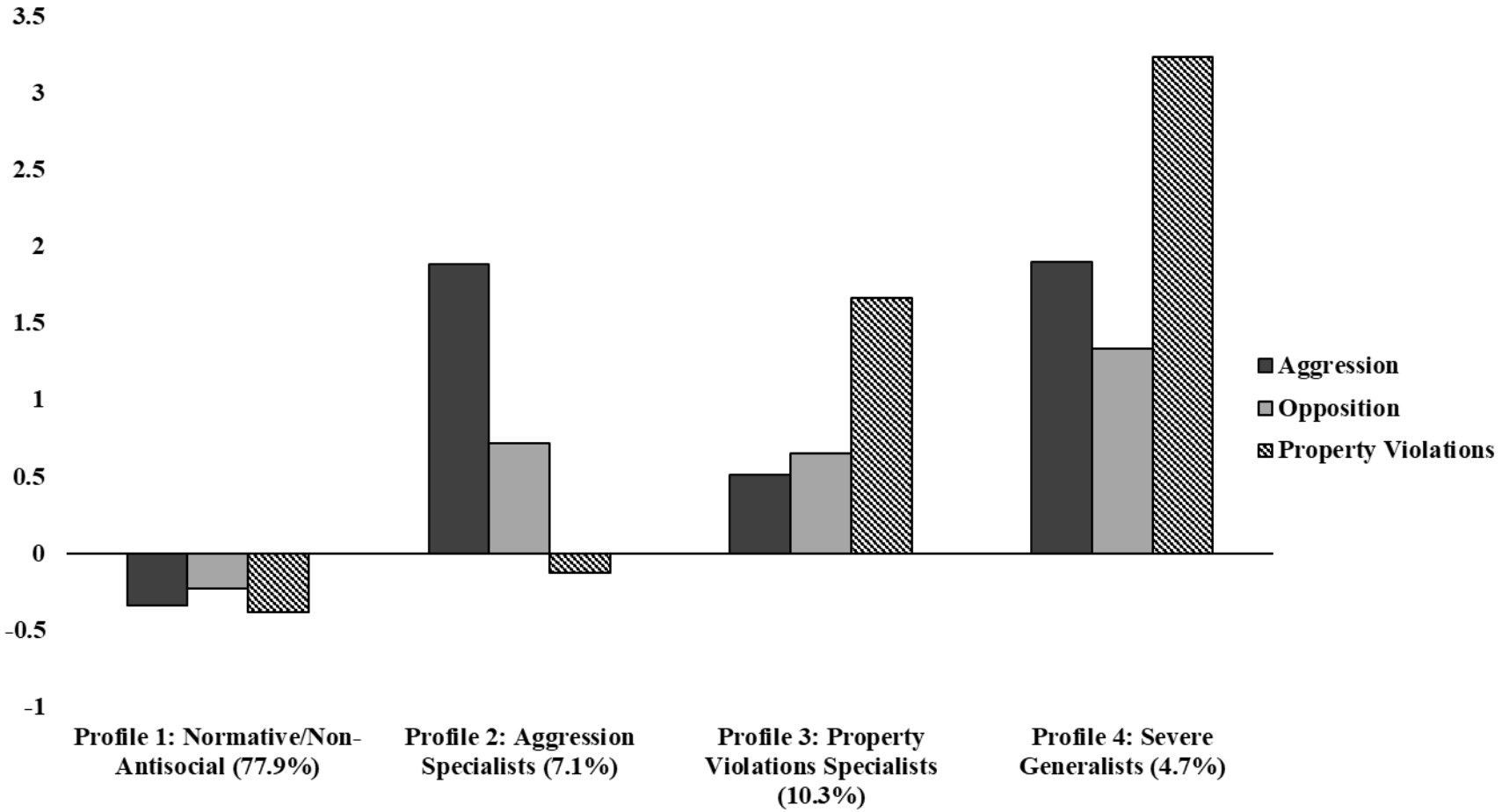
Elbow Plot of the ABIC, BIC, and CAIC at Time 3.



Note. BIC = Bayesian Information Criterion, ABIC = Sample-Size Adjusted Bayesian Information Criterion, CAIC = Consistent Akaike Information Criterion.

Figure 4

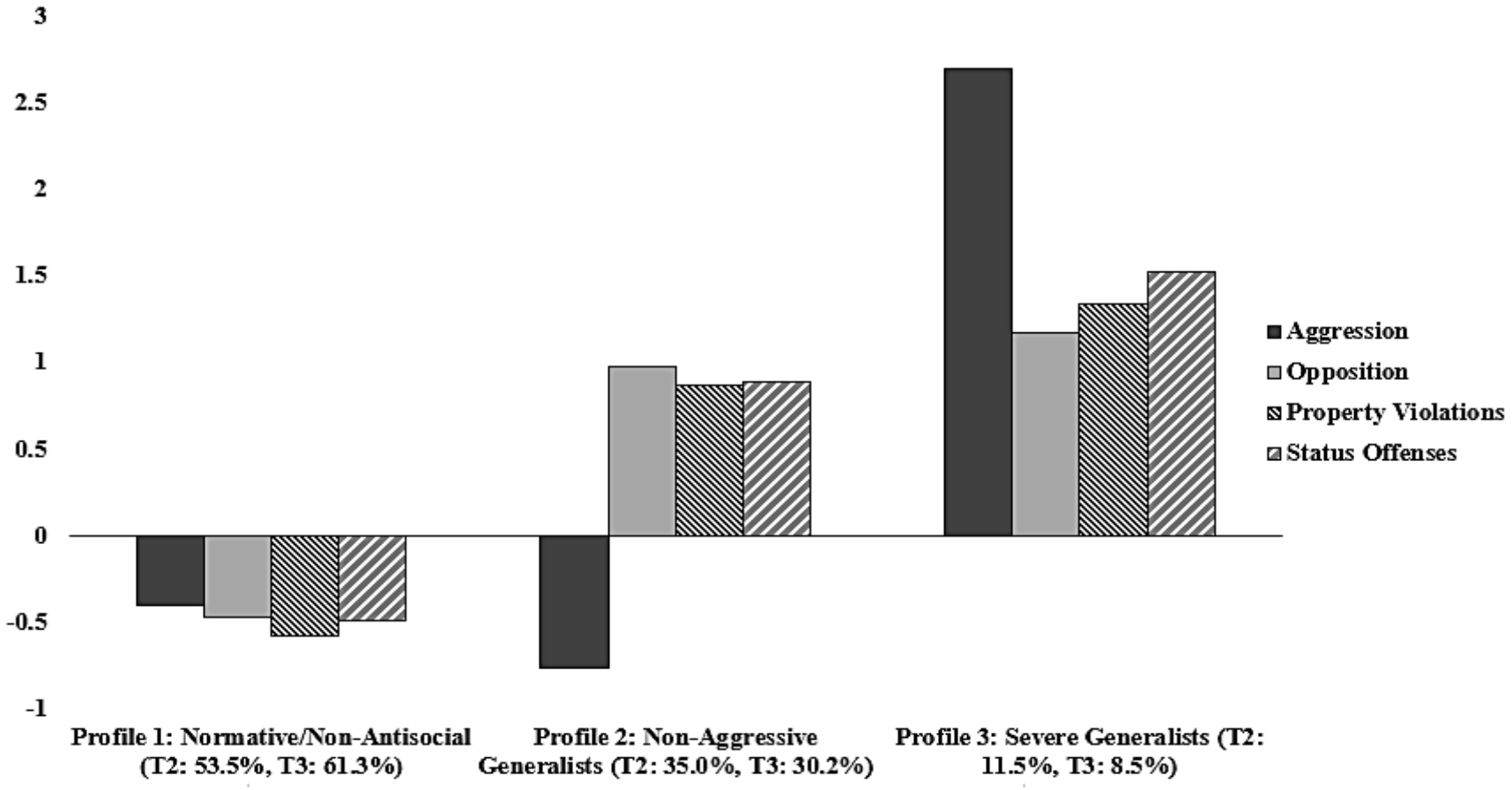
Final 4-profile solution at Time 1.



Note. Indicators are standardized scores with a mean of zero and a standard deviation of one. The values of the indicators for each profile are the parameter estimates obtained in the model that established dispersion similarity across Times 2 and 3.

Figure 5

Final 3-profile solution at Times 2 and 3.



Note. T2 = Time 2, T3 = Time 3. Indicators are standardized scores with a mean of zero and a standard deviation of one. The values of the indicators for each profile are the parameter estimates obtained in the model that established dispersion similarity across Times 2 and 3.