

**A prospective longitudinal study of the
transition to secondary school:
exploring risk and protective factors**

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Declaration

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

The work presented in this thesis is based on data I collected as part of a team whilst setting-up and running the School Transition and Adjustment Research Study from 2011 to 2013. My role included preparing and selecting study measures (particularly measures relating to self-control and parenting), recruitment of the study's schools, and managing and participating in all aspects of data collection.

A handwritten signature in black ink that reads "TNg-Knight." The signature is written in a cursive, slightly slanted style.

(Terry Ng-Knight)

Abstract

The transition to secondary school is an important developmental period that includes changes to children's academic, physical, and social environments. This school transition also coincides with the average age for the onset of puberty. Most children express some concerns about this transition and a significant minority have ongoing difficulties after starting at secondary school. Drawing on a developmental psychopathology approach, this thesis aimed to outline a model for measuring successful transitions to secondary school and explore risk and protective factors related to 'transition success'.

Using data from a prospective, three-wave, multiple-informant longitudinal study of school transition, findings indicated that transition success is multidimensional, consisting of two broad domains of functioning at school: (1) academic and behavioural adjustment, and (2) school bonding. A number of risk and protective factors were identified for each domain. Particular attention was paid to the role of self-control, puberty, and social relationships (with parents and friends) as influences on children's adjustment during this period. Self-control was found to decline over the transition and to predict children's adjustment at secondary school. Support was found for parenting and puberty as influences on the development of children's self-control over the transition. Aspects of children's relationships over the transition were found to predict children's adjustment at secondary school. For parent-child relationships, there were negative effects of maternal depression and parental hostility, and positive effects of parental warmth. Stable friendships were generally found to confer adjustment benefits but some negative effects were found when multiple low quality friendships were maintained over the transition.

Overall the findings presented in this thesis advance understanding of the risk and protective factors associated with successful secondary school transitions, in particular, elucidating the nature of relationships between a number of individual-level and social-contextual factors.

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CHAPTER 1: General Introduction

The transition to secondary school and the developmental psychopathology perspective

The secondary school transition is one of the defining events of early adolescence. In the UK nearly all children move from primary to secondary school when they are 11 years old, whilst most children in the US either move from elementary to middle school when they are 11 years old or to junior high school when they are 12 years old (U.S. Department of Education: National Center for Education Statistics, 2015). Similar early adolescent school transitions occur in many school systems throughout the world (World Bank, 2006). This transition is an abrupt, enforced change that immerses children in a novel educational setting (Simmons & Blyth, 1987) where there is a greater focus on academic performance, relationships with teachers are less personal, friendships change, and schools are much larger and contain many more peers, most of whom are older (Bowes et al., 2013; Eccles, Midgley, et al., 1993; Eccles, Wigfield, et al., 1993; Pratt & George, 2005; Symonds & Galton, 2014). Thus, moving to secondary school is an important developmental event that requires children to adapt to a new academic, social, and physical environment.

Most children express some concerns about this transition. Some of the most common concerns relate to new academic and organisational demands – such as homework and remembering to bring the correct equipment for lessons – as well as to the social aspects of secondary school – such as being bullied or losing friends (Rice, Frederickson, & Seymour, 2011; West, Sweeting, & Young, 2010). While apprehension about the transition is likely to be a normative response to change, a significant minority of pupils display continued difficulties after starting secondary school such as decreases in academic attainment and attendance, and increases in disruptive behaviour and anxiety (Anderson, Jacobs, Schramm, & Splittgerber, 2000; Galton, Morrison, & Pell, 2000; Symonds & Galton, 2014). However, as with environmental stressors and change events more generally, not all children have

problematic transitions highlighting that there are substantial individual differences in response to the move to secondary school (Graber & Brooks, 1996; Moffitt, Caspi, & Rutter, 2005; Rutter & Silberg, 2002). The successful navigation of transition points may also set in motion chains of events that have positive effects on children's well-being over extended periods of time (Felner, Ginter, & Primavera, 1982; Rutter, 1989; Vitaro & Tremblay, 2008). Thus, the transition to secondary school is a developmentally salient period of adaptation and assimilation, acting not only as a period of vulnerability and change, but also a period of opportunity.

This thesis explores the transition to secondary school from a developmental psychopathology perspective. This introductory chapter considers the implications of the developmental psychopathology approach for the conceptualisation and measurement of successful transition to secondary school, and for the identification of potential risk and protective factors relating to transition success. Development arises from the dynamic interplay between the person and their environment (Sameroff, 2009) and this thesis therefore examines the role of both individual-level and contextual factors in transition success. Before turning to these points, this chapter first describes the importance of studying school adjustment and educational outcomes, and highlights why adolescence is a particularly salient period of development in this regard.

1.1. The importance of school adjustment and educational outcomes

Schools provide the main context for children's formal learning and instruction. The educational achievements which are the central focus of schooling are related to a number of important outcomes in adult life. For example, children who achieve better educational outcomes are more likely to be employed and financially independent during adulthood (Aud et al., 2011; Fergusson, Swain-Campbell, & Horwood, 2002;

Muller, 2002). Doing well in secondary education also provides access to further educational opportunities, such as university, and these higher-level qualifications are further related to beneficial financial and employment outcomes (Walker & Zhu, 2013). Children who do not do well at secondary school are more likely to be economically inactive and this is related to negative health outcomes for the individual (Marmot et al., 2010; Mirowsky & Ross, 2003), and also to wider societal costs, such as higher levels of welfare and unemployment assistance (Rumberger, 1987; Schoon & Duckworth, 2010). The disadvantages associated with low educational achievement are likely to intensify with a growing knowledge economy whereby it is becoming increasingly difficult to earn a comfortable income in unskilled unemployment in countries such as the UK and US (Aud et al., 2011). Understanding the causes of and processes influencing educational outcomes is therefore an important research aim.

Schools are also important socializing agents. Children spend a large amount of time at school and after the family, schools tend to be the main system in which children are exposed to social norms relating to areas such as conduct, discipline, appearance, and knowledge (Rutter, Maughan, Mortimore, Ouston, & Smith, 1979; Schaffer, 1996). The influence of schools therefore goes beyond educational outcomes with additional influences on children's health and behaviour (e.g., Denny et al., 2011; Resnick et al., 1997). For example, research shows that children who feel a stronger bond with their school are less likely to engage in a range of risky behaviours including smoking cigarettes and cannabis, drinking alcohol, and early sexual debut, and are also less likely to suffer from emotional distress, suicidality, and to engage in violent behaviour (Resnick et al., 1997). Thus, schools exert influence on multiple aspects of children's development that have long-term effects on their health and economic success.

1.2. Adolescence

Children typically encounter a number of school transitions throughout their lives with each transition occurring in its own context and posing its own challenges. One thing that makes the transition to secondary school particularly interesting from a developmental perspective is that to a large extent it marks the start of adolescence, in part because it coincides with the onset of puberty but also because entry into secondary school marks a change in social status from child to adolescent (Hirsch & Rapkin, 1987; Simmons & Blyth, 1987). As with transition periods more generally, adolescence is a period of both vulnerabilities and opportunities (Rutter, 1996). For instance, rates of mental health problems such as depression and substance use disorders increase during adolescence (Costello, Copeland, & Angold, 2011). But adolescence is also a time when children start to take on a new impetus toward autonomy, this requires renegotiating relationships with parents, taking increasing independence over educational choices and behaviour, and developing social relationships which increasingly involve mixed-gender networks at a time when children's capacity for intimacy is growing (Sroufe, Egeland, Carlson, & Collins, 2005). Adolescence therefore provides an important and multifaceted context for studying school transitions as it is a period of development characterised by biological, emotional, psychological and social changes which affect children's relationships with the world around them.

Stage-environment fit theory suggests the transition to secondary school may generate a range of problems for children due to a mismatch between the secondary school environment and the needs of the child as they enter early adolescence (Eccles, Midgley, et al., 1993). Given that development during this period is characterised by a number of changes including the increased desire for autonomy and self-determination, a greater orientation towards peers and an intensification of peer relationships, as well

as increased self-consciousness and self-focus (Eccles, Midgley, et al., 1993; Simmons & Blyth, 1987; Symonds & Galton, 2014; Thompson, Winer, & Goodwin, 2011), the environmental changes brought about by the transition to secondary school may act to constrain adolescent development. For example, early adolescents' desires for autonomy will likely clash with secondary schools' emphasis on teacher control and discipline as well as reduced opportunities for pupils to participate in decision making compared to primary school (Thompson et al., 2011; Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006). Moving school may also disrupt children's peer networks at a time when peer relationships are particularly important to them (Dishion & Tipsord, 2011). Likewise, secondary schools tend to emphasise competition and social comparison during a period of increasing self-focus and evaluation (Eccles, Midgley, et al., 1993). Therefore, the secondary school environment may pose a number of difficulties for adolescents.

Adolescence is an important period of development for both short and long term health outcomes (Viner et al., 2012). In the short term, adolescence is a period where many risky behaviours begin, such as substance misuse, and features of puberty, such as its timing, are associated with mental health outcomes such as depression (Kaltiala-Heino, Marttunen, Rantanen, & Rimpelä, 2003). In the longer term, many of the risky behaviours that begin in adolescence are linked to poor health and increased mortality in adulthood (e.g., Elders, Perry, Eriksen, & Giovino, 1994). Given the importance of adolescence, investigating the ways in which important developmental events such as school transition may cause difficulties for the developing adolescent is likely to be of public health benefit. Understanding the conditions that support a smooth and positive transition to secondary school is therefore an important research aim.

1.3. The developmental psychopathology approach

Human development arises from the dynamic interplay between the person and their environment (Sameroff, 2009; Sameroff & Chandler, 1975). This means that both individual-level and social-contextual factors will influence development over the transition to secondary school (Bronfenbrenner, 1979). Individual-level factors will include children's genetic make-up, their unique developmental history and other individual characteristics which shape their ability to successfully adapt to secondary school (Sroufe & Rutter, 1984). For instance, important individual-level characteristics may include cognitive ability, non-cognitive skills such as self-control and motivation, emotional and behavioural functioning, and puberty. Social-contextual factors refer to the social influences on development that occur at multiple ecological levels and which are nested within each other (Bronfenbrenner, 1979). Whilst distal environments such as parents' work lives, socioeconomic circumstances, and the cultural context are important features of the social context, the primary drivers of children's development are the reciprocal interactions between the individual and their immediate social and physical environment (Bronfenbrenner & Morris, 2006). Key aspects of the child's immediate environment are their relationships with parents, peers, and teachers. Central to the current thesis is an examination of how these key proximal interactions between the person and their social context - such as children's relationships with their parents and peers - influence children's development across the transition to secondary school.

Issues central to a developmental psychopathology perspective include an emphasis on the importance of examining developmental processes as well as outcomes, and an interest in both normal and pathological development (Rutter & Sroufe, 2000). The developmental psychopathology approach also acknowledges that development is complex and continues across the life course (Maughan & Collishaw,

2015) and this approach aims to explain the interplay among psychological, biological, and social-contextual aspects of development (Cicchetti, 1984; Cicchetti & Toth, 2009). Informed by this approach, the work outlined in this thesis therefore examines the role of multiple hypothesised risk and protective factors measured at multiple levels and also examines aspects of both normal and pathological development through a focus on both positive and negative adjustment at secondary school. For example, chapter four examines the role of self-control (individual-level), parenting (social-context), and pubertal status (biological and social) as predictors of children's adjustment in areas such as academic attainment and mental health difficulties.

1.4. School transition as a developmental process

In their study of the transition from US elementary school to junior high school, Simmons and Blyth (1987) described the transition as a “sharp and difficult discontinuity” due to the large difference between the two types of school and the abruptness with which transition occurs. Part of what makes the transition to secondary school theoretically and empirically interesting is that it acts as a clear break between old and new environments, that is, it acts as an environmental discontinuity. Moreover, because school transition is a universal and normative experience it provides a useful research design for exploring the effects of an environmentally imposed change that is not dependent on characteristics of the individual (Rutter & Sroufe, 2000). It is not just the change in environments which allows an informative assessment of continuity and change, it is also the requirement of adaptive effort on behalf of the individual to adapt to a new, very different school system:

“... the child is confronted with a new system with different rules, requirements, and norms; and ... the child is expected to make the adaptation to the new school system speedily with little explicit guidance.” (Schaffer, 1996, p.339)

However, while most children express some concerns about the transition, this is only likely to be problematic where the demands of the new school are beyond the actual or perceived capabilities of the child. This means that many children may experience relative continuity in development, whilst others may take advantage of the change in environments to escape challenges or problems experienced in primary school (Benner, 2011; Rutter, 1996; Wheaton, 1990).

Developmental psychopathology draws on an organisational perspective of development, where transition and change events result in developmental reorganisation (Sroufe & Rutter, 1984). This perspective suggests that at important developmental junctures, prior developmental structures are incorporated into later structures and in this way are subsequently carried forward across the life span (Sroufe & Rutter, 1984). This process highlights that new development builds on and incorporates previous development. Therefore, the successful negotiation of transition points such as the secondary school transition increases the probability of children’s positive adjustment, whilst failure increases the likelihood that children will have ongoing difficulties (Sroufe & Rutter, 1984). Although what occurs at any transition point is unlikely to be entirely deterministic of children’s future outcomes, the accumulation of multiple unsuccessful transitions is likely to constrain individuals’ development, meaning that change becomes more difficult and certain outcomes are less likely over time (Sroufe et

al., 2005). Therefore, the successful transition to secondary school is an important developmental task.

1.5. Measuring school transition success

School adjustment is generally considered to be a multidimensional construct (e.g., Battistich, Solomon, Kim, Watson, & Schaps, 1995; Rutter et al., 1979), yet to date, there is no consensus on what criteria should be used to assess whether a child has successfully adapted to secondary school. Studies have identified numerous attitudes and areas of functioning that appear to be negatively affected over the transition to secondary school, such as reduced satisfaction with and commitment to school (Hirsch & Rapkin, 1987), reduced academic interests (Dotterer, McHale, & Crouter, 2009; Schneider, Tomada, Normand, Tonci, & de Domini, 2008), poorer mental health (Chung, Elias, & Schneider, 1998), lowered social support (Martinez, Aricak, Graves, Peters-Myszak, & Nellis, 2011), and declines in academic attainment (Alspaugh, 1998; Chung et al., 1998; Rosenblatt & Elias, 2008). However, assessing change in single aspects of children's functioning is unlikely to provide a comprehensive assessment of transition success, so multi-domain, multicontextual measurement strategies are required (Cicchetti, 1993).

It is important to try and isolate the effects of school transition from other influences on the child, for instance, increases in some mental health problems are known to occur during adolescence (Costello et al., 2011) so care must be taken to prevent conflation of maturational changes with the effects of school transition. Additionally, in order to understand whether the secondary school transition is in fact associated with changes to children's mental health, it should be possible to empirically test this association by developing a measure that specifically measures children's

transition success. A well-defined outcome measure is therefore a necessary requirement for distinguishing between the processes and outcomes of successful school transition, and for work aiming to assess the potential risk and protective factors of successful transitions. To address this gap, chapter three sets out a framework of criteria for measuring successful transition and uses this framework to empirically test a measurement model of successful transition. This measure is then used to examine the association between risk and protective factors with transition success.

1.6. Selecting potential risk and protective factors relating to successful transition

As described earlier, development is best understood as the dynamic interplay between the person and the environment (Sameroff & Chandler, 1975). This section gives a brief introduction to some of the individual-level and social-contextual factors that are likely to be important influences on children's adaptation to secondary school. The following individual-level factors are discussed: cognitive ability, non-cognitive skills, emotional and behavioural functioning, and puberty. Children's relationships with parents and peers are considered as indicators of social-context. This focus on relationships is warranted for several reasons: (1) social interactions are considered to be some of most important drivers of children's development (Bronfenbrenner & Morris, 2006); (2) positive social relationships are likely to provide important support during the potentially stressful period of moving and adapting to secondary school (Jindal-Snape & Miller, 2008; Simmons & Blyth, 1987; Symonds & Galton, 2014); (3) whilst more distal contextual factors such as low socioeconomic status (SES) are already known to be associated with poorer school outcomes and psychological adjustment (Conger, Conger, & Martin, 2010; Sirin, 2005), on their own, these associations are relatively uninformative in terms of the processes through which such

negative effects come about. By taking a focus on factors like parenting style and parental distress that are associated with distal factors like SES (Conger et al., 2010), this thesis aims to improve understanding of the sorts of processes that link aspects of the family environment to children's adjustment at school.

1.6.1. Individual-level factors

Measures of cognitive ability (or intelligence) such as IQ have long received credit for successful school and educational outcomes and they generally show robust moderate associations in this respect (Neisser et al., 1996; Richardson, Abraham, & Bond, 2012; Sternberg, Grigorenko, & Bundy, 2001). Cognitive ability describes a range of skills linked to success in school such as understanding visual, numerical and verbal materials and tasks, processing information quickly, and remembering and manipulating information (Keil, 2014). Nevertheless, cognitive ability is not the only factor which predicts school performance and the importance of other 'non-cognitive' skills and attributes have increasingly gained recognition for the notable role they play in positive school outcomes (Gutman & Schoon, 2013; Heckman & Rubinstein, 2001). For example, personality measures, especially those related to self-control and conscientiousness, show similar effect sizes as cognitive ability in predicting academic performance (Duckworth & Seligman, 2005; Poropat, 2014).

Self-control is viewed as a person's capacity to change and adapt in order to provide a better fit between the self and the environment (Tangney, Baumeister, & Boone, 2004), this is likely to be a particularly important skill where the environment is not optimally designed to meet the individual's needs, as has been suggested in relation to secondary schools (Eccles & Midgley, 1989; Eccles, Midgley, et al., 1993). Exercising self-control requires individuals to forego immediate rewards in the service

of longer term goals, for example, by doing homework rather than watching TV. Self-control involves the control of attention, thoughts, impulses, and emotions and is likely to aid school-related tasks such as listening to teachers, following rules, and completing work on time (Tangney et al., 2004). Both cognitive and non-cognitive skills are therefore likely to be key influences on children's transition success and these relationships are explored in chapter three. Additional attention is paid to self-control in chapter four for two reasons: (1) self-control shows meaningful variation over time and evidence suggests it is likely to be more amenable to intervention than cognitive ability (Diamond, 2012; Heckman, 2011; Moffitt et al., 2011); (2) opportunities for risk-taking and autonomy during adolescence as well as the increased demands placed on children to be organised and independent mean the secondary school transition is likely to be a particularly important period for exercising good self-control (Steinberg, 2007; Steinberg & Morris, 2001; Symonds & Galton, 2014). Self-control is an important skill that is increasingly being considered as an intervention target yet little is known about its normative development over the transition to secondary school and how this may be linked to individual differences in adjustment. These questions are examined in chapter four.

Another individual-level characteristic that is likely to influence children's adaptation to secondary school is their emotional and behavioural adjustment. For example, a recent meta-analysis found depressive symptoms were associated with subsequent poor school attainment and this finding was most consistent during early adolescence (Riglin, Petrides, Frederickson, & Rice, 2014). Similarly, in an analysis of three British cohorts, childhood conduct problems were found to increase the likelihood of people having no qualifications during early adulthood (Richards & Abbott, 2009). Multiple symptoms associated with emotional and behavioural problems may have

direct effects on children's learning and capacity to adapt to the secondary school environment. For example, difficulties concentrating are common in those with symptoms of depression and anxiety (American Psychiatric Association, 2013), children with emotional problems are therefore likely to struggle in a learning environment that requires sustained attention. Additionally, children with symptoms of conduct problems typically behave aggressively, break rules, and have disturbed peer relationships (American Psychiatric Association, 2013) which is likely to diminish the ability to develop positive relationships with new peers and teachers at secondary school. In sum, symptoms of emotional and behavioural difficulties are likely to impair children's ability to successfully meet the demands associated with positively adapting to secondary school.

Many children make the secondary school transition at a time when they are also making the biological transition of puberty. The average onset of puberty in the UK is 11 years old and therefore coincides with the transition to secondary school (Parent et al., 2003; Patton & Viner, 2007), this is especially likely for girls as they tend to experience some of the most conspicuous features of puberty, such as a growth spurt, earlier than boys (Patton & Viner, 2007). The demands brought about by having to deal with multiple stressors may be challenging or even cognitively or biologically overwhelming (e.g., via elevated glucocorticoids; Conrad, 2008). Research suggests having to deal with pubertal and school transitions simultaneously increases the risk of negative outcomes (Monahan & Steinberg, 2011; Simmons & Blyth, 1987). For example, Simmons and Blyth (1987) found evidence of reduced self-esteem in children, particularly girls, who had to deal with school and pubertal transitions simultaneously.

There are two main routes by which puberty might act as a risk factor for negative school transitions. The first relates to a 'cumulative change' hypothesis

whereby children experiencing changes in multiple areas of their lives suffer due to the lack of a 'safe space' or 'arena of comfort' (Simmons & Blyth, 1987). This 'arena of comfort' refers to the notion that individuals need some aspect of continuity in their lives, a safe context where they can relax and rejuvenate in order to master or endure stressful changes and experiences that are occurring in other areas of their lives (Mortimer & Call, 2001). The second stipulates that early maturing children are perceived and treated as older than other children their age. For example, early maturing children may be perceived as older than they actually are by other people, such as parents and peers (Mendle, Turkheimer, & Emery, 2007; Symonds & Galton, 2014), potentially resulting in demands being placed on them that they cannot cope with or resulting in exposure to older, riskier peer groups (Haynie, 2003).

The empirical literature indicates that early pubertal onset is a risk factor for a range of negative outcomes including emotional, behavioural, and educational difficulties (Cavanagh, Riegle-Crumb, & Crosnoe, 2007; Ge, Conger, & Elder, 1996). Pubertal status at the transition to secondary school may therefore complicate and impair children's transition to secondary school. The role of pubertal status as a direct influence on children's adjustment at secondary school is assessed in chapter three alongside the other factors described in this section. Pubertal status is additionally examined in chapter four due to previous research which suggests puberty is linked to declines in aspects of children's self-control (Ernst, Pine, & Hardin, 2006; Steinberg, 2005) and empirical work that shows social-contextual factors like parenting may have different influences on children's self-control as they progress through adolescence (Eisenberg et al., 2005; Kiff, Lengua, & Zalewski, 2011; Lengua, 2006).

In this thesis, the individual-level factors described here are investigated as potential influences on children's transition success. Increasing understanding of these

influences may aid the development and targeting of intervention efforts that aim to help children make a successful transition to secondary school.

1.6.2. Contextual factors

Children's interpersonal relationships are thought to have important influences on their positive development (Bronfenbrenner & Morris, 2006; Underwood & Rosen, 2011). In fact, the relationships children depend on for social support may be considered to be the most important feature of the developing child's social context (Thompson et al., 2011) and researchers have highlighted the importance of a safe, supportive environment for adolescents transitioning to secondary school (Eccles, Midgley, et al., 1993; Simmons & Blyth, 1987). Children's emotional and social development are particularly dependent on their close relationships as these provide and shape the conditions in which children experience and make sense of their emotions and social experiences, e.g., through shared conversations, instruction, modelling, and support (Thompson et al., 2011). Not only do proximal influences such as children's relationships with their parents have important direct effects on development, but they also act as a link between many distal influences (e.g., socioeconomic disadvantage) and the child (Conger et al., 2010; Lamb & Bornstein, 2011). Crucially, the availability of stable supportive social relationships may provide children with an 'arena of comfort' for those experiencing turbulence across the secondary transition (Simmons & Blyth, 1987). Children tend to receive less support from teachers post-transition, which is likely because children typically go from having only one teacher at primary school to having as many as twenty teachers at secondary school (Symonds & Galton, 2014). It therefore seems likely that the support received from parents and peers will be particularly important at this transition.

Examining the role of relationships across the transition may help uncover risk and protective processes linked to transition success and potentially lead to mechanisms by which children can be supported during this period. This section discusses two key contexts from which children may receive social support during the transition to secondary school: parents and peers.

Parents. As described throughout this chapter, the move from primary to secondary school is likely to disrupt several aspects of children's lives, including their friendships, relationships with teachers, routines, and academic expectations. Good quality relationships and sources of support over the transition are likely to be important resources for children trying to adapt to the new school environment (Fenzel, 2000; Jindal-Snape & Miller, 2008; Simmons & Blyth, 1987). Parents can buffer against the negative effects of life stress (e.g., Aro, Hänninen, & Paronen, 1989; Greenberg, Siegel, & Leitch, 1983) and research from cohort studies and meta-analyses show aspects of parenting are associated with children's academic outcomes (Flouri, 2006; Hill & Tyson, 2009) indicating that the parent-child relationship is likely to be a particularly important resource over the transition. Therefore, the support offered by the family, particularly positive relationships with parents, is likely to be valuable at a time when many other aspects of children's lives are in flux.

A number of studies have identified aspects of the parent-child relationship that are related to children's transition experiences. For example, in a cross-sectional survey of 636 Canadian pupils, children who perceived their parents as more available, responsive, supportive and easy to communicate with also reported fewer concerns about their impending transition to middle school (Duchesne, Ratelle, Poitras, & Drouin, 2009). Positive parenting also shows longitudinal associations with changes in children's functioning across school transitions. In a small study (N = 60) of children

transitioning to US junior high school, higher parental *cognitive* involvement with children (e.g., discussing current events) buffered declines in reading grades and perceived academic competence, while parental *personal* involvement (e.g., knowledge of what their child is doing at school) buffered declines in reading grades, and increases in behavioural and learning problems (Grolnick, Kurowski, Dunlap, & Hevey, 2000). Also, in a longitudinal study of 434 children transitioning into Italian middle schools, Schneider et al. (2008) found higher levels of parental support buffered declines in school bonding and academic motivation. These studies suggest that parents play a role in supporting children's adaptation to secondary school, though similar studies are yet to be conducted in the UK and understanding of the mechanisms through which parents influence school outcomes over the transition to secondary school is limited.

Research and theory points to adolescents benefiting from parenting that is supportive and accepting, that provides the child with opportunities to express themselves, and that provides guidelines for behaviour that are rationally explained and understood by the child (Thompson et al., 2011). Both theoretical perspectives and empirical research has indicated that such parenting is associated with important skills such as self-control in children (Eisenberg et al., 2005; Grolnick & Farkas, 2002). Given that children's self-control has also been linked to higher academic attainment, this provides an interesting opportunity for examining processes by which social-contextual factors such as parenting and individual-level factors such as self-control may work together to influence children's adaptation to secondary school. A recent review of children's development across the school transition highlighted a need for more research that incorporates such transactional models (Symonds & Galton, 2014). This is the focus of chapter four, which assesses the influence of parenting behaviour on the development of children's self-control during the transition to secondary school.

Given the importance of parenting for children's adjustment, factors that influence parenting are also likely to have implications for children's functioning and development. One such factor is poor parental mental health. A commonly occurring feature of poor mental health are depressive symptoms, particularly among women where lifetime rates of depressive disorder are as high as 20% (Kessler et al., 2005; World Health Organization, 2013). Both depressive disorder and subsyndromal levels of depressive symptoms are associated with impaired functioning including impairments in social relationships (Rapaport & Judd, 1998; Weissman, Paykel, Siegel, & Klerman, 1971). Moreover, results from a meta-analysis indicate that maternal depression is associated with increased hostility and lower warmth in the parent-child relationship which may subsequently reduce mothers' capacities for supporting children as they make the potentially stressful transition to secondary school (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Whilst research has shown that aspects of maternal mental health, such as depression, are associated with increased risk of psychiatric disorders in children much less is known about the potential influences on children's broader functioning including functioning at school (Downey & Coyne, 1990; Goodman et al., 2011). This is the focus of chapter five, where the association between maternal depressive symptoms and children's academic attainment is examined, with particular attention paid to the potential pathways through which maternal depressive symptoms may exert its effects.

Peers. During late childhood and early adolescence friendships are believed to become increasingly intimate and reciprocal while also starting to take a more central role in children's identity and feelings of self-worth (Sullivan, 1953). Relationships with peers, and friendships in particular, provide children with a means to satisfy their needs for companionship and support (Hartup, 1989), as well as opportunities to

develop important social competencies, such as conflict resolution (Piaget, 1932; Smith, Cowie, & Blades, 2011). Losing old friends is one of the top concerns for children transitioning to secondary school (Rice et al., 2015), which seems justified when considering that the transition to secondary school will disrupt most children's peer networks. For instance, primary school friends may go to different secondary schools or be allocated to different classes. Friendships can buffer against life stress (Price, 1998; Rose, 2002), so given the importance of friendships to children of this age group, it is expected that those children who maintain supportive friendships across the potentially stressful experience of school transition will show better adjustment. If this is the case, there may be implications for how schools manage existing friendships over the transition.

There is some existing evidence showing peer relationships do influence how well children adapt to secondary school. For example, in a study of 365 children transitioning to US middle schools, peer relationship variables measured pre-transition were associated with positive post-transition outcomes (Kingery, 2011). Specifically, higher levels of peer acceptance were associated with less loneliness, higher levels of school involvement, and higher academic achievement, and better quality friendships were associated with less loneliness and higher self-esteem. Other findings also indicate that higher quality friendships before the transition are associated with superior academic, behavioural and social adjustment post-transition (Aikins, Bierman, & Parker, 2005). Pre-transition social functioning has been highlighted as a useful factor predicting transition success, however, research into peer influences is increasingly moving towards examining *how* and *under what conditions* interpersonal relationships may influence children's functioning and development (Collins, Raby, & Causadias, 2011). The disruption to children's social networks is one of the defining features of

school transitions, as such, an important next step is to investigate how transition-induced changes to children's social relationships influences their transition success and psychological adjustment. This is examined in chapter six.

1.7. Summary and thesis overview

This thesis takes a developmental psychopathology perspective on children's development over the transition to secondary school. This approach acknowledges that there are complex pathways leading to both maladjustment and positive adjustment and that development results from the interplay of multiple factors operating over time (Sroufe et al., 2005). Therefore, the chapters in this thesis examine individuals' development using a multivariate approach and include factors measured at multiple ecological levels focussing on child-level factors such as self-control and puberty and social-contextual factors such as parenting, maternal mental health, and friendships. This necessitates the use of a prospective longitudinal research design to (i) examine changes in mechanisms and outcomes over time and (ii) examine potentially causal processes as they operate over time through direct and indirect chains of effect (Maughan & Collishaw, 2015; Rutter & Sroufe, 2000). This thesis reports findings from a prospective, three-wave, multiple-informant longitudinal study of school transition collected for this purpose. Longitudinal prospective designs hold a number of benefits. This includes the ability to follow individuals and explore change over time as well as strengths regarding the ability to make causal inferences, including: (i) the ability to temporally order cause and outcome variables; (ii) the ability to show statistical associations between the presumed causes and outcomes; (iii) the ability to exclude possible alternative explanations (e.g., by controlling for confounders; Coolican, 2014; McNamee, 2005; Mill., 1843). Collecting data from multiple

informants allows the use of separate informants to measure key predictor and outcome variables, reducing the influence of common method biases that tend to inflate associations when the same informant is used (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Rutter, Pickles, Murray, & Eaves, 2001). Chapter two describes the dataset collected to address the aims of this thesis.

Chapter three aims to answer two research questions. (1) How can transition success be measured? (2) What are the risk and protective factors relating to transition success? Research question 1 is addressed by establishing a conceptual framework based on a review of the existing research literature. This framework is then used to empirically test a multivariate measure of transition success. Research question 2 is answered by assessing associations between potential risk and protective factors and the measure of transition success developed for research question 1.

Chapter four examines longitudinal change in self-control over the transition from primary to secondary school. This includes describing the normative pattern of self-control development over this period and examining whether variation in this pattern is associated with children's transition success and psychological adjustment at secondary school. This chapter also examines whether self-control is related to theoretically relevant risk and protective factors such as puberty and parenting.

Chapter five further explores how the family context might influence children's transition success. The chapter builds on findings from chapters three and four in order to examine mechanisms by which adversity in the family environment may impact children's functioning at secondary school. Based on the well-established relationship between children's self-control and academic attainment, the analyses in this chapter examine mechanisms through which maternal depressive symptoms may impair children's academic attainment at secondary school. Both maternal parenting and

paternal parenting are examined as possible mediating mechanisms linking maternal depressive symptoms to children's self-control and attainment.

Chapter six examines how the secondary school transition interrupts the stability of children's friendships, one of the defining features of the transition. First, the stability of children's friendships over the transition is described. Next, this chapter examines the role of children's friendship stability as an influence on their transition success and psychological adjustment. Finally, exploratory analyses are conducted to assess whether school friendship policies influence children's friendship stability.

CHAPTER 2: Methods

The School Transition and Adjustment Research Study (STARS)

2.1. Design

Data used in this thesis come from the School Transition and Adjustment Research Study (STARS), a three-wave longitudinal study of children moving from primary to secondary school. In the UK and Northern Ireland, this school transition almost universally occurs at the end of Year 6 when children are approximately 11 years old. Each wave of data collection was approximately six months apart, the first wave was during the last term of primary school (May 2012), the second wave was during the first term of secondary school (November 2012), and the final wave was at the end of the first year of secondary school (June 2013). Children moved from primary to secondary school at the beginning of September 2012 (figure 2.1). Data were collected from three informants at each wave: children, their parents, and their teachers.

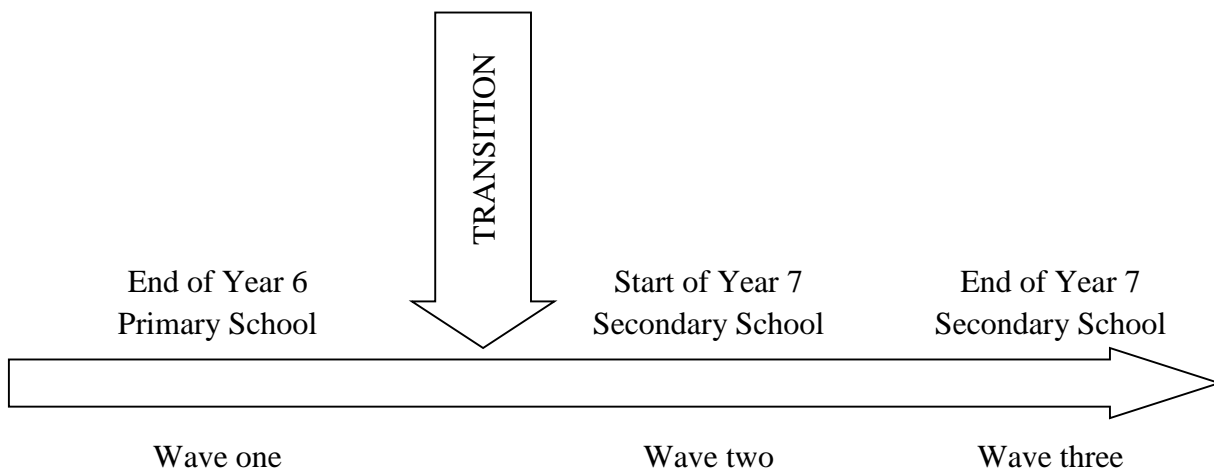


Figure 2.1. Description of study design and timing of data collection waves.

2.2. Procedure

At wave one data were collected from children via postal questionnaires. At waves two and three data were collected from children via questionnaires completed during the school day in classes led by a member of the research team or trained research assistants.

At all waves, data were collected from parents via postal questionnaires. At wave three parents were also invited to complete questionnaires at parents' evenings.

At wave one, where parental consent was received, primary school teachers were invited to complete a postal questionnaire sent directly from the STARS team (teachers were given a £5 voucher for each completed questionnaire). At waves two and three, data were collected from secondary school teachers via questionnaires which were distributed by a contact at each secondary school (e.g., Head of Year).

2.3. Sample/Participants

Participants were recruited from 10 secondary schools in the South East of England. The selection of primary school pupils took place via the secondary schools, with secondary schools' lists of prospective pupils forming the study's sampling frame. This decision was guided by previous pilot work which indicated that inviting prospective secondary school pupils to participate was the most feasible approach for a prospective longitudinal study of secondary transition. Recruitment via primary schools was unfeasible because pupils move to so many secondary schools. Recruitment via secondary schools was feasible because they finalise their lists of prospective pupils by the 1st March which enabled the research team to write to the pupils whilst they were still at primary school, therefore providing baseline data before children started at secondary school.

From October to December 2011, mixed-sex, non-selective, comprehensive secondary schools were invited to participate in STARS by the research team and via contacts of the University's Educational Psychology department. In total, seventy schools were invited to take part of which 17 agreed to participate. A final group of ten schools were selected which showed variation in key demographic characteristics such as academic performance, socioeconomic status, and ethnicity, but which as a whole also approximated the demographic make-up of the local area from which they were drawn (i.e., London and the South-East of England). The ten schools formed a total sample that was broadly representative of English secondary schools in terms of the proportion of pupils with Special Educational Needs (SEN), with English as an additional language (EAL), with free school meal eligibility (FSM; a proxy for economically disadvantaged households) and examination pass rates (see table 2.1).

One of the participating schools dropped out of the study after wave one due to a change of school leadership. For this school, only children who participated (either themselves or a parent) at wave one were invited to participate at waves two and three.

Table 2.1. *Demographic characteristics of study schools at commencement of study.*

	GCSE	FSM	EAL	SEN
School 1	73%	14%	37%	2%
School 2	62%	8%	4%	1%
School 3	43%	19%	17%	3%
School 4	66%	12%	4%	1%
School 5 ^a	46%	14%	10%	5%
School 6	62%	8%	3%	1%
School 7	73%	13%	61%	2%
School 8	80%	9%	16%	2%
School 9	76%	4%	2%	1%
School 10	62%	24%	56%	4%
<i>Participating schools average^b</i>	67%	12%	23%	2%
<i>English schools average^c</i>	59%	16%	12%	2%

Notes. ^athis school left the study after wave one. ^bweighted by number of pupils in each school. ^cSource: (Department for Education, 2011). GCSE = % of pupils gaining 5 GCSEs A* to C (including Maths and English); FSM = % of pupils with free school meals eligibility; EAL = % of pupils with English as an additional language; SEN = % of pupils with a statement of special needs.

Figure 2.2 gives details of study participation at all waves. At wave one 2161 pupils and parents were invited to take part, 1960 at wave two, and 1950 at wave three. This decreased between waves one and two because one school withdrew from the study after a change of school leadership. Response rates are given in Table 2.2. Pupil response rates were lower at wave one (35%) due to the opt-in postal format used, whilst at waves two (93%) and three (88%) an opt-out in-class format was used (Table 2.2). Parent response rates at wave three (48%) were higher due to the additional option of completing questionnaires at parents' evenings (Table 2.2). Teacher response rates were high at all waves, though noticeably improved at waves two (75%) and three (85%) due to the secondary school's support of the research study which meant a member of school staff assumed responsibility for giving out and collecting in teacher questionnaires (Table 2.2).

Table 2.2. *Response rates by study wave and respondent type.*

	Wave 1	Wave 2	Wave 3
Pupils	750/2161 (35%)	1712/1835 (93%)	1653/1879 (88%)
Parents	745/2161 (34%)	544/1960 (28%)	939/1950 (48%)
Teachers	505/761 (66%)	1372/1835 (75%)	1594/1879 (85%)

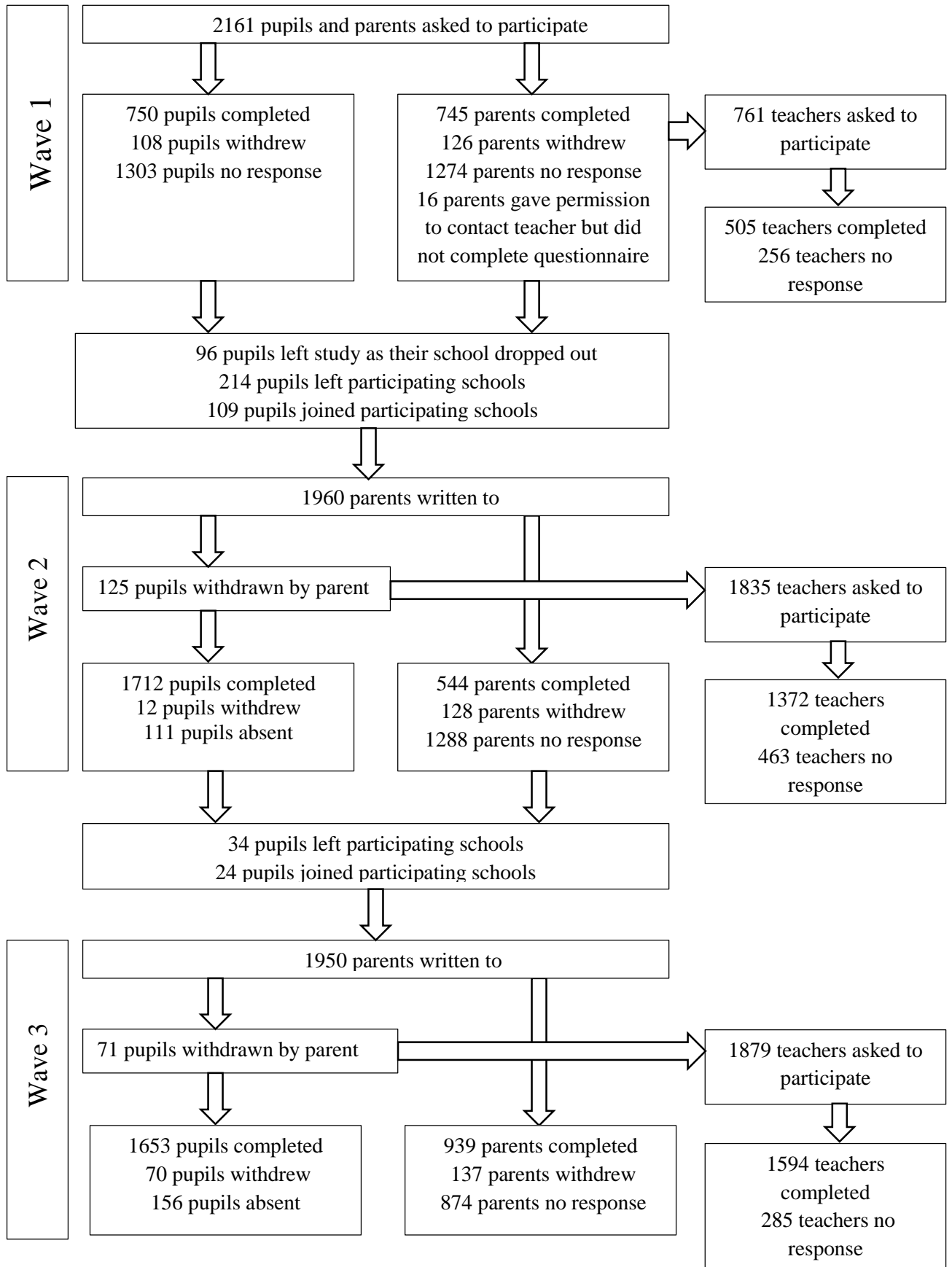


Figure 2.2. Flow diagram showing study participation at all waves.

Table 2.3. *Pupil characteristics by respondent participation (yes/no), by wave.*

	Gender: boys		FSM		SEN		EAL		BME		KS2 English attainment		KS2 Maths attainment	
	Participated		Participated		Participated		Participated		Participated		Participated		Participated	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes <i>M (SD)</i>	No <i>M (SD)</i>	Yes <i>M (SD)</i>	No <i>M (SD)</i>
Pupils														
<i>Wave 1</i>	377 (51%)	605 (55%)	90 (14%)	151 (17%)	10 (2%)	22 (2%)	187 (28%)	241 (27%)	249 (38%)	362 (41%)	4.28 (.71)	4.18 (.70)	4.33 (.80)	4.20 (.80)
<i>Wave 2</i>	912 (53%)	112 (54%)	245 (16%)	19 (23%)	34 (2%)	3 (4%)	446 (29%)	25 (30%)	611 (40%)	36 (46%)	4.21 (.72)	4.21 (.70)	4.25 (.80)	4.15 (.88)
<i>Wave 3</i>	868 (53%)	142 (55%)	228 (16%)	34 (18%)	26 (2%)	11 (6%)	403 (28%)	57 (30%)	562 (40%)	71 (38%)	4.22 (.70)	4.09 (.86)	4.27 (.79)	4.09 (.89)
Parents														
<i>Wave 1</i>	391 (52%)	591 (54%)	89 (14%)	152 (17%)	9 (1%)	23 (3%)	176 (27%)	252 (28%)	232 (36%)	379 (43%)	4.28 (.70)	4.18 (.71)	4.33 (.81)	4.21 (.79)
<i>Wave 2</i>	273 (50%)	751 (55%)	49 (10%)	215 (19%)	9 (2%)	28 (2%)	123 (25%)	348 (30%)	163 (33%)	484 (44%)	4.36 (.68)	4.14 (.73)	4.40 (.76)	4.18 (.81)
<i>Wave 3</i>	467 (50%)	543 (56%)	123 (15%)	139 (18%)	17 (2%)	20 (3%)	265 (32%)	195 (25%)	344 (42%)	289 (37%)	4.25 (.71)	4.16 (.73)	4.29 (.80)	4.21 (.80)
Teachers														
<i>Wave 1</i>	258 (51%)	140 (55%)	49 (11%)	43 (19%)	8 (2%)	2 (1%)	97 (22%)	86 (37%)	115 (27%)	125 (54%)	4.29 (.70)	4.24 (.69)	4.34 (.80)	4.29 (.81)
<i>Wave 2</i>	728 (53%)	246 (54%)	204 (17%)	60 (15%)	28 (2%)	9 (2%)	321 (26%)	150 (37%)	464 (38%)	183 (46%)	4.20 (.71)	4.23 (.74)	4.24 (.77)	4.28 (.90)
<i>Wave 3</i>	844 (53%)	146 (52%)	227 (17%)	30 (14%)	30 (2%)	5 (2%)	420 (31%)	33 (15%)	591 (44%)	33 (15%)	4.22 (.72)	4.20 (.70)	4.26 (.78)	4.21 (.90)

Notes. Numbers in bold show significant differences ($p < .05$) between ‘yes’ and ‘no’ group within respondent type and wave. ‘No’ group consists of non-responding participants and withdrawn participants. FSM: eligible for free school meals. SEN: has a statement of special educational needs. EAL: has English as additional language. BME: Black or Minority Ethnic. KS2: Key Stage 2 (Years 3 to 6). Numbers may fluctuate slightly due to missing data on some variables.

Table 2.3 shows the number and percentage of people within a demographic group (boys, FSM, SEN, BME etc.) according to whether they participated (Yes) or did not participate (No) – where these percentages are similar it can be concluded that there is no response bias for that demographic characteristic. This is shown for pupils, parents, and teachers at each wave. For example, for pupils at wave one 377 boys participated (51% of all wave one participants) and 605 boys did not participate (55% of all wave one non-participants), these were not statistically different so it was concluded that a similar proportion of boys took part as did not take part and therefore no gender bias was present in pupil participation at wave one.

Participating children did not differ from non-participating children in gender composition, free-school meals eligibility, having English language as an additional language, or BME composition (Table 2.3). They did differ in the percentage of children with SEN at wave three only and in Key Stage 2 (KS2) English and Maths attainment at waves one and three only. Whilst this indicates some small bias towards a slightly healthier and higher attaining sample, these sample statistics suggest good overall coverage of the sampling frame (i.e., the Year 7 intake of the participating secondary schools).

Participating parents tended to have higher attaining children. The postal format seemed to reduce participation by parents of children on free school meals (FSM), with English as an additional language (EAL), or who were from Black or Minority Ethnic (BME) groups. This is particularly noticeable by the tendency of parents of EAL and BME (non-significant) pupils to be more likely to respond at wave three when questionnaires were also available at parents' evenings. As for pupil participation rates, whilst there is slightly better coverage of higher attaining pupils, there is good coverage of the sampling frame when considering all waves of data.

For participating teachers, there was a tendency towards underrepresentation of EAL and BME pupils at waves one and two, however this bias was reversed at wave three where pupils from these groups were overrepresented. Again, taken as a whole, there is good data coverage from teachers.

2.4. Measures

Measures are listed here in alphabetical order (A-Z).

2.4.1. Academic attainment

Attainment at the end of Year 6 (primary school) was measured using the results of formal Key Stage 2 National Curriculum Tests in Maths and English (Reading and Writing). Official grades awarded in these tests range from level 2 (lowest) to level 6 (highest). Pupils who do not reach level 2 are designated as ‘working below level 2’. For analysis these scales were recoded into a continuous scale so that pupils working below level 2 = 1, at level 2 = 2, at level 3 = 3 and so on (range = 1 to 6).

Attainment at the end of Year 7 (secondary school) was measured using children’s grades from teacher assessments in Maths, English and Science. For seven of the participating schools, performance scores for the end of Year 7 were National Curriculum (NC) attainment levels for English, Maths and Science (range = 2c to 8b, where 2c is lowest and 8b is highest). There are 8 NC levels, where level 1 describes average achievements expected of a child at around 5 years old, and level 8 describes the level achieved by the most able pupils at 14 years old. At the end of Year 6 (corresponding to the start of this study) the majority of pupils are expected to achieve level 4. The letters accompanying each level refer to the following: c = the child has started to work at the NC level; b = the child is working well within the NC level; a = the child has reached the top of the NC level and is working towards the next NC level (Awliscombe Primary School, 2011). For analysis, these levels were recoded into a continuous scale so that 2c = 1, 2b = 2... 8b = 20. For the remaining two schools, performance scores for the end of Year 7 were International Middle Years Curriculum attainment levels for English, Maths and Science where there were four levels (pass,

merit, credit, distinction). These levels were recoded into an ordinal scale so that: pass = 1, merit = 2, credit = 3, distinction = 4. For the main analyses, in order to account for these differences in measurement, scores for each subject were standardised within schools. Standardised scores for English, Maths and Science showed good internal consistency ($\alpha = .85$). Higher scores indicate higher attainment.

To assess the practical significance of the effect sizes relating to academic attainment, some analyses presented in this thesis were re-run using the National Curriculum (NC) attainment data only (available for 7 of the participating schools).

2.4.2. Best friendship quality

For best friends only, friendship quality was assessed using a shortened version of the Friendship Quality Questionnaire (Bukowski, Hoza, & Boivin, 1994). Three questions were used to assess each of four dimensions: companionship (e.g., ‘My friend and I spend all our free time together’); help (e.g., ‘My friend helps me when I am having trouble with something’); closeness (e.g., ‘I feel happy when I am with my friend’); and security (e.g., ‘If I had a problem at school or at home I can talk to my friend about it’). Items were rated on a five-point scale (1 = Not at all, 2 = Very little, 3 = Somewhat, 4 = Quite a bit, 5 = Very much). These twelve items were summed to produce a total best friendship quality measure ($\alpha = .84$) with high scores representing higher quality friendships. The validity of this measure is supported by its ability to distinguish between reciprocated and non-reciprocated friendships and between stable and non-stable friendships (Bukowski et al., 1994).

2.4.3. Classroom behaviour

At wave three, children's classroom behaviour was measured using peer-reported measures of cooperative and disruptive behaviour. The Guess Who peer assessment measure was adapted to allow unlimited nominations (Coie, Coie, Dodge, & Coppotelli, 1982). Pupils identified, who, from a list of classmates fitted behavioural descriptors *Cooperates* and *Disrupts*. "Cooperates: this person is really good to have as part of your group because they are agreeable and cooperate. They join in, share and give everyone a turn". "Disrupts: this person has a way of upsetting everything when he or she gets in a group. They don't share and try to get everyone to do things their way".

The proportion of classmates nominating each child as fitting each descriptor were the outcomes. Throughout this thesis scores on the *Disrupts* measure were reversed so that higher scores indicate less disruptive behaviour. In chapters four and six, *Disrupts* (reversed) scores were combined with *Cooperates* scores to create a 'classroom behaviour' variable ($\alpha = .71$), where higher scores indicate more cooperative and less disruptive behaviour. Stability coefficients of .76 (cooperates) and .80 (disrupts) have been reported over a five week interval with pupils aged 9-12 years (Frederickson & Graham, 1999). In the STARS sample, *Cooperates* scores were positively correlated with higher scores on the teacher-rated SDQ prosocial scale ($r = .37, p < .001$) and *Disrupts* scores were positively correlated with higher scores on the teacher-rated SDQ conduct problems scale ($r = .52, p < .001$).

2.4.4. Friendships

At all waves, friendships were assessed by a shortened version of the Friendships Qualities Scale (Parker & Asher, 1993). This scale asked children to

identify and rank their three best friends. Children were also asked to rate how happy they were with each of these friendships on a 5-point scale based on unhappy and happy faces (coded so that ☹☹ = 1, ☹ = 2, 😐 = 3, 😊 = 4, 😊😊 = 5), higher scores indicate higher satisfaction with these friendships.

2.4.5. IQ

IQ was measured by the Cognitive Abilities Test (CAT3; Lohman et al., 2001), a standardised assessment which measures verbal, quantitative and non-verbal reasoning ($\alpha = .86$). These tests were administered independently by six of the participating schools and collected from school records. Higher scores indicate higher IQ.

2.4.6. Learning motivation

At wave one, children's learning motivation was assessed with children's self-reports to the Academic Goals Scale (4 items, e.g., 'How often do you try to learn something new even when you don't have to?' $\alpha = .79$; Wentzel, 1993). Item responses were made on a five-point response scale (1 = never, 2 = seldom, 3 = sometimes, 4 = often, 5 = always). Higher scores indicate higher motivation to learn. Higher levels of learning (or mastery-oriented) motivation have been shown to be associated with higher school grades (Wentzel, 1993).

2.4.7. Liking school

At wave three, pupils' perceptions of school were measured with five items (e.g., 'I like my school') from the *Liking School* scale developed by the Child Development Project (Battistich et al., 1995; Solomon, Battistich, Watson, Schaps, & Lewis, 2000). Items were rated on a four-point response scale (1 = NO!!, 2 = no, 3 =

yes, 4 = YES!!). The internal consistency of the five items ($\alpha = .80$) was consistent with those found in other studies (e.g., Battistich et al., 1995). Higher scores indicate liking school more.

2.4.8. Loneliness at school

At waves one and three, children's feelings of loneliness were measured using seven items (e.g., 'I'm lonely at school') from the school-oriented version of the Loneliness in Children scale (Asher & Wheeler, 1985). Items were rated on a five-point response scale (1 = not true at all, 2 = hardly true at all, 3 = sometimes true, 4 = true most of the time, 5 = always true). The internal consistency of the seven items (wave one $\alpha = .81$, wave three $\alpha = .80$) was similar to those found in other studies (e.g., Asher & Wheeler, 1985). Higher scores indicate more loneliness at school, but the scale is reversed in chapter 3 and therefore higher scores indicate less loneliness. This measure has been found to distinguish between rejected, average, and popular children (Asher & Wheeler, 1985).

2.4.9. Parental depressive symptoms

At wave one, responding parents reported on their own current depression symptoms by completing the depression subscale of the Hospital Anxiety and Depression Scale (HADS) which asks about symptoms in the past week (Zigmond & Snaith, 1983) (seven items, e.g., 'I still enjoy the things I used to enjoy', $\alpha = .77$). Item responses were made on a four-point response scale (e.g., 0 = definitely as much, 1 = not quite so much, 2 = only a little, 3 = hardly at all). Scores on all items were combined to create a total score (range 0 to 21). The HADS has been validated for use

in community samples and various age groups (Spinhoven et al., 1997; White, Leach, Sims, Atkinson, & Cottrell, 1999).

2.4.10. Parenting

At wave one, parenting was assessed with responding parents' self-reports to four subscales of the Iowa Youth and Families Project (IYFP) Interaction Rating Scales (Melby et al., 1993). Item responses were made on a seven-point response scale (1 = always, 2 = almost always, 3 = fairly often, 4 = about half, 5 = not too often, 6 = almost never, 7 = never). Two scales measured parents' reports of positive and negative behaviour and affect expressed towards their child: Warmth (six items, e.g., 'How often did you let them know you really care about them?' $\alpha = .87$) and Hostility (four items, e.g., 'How often did you get angry at them?' $\alpha = .76$). Two scales measured the strategies parents use to control their child: Inconsistent Discipline (4 items, e.g., 'Once a punishment has been decided, how often can they get out of it?' $\alpha = .71$) and Inductive Reasoning (four items, e.g., 'How often do you give reasons to this child for your decisions?' $\alpha = .79$). These scales have been widely used to assess parenting behaviours (e.g., Brody et al., 2005; Dogan, Conger, Kee Jeong, & Masyn, 2007).

At wave two, children's perceptions of parental warmth and hostility were assessed with children's reports to the same scales (Melby et al., 1993): Warmth (six items, e.g., 'How often did your mum/dad let you know she/he really cares about you?' $\alpha = .90$ and $.92$ for mums and dads respectively) and Hostility (four items, e.g., 'How often did your mum/dad get angry at you?' $\alpha = .79$ and $.82$ for mums and dads respectively).

2.4.11. Puberty

At all waves, children's pubertal status was assessed using the nine-item Puberty Development Scale (PDS; Petersen, Crockett, Richards, & Boxer, 1988) which shows good validity in comparison to physician ratings (Brooks-Gunn, Warren, Rosso, & Gargiulo, 1987). Items asked pupils (i.e., self-report) whether there had been no development, a little development or a lot of development in five areas. All children were asked about body hair, skin and increased speed of growing. Boys were additionally asked about vocal pitch ('voice breaking') and facial hair. Girls were additionally asked about breast development and menarche status. The scale also asked whether physical development in these areas was complete (like that of an adult). Scores for each characteristic (1 = no development; 2 = a little; 3 = a lot; 4 = complete or like that of an adult) were summed to produce a continuous puberty scale (range: 5-20, $\alpha = .65$ and $.60$ for girls and boys, respectively). For descriptive purposes Puberty Category Scores were also calculated in line with suggestions in Carskadon and Acebo (1993), where: 1 = Prepubertal (wave one = 32%, wave two = 18%, wave three = 13%); 2 = Early Pubertal (wave one = 34%, wave two = 34%, wave three = 30%); 3 = Midpubertal (wave one = 28%, wave two = 31%, wave three = 32%); 4 = Late Pubertal (wave one = 6%, wave two = 15%, wave three = 24%); 5 = Postpubertal (wave one = 0.4%, wave two = 1%, wave three = 2%). Higher scores indicate higher pubertal status.

2.4.12. Recent life events

At wave one, positive (4 items, range 0 to 4, e.g., 'special prize or recognition for doing well in an activity') and negative (21 items, range 0 to 21, e.g., 'death of a parent, brother or sister') life events were measured using parents' and children's reports to a modified version of the Life Events Checklist (Johnson & McCutcheon,

1980). Events were coded as present if parents or children indicated the child had experienced any of the listed events during the last 12 months in line with research indicating that combining reports from parents and children yields more reliable ratings (Gest, Reed, & Masten, 1999). Binary responses were summed to form total scores. Higher scores indicate more positive or negative events have occurred in the year. The life events checklist shows good test-retest reliability (Brand & Johnson, 1982).

2.4.13. School attendance

At the end of Year 7 two indicators of pupils' attendance for the entire academic year were collected: (i) the percentage of school days attended; (ii) the percentage of days students were absent from school due to unauthorised absences. Higher scores indicate higher attendance and fewer unauthorised absences.

2.4.14. School connectedness

At waves one and three, school connectedness was measured by self-report using a six-item scale (Resnick et al., 1997) which asked children to what extent they agreed with statements about their current school (e.g., 'I feel close to people at school', wave one $\alpha = .88$, wave three $\alpha = .82$). Items were rated on a five-point scale (1 = strongly disagree, 2 = disagree, 3 = not sure, 4 = agree, 5 = strongly agree). Higher scores indicate more connectedness to school.

2.4.15. Self-control

At all three waves, children's self-reports to the Brief Self-Control Scale (BSCS; Tangney et al., 2004) was used to measure children's self-regulatory behaviour in four domains: thoughts, emotions, impulses and performance. This 13-item scale asked

children to rate how much each statement reflects how they typically behave (e.g., ‘I am good at resisting temptation’). Item responses were made on a five-point response scale (1 = not at all, 2 = very little, 3 = somewhat, 4 = quite a bit, 5 = very much). Responses on the 13 items were averaged. The scale showed good internal consistency (wave one, $\alpha = .81$; wave two, $\alpha = .80$; wave three, $\alpha = .80$) and has previously been used with children (e.g., Duckworth & Seligman, 2005; Finkenauer, Engels, & Baumeister, 2005). At wave one, children’s self-control was also measured via parents’ reports to the BSCS ($\alpha = .87$; Tangney et al., 2004). Higher scores indicate higher self-control.

2.4.16. Socio-demographic characteristics

Children’s age at wave one was measured in months with data from school records (wave one $M = 134.63$, $SD = 3.86$). Gender was coded as 0 = male and 1 = female (51% male).

2.4.17. Socioeconomic status

At wave one, the responding parent reported on a number of questions about the socioeconomic status (SES) of themselves and their partners (if applicable). Three indicators of socioeconomic status were collected: economic status, social status, and work status (Adler et al., 1994; Conger et al., 2010).

Economic status was measured by family income on an eight point scale ranging from 1 to 8 (median = 4) where:

1 = up to £10,000,

2 = £10,000 to £19,999,

3 = £20,000 to £29,999,

4 = £30,000 to £39,999,

5 = £40,000 to £49,999,

6 = £50,000 to £74,999,

7 = £75,000 to £99,999,

8 = £100,000 or more.

Social status was measured by education level (1 = O-levels or GCSEs, 2 = A-levels/Highers, 3 = university degree, 4 = higher or postgraduate degree). Work status was measured by employment status (unemployed vs. employed/retired/in education).

Parental reports of their economic, social, and work status data offer a comprehensive approach to measuring SES but were only available where parents responded at wave one (n = 745). Moreover, even within this group of respondents, data on indicators such as income suffered from lower responses (n = 599). To overcome these limitations, a further indicator of SES was also collected for the STARS sample: children's eligibility for free school meals. Children in this age group are generally eligible for free school meals when their parents receive welfare benefits or are on a low income (Brent Council, 2015). This is a less detailed measure than the indicators of SES discussed above, but it benefited from wider coverage in the sample (n = 1643) as it was collected from school records.

2.4.18. Symptoms of mental health problems (Strengths and Difficulties Questionnaire)

Children's mental health problems were measured using children's self-reports (all waves), parents' reports (waves one and two), and teachers' reports (all waves) to the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), a 25-item scale measuring adjustment and psychopathology via five subscales (see table 2.4 for α 's): emotional symptoms (e.g., 'I worry a lot'); conduct problems (e.g., 'I get very angry and lose my temper'); hyperactivity/inattention (e.g., 'I am restless, I cannot sit still for

long’); peer problems (e.g., ‘I am usually on my own. I generally play alone or keep to myself’); prosocial behaviour (e.g., ‘I usually share with others’). A total difficulties score can be computed by combining the emotional symptoms, conduct problems, hyperactivity/inattention, and peer problems subscales. Items were rated on a three-point scale (0 = not true, 1 = sort of true, 2 = certainly true). Higher scores indicate higher levels of emotional problems, conduct problems, hyperactivity/inattention, peer problems, or prosocial behaviour. The SDQ is a well validated measure, showing adequate reliability and validity and performing well compared to other established measures of child psychopathology (Goodman, 1997, 2001).

Table 2.4. *Internal consistency of SDQ scales, by rater and wave.*

Rater and scale	Wave 1 α	Wave 2 α	Wave 3 α
Child			
Emotional symptoms	.71	.74	.74
Conduct problems	.57	.61	.62
Hyperactivity/inattention	.73	.69	.73
Peer problems	.58	.57	.59
Prosocial behaviour	.64	.68	.66
Total difficulties	.81	.83	.82
Parent			
Emotional symptoms	.75	.78	-
Conduct problems	.48	.52	-
Hyperactivity/inattention	.80	.77	-
Peer problems	.65	.74	-
Prosocial behaviour	.70	.73	-
Total difficulties	.83	.85	-
Teacher			
Emotional symptoms	.75	.86	.85
Conduct problems	.70	.72	.80
Hyperactivity/inattention	.84	.81	.80
Peer problems	.73	.65	.75
Prosocial behaviour	.85	.87	.85
Total difficulties	.86	.87	.89

2.4.19. Transition concerns

At wave one, children's own concerns about the transition to secondary school were measured with the School Concerns Questionnaire (20 items, $\alpha=.92$; Rice et al., 2011). Children were asked to indicate how worried they were about each of the 20 areas (e.g., 'making new friends'). Item responses were made on a ten point scale (1 = not at all worried, 10 = I get extremely worried about it). Higher scores indicate higher levels of concerns about secondary school.

At wave one, parents' transition concerns were measured as the total number of areas that the responding parent reported they were concerned about (11 items, range = 0 to 11; Evangelou, 2008). Responses for each item were coded as 0 = not concerned or 1 = concerned for the following 11 areas: amount of freedom; amount of homework; level of work; adjusting to having lots of teachers; safety; travel to school; keeping old friends; making new friends; bullying; understanding school procedures; understanding school rules. Higher scores indicate higher concerns about the transition to secondary school.

2.5. Ethics

Ethical approval for this study was obtained from the University College London research ethics committee. At each assessment, parents were given the opportunity to opt their children out of the study and informed pupil assent was obtained in the classroom sessions prior to questionnaire administration. All participants were provided with information about the aims of the study and signposted to relevant persons (e.g., teachers) and organisations (e.g., Childline) in case of any concerns arising regarding the school transition or any of the topics covered in the questionnaires. Prior to questionnaire administration, participants were informed that the questionnaires contained questions on sensitive topics and were asked to skip any questions they did not feel comfortable answering. Pupils were provided with a sheet to cover their answers. Parents and pupils were able to withdraw from the study at any time without providing a reason.

All information was kept strictly confidential, stored securely, and kept in accordance with the Data Protection Act 1998. Names were stored separately from questionnaire responses.

**CHAPTER 3: Measuring successful school transitions and exploring
associated risk and protective factors**

Abstract

The transition to secondary school is an important period which can have long-term effects on children's adjustment. To some extent, drawing generalisable conclusions from research on the transition to secondary school has been hampered by a lack of consensus on how transition success is defined and measured. This chapter reviews the existing literature in order to identify and empirically test a parsimonious model of transition success. Two domains of 'academic and behavioural adjustment' and 'school-bonding' were a good fit to the STARS data (N = 1842) and a second independent dataset (N = 234). These two domains are then used to test longitudinal associations with a number of putative risk and protective factors. The chapter concludes that research into successful transition would ideally include indicators of both academic and behavioural adjustment, and school bonding.

3.1. Introduction

Moving to secondary school is one of the defining events of early adolescence. The transition from primary to secondary school introduces novel experiences and challenges for children, such as higher academic expectations, new social relationships, and the negotiation of a new environment. Many pupils express some concern about this transition, particularly the structural and social aspects of the new school environment such as following a timetable and interacting with older peers (Rice et al., 2011; West et al., 2010). While such apprehension is likely to be a normative response to change, a significant minority of pupils display continued difficulties after starting secondary school, characterised by decreases in academic attainment and attendance, and increases in disruptive behaviour and anxiety (Anderson et al., 2000; Galton et al., 2000). These individual differences in response to the move to secondary school are consistent with research showing that there is substantial individual variation in responses to change events and environmental stressors (Moffitt et al., 2005; Rutter & Silberg, 2002).

Transitions cause stress when they result in an imbalance between the demands of the environment and an individual's capabilities to meet these demands (Cohen, Janicki-Deverts, & Miller, 2007; McGrath, 1970). Individual differences in overcoming transition-induced stress is one route by which school transition may affect children's psychological adjustment (Rutter, 2012). Furthermore, the successful navigation of transition points can set in motion chains of events that have positive effects on children's well-being over extended periods of time (Felner et al., 1982; Rutter, 1989; Vitaro & Tremblay, 2008). Thus, the transition to secondary school should be viewed as a developmentally salient period which has the potential to influence a child's life course (Elias et al., 1992; Leonard & Elias, 1994).

Despite the broad literature that continues to grow around the transition to secondary school, there is a lack of consensus about which aspects of children's development should be assessed in the definition and measurement of successful transition. This significant gap regarding what exactly successful school transitions are and how to best measure them has hampered the extent to which it has been possible to draw conclusions from empirical work in this area. For example, testing the replicability of previous findings becomes problematic in the absence of a definition of transition success and may have contributed to conclusions (e.g., that girls are vulnerable to difficult transitions; Anderson et al., 2000) that are inconsistent with empirical research (e.g., Roeser, Eccles, & Sameroff, 2000). A working definition of transition success would help in identifying and testing key processes of risk and resilience underlying problematic and successful transitions respectively. It would also aid in identifying whether risk and protective factors differ in their pattern of association across domains of transition-related functioning.

This study draws on previous theory and research to outline a model for measuring transition success. This model is then tested in two datasets. Finally, the construct validity of this model is examined by testing its associations with a range of potential risk and protective factors identified by previous research. An outline of a model for measuring successful school transition is first described.

Measuring successful transition

In order to obtain an accurate view of how school transition affects children it is important to separate the effects of school transition from other major events that coincide during adolescence, such as pubertal development. One area where this is particularly important is the study of how school transition is related to psychological

difficulties. A number of studies have reported post-transition increases in emotional and behavioural problems (Burchinal, Roberts, Zeisel, & Rowley, 2008; Chung et al., 1998; Hirsch & DuBois, 1992; Hirsch & Rapkin, 1987). However, the prevalence of many mental health disorders and symptoms increase during adolescence (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003) making it difficult to separate the effects of school transitions from other developmental processes. One way of increasing confidence in the effects of school transition is to ensure that indicators of transition success measure school-specific functioning (Ladd, 1989).

Despite previous research attention given to the primary-secondary school transition, no single theoretical framework is specifically concerned with measuring the success of transitions to secondary school. Nevertheless, previous research indicates that pupil functioning at school is best conceptualised as a multi-dimensional construct (e.g., Appleton, Christenson, Kim, & Reschly, 2006; Battistich et al., 1995; Birch & Ladd, 1996). For the current purpose of measuring successful transitions to secondary school this thesis draws on research into early school transitions (i.e., home to school on school entry), as this is the only body of work that defines pupil functioning in the context of school transitions (Birch & Ladd, 1996; Ladd & Kochenderfer, 1996). Ladd identifies four main cognitive and interpersonal demands placed on children entering a new school: progressing academically, meeting the expectations of the new school and teachers, becoming comfortable in the school environment, and gaining acceptance by peers (Ladd, 1989). This framework emphasises that school adjustment should not only be defined using traditional measures of academic performance, but also in terms of children's behavioural involvement with school, their perceptions of school, and their social-affective experiences in school (e.g., Birch & Ladd, 1996). These four domains

are used to guide the development of a measure of successful adaptation to secondary school.

Academic attainment is by far the most common construct studied in transition studies. It is a key measure used to evaluate children's performance, progress and learning at school and has been shown to affect children's health and life chances well into adulthood (e.g., Wadsworth & Kuh, 1997). It is therefore an important indicator for any measure of transition success. Few studies have explicitly examined measures of behavioural involvement at school other than attainment. Where other measures have been examined, they tend to relate to pupils' attendance (e.g., increased truancy) or conduct (e.g., increased disruption and antisocial behaviour), both of which worsen post transition (De Wit, Karioja, & Rye, 2010; Theriot, 2010; Witherspoon & Ennett, 2011). These changes may indicate disengagement from school, at least in the short term. Future work is likely to benefit from measuring both positive and negative aspects of school involvement (i.e., attendance and truancy rates) and behaviour (i.e., cooperative and disruptive behaviour).

Pupils' perceptions of their school appear to become more negative post-transition (Riglin, Frederickson, Shelton, & Rice, 2013), and the broader, but related construct of school connectedness weakens (Schneider et al., 2008; Witherspoon & Ennett, 2011). School connectedness is a construct spanning both perceptions of school and social-affective experiences in school (e.g., Catalano, Oesterle, Fleming, & Hawkins, 2004; Kidger, Araya, Donovan, & Gunnell, 2012; Libbey, 2009). Given that school connectedness shows evidence of decline following transition and that it confers protective effects for a range of outcomes (Resnick et al., 1997), it may be a useful indicator of post-transition functioning.

Many pupils express concerns about the social changes associated with school transition (e.g., making new friends, the potential for being bullied; Rice et al., 2011), though children report both positive and negative changes to their social functioning post-transition (Cantin & Boivin, 2004; Fenzel, 2000; West et al., 2010). Given the important role friendships play in children's psychosocial development (Poulin & Chan, 2010) and the importance of social relationships to children's school connectedness, the presence of friendships, feelings of social inclusion, and absence of loneliness are likely to be important indicators of positive social and affective functioning post-transition.

The transition to secondary school involves a period of adaptation over time (Anderson et al., 2000; Elias et al., 1992; Leonard & Elias, 1994). For example, while most children express some concerns about moving to secondary school, these concerns tend to decrease during the first year of secondary school for most pupils. Thus, children with persistent difficulties across the first year of secondary school are likely to comprise a vulnerable group. The end of the first academic year therefore appears to be an appropriate time to assess transition success.

In summary, a model for measuring transition success is proposed which is both multidimensional and school-specific, such that, a pupil would be considered to have made a successful transition to secondary school in all domains if, at the end of their first year, they do well in their school work (performance domain), attend school (behavioural involvement domain), display appropriate behaviour (behavioural involvement domain), like their school (perceptions of school domain), and feel socially included (social-affective experiences in school domain). The next section outlines a number of risk and protective factors that are hypothesised to be associated with successful transition and are therefore used to test the convergent and discriminant validity of measures of transition success.

What are the possible risk and protective factors associated with successful transition?

The developmental model presented in chapter one described a number of social-contextual and individual-level factors that are likely to be related to successful transition (Bronfenbrenner, 1979; Sameroff, 2009). Drawing on literature on school transitions and school functioning more generally, this section outlines a number of hypothesised associations between risk and protective factors and the four domains of transition success described above. These are used to test the convergent validity of the transition success model (i.e., test that transition success is associated with its expected risk and protective factors).

A number of sociodemographic factors have been linked to school outcomes, specifically, it is hypothesised that boys, younger children (e.g., summer born children), and children from lower income families will have lower levels of performance at secondary school (Crawford, Dearden, & Greaves, 2013; Riglin et al., 2013; Roeser et al., 2000; Symonds & Galton, 2014).

Parental characteristics have been implicated as potential mechanisms through which transition-related declines in pupil functioning may occur or may be moderated (Jindal-Snape & Miller, 2008). For example, declines in pupils' academic interests and motivation over the transition appear to be buffered by higher levels of maternal academic interest (Dotterer et al., 2009) and parental support (Schneider et al., 2008), respectively. It has also been suggested that parents' may help their children overcome difficult transition experiences by increasing children's self-esteem and self-efficacy, for instance, through supporting and praising their children's efforts (Jindal-Snape & Miller, 2008; Rutter, 1987; Symonds & Galton, 2014). It is therefore hypothesised that positive, supportive parenting characteristics such as parental warmth and an absence of

hostility will predict higher transition success. The empirical findings described above suggest this can be expected to occur in relation to measures of children's perceptions of school.

Parental distress is likely to reduce parents' capacities to support their children during the secondary transition. A common source of distress for parents is poor mental health which has been linked to a range of poor outcomes for children. The best evidence for this relates to psychiatric outcomes, but there is also some evidence suggesting school outcomes such as academic performance will be negatively affected (Downey & Coyne, 1990; Goodman et al., 2011). It is therefore hypothesised that children's transition success, at least in the performance domain, will be negatively impacted by parental mental health problems. It has been suggested that parents support children's transitions by altering how the child interacts with risk during this period (Jindal-Snape & Miller, 2008; Rutter, 1987; Symonds & Galton, 2014). This includes helping the child to develop adaptive coping skills and manage risk. It has also been suggested that parents who worry their children about the transition are likely to increase chances of a negative transition (Symonds & Galton, 2014), it is therefore hypothesised that parental concerns will be associated with poorer transition success.

Previous research suggests that a number of individual-level characteristics may be related to poorer functioning post transition. Findings point to children having poorer educational outcomes when school transitions coincide with other stressful events such as the onset of puberty (Simmons, Burgeson, Carlton-Ford, & Blyth, 1987). It is therefore hypothesised that the experience of a greater number of negative events will be associated with poorer transitions. Mastery-oriented learning motivations are associated with positive school functioning in areas related to performance, involvement and perceptions of school (Anderman & Midgley, 1997; Pintrich, 2000). It is therefore

hypothesised that children who are more motivated to learn will show superior post-transition functioning in these domains. More generally, educational research has shown strong links between higher school attainment and factors such as cognitive ability (Brody, 1997; Gottfredson, 2004) and self-control (Duckworth & Seligman, 2005) and it is likely that adaptive individual-level characteristics such as these will play a positive role in functioning at secondary school, particularly in the performance domain.

Children's psychological adjustment is likely to influence their adaptation to secondary school. Longitudinal studies have linked symptoms of mental health difficulties to lowered academic performance (Riglin et al., 2013; Roeser et al., 2000), and to higher levels of behavioural problems and lower levels of school liking (Riglin et al., 2013). Elevated levels of transition-related worries have also been linked to reduced academic performance and lower school liking (Rice et al., 2011; Riglin et al., 2013). Therefore, it is hypothesised that children's symptoms of mental health problems and higher levels of transition concerns will be negatively associated with transition success in the domains of performance and perceptions of school.

The current study

The evidence reviewed supports a model for measuring transition success that comprises four domains: performance, behavioural involvement, perceptions of school, and social-affective experiences in school. The first aim of this study was to empirically test this working model of successful transition. Associations between these domains of transition success were examined in order to derive an empirically-informed and parsimonious measure of transition success. The second aim of this study was to test the validity of this model of transition success by examining associations

between successful transition measured at the end of the first year of secondary school and a range of hypothesised risk and protective factors measured prior to the transition.

3.2. Method

Study designs and samples

Two datasets are used in this chapter. The primary dataset comes from the School Transition and Adjustment Research Study (STARS) described in chapter two. The second dataset was originally collected as a pilot study for STARS and is used here to cross-validate the model of transition success derived using the STARS dataset in an independent sample. The pilot dataset contained all of the outcomes measures collected in STARS except for a measure of children's loneliness at school.

Dataset one (School Transition and Adjustment Research Study; STARS).

Data included in this chapter come from the third wave of data collection conducted at the end of Year 7 (pupils' first year of secondary school; school transition success outcomes, Aim 1) and the first wave of data collection conducted one year earlier at the end of Year 6 (pupils' last year of primary school; risk and protective factors associated with transition success, Aim 2). This chapter uses data from 2151 pupils at the nine secondary schools which participated at all waves of the study. The tenth school was not used here as they did not participate in wave three of STARS which is when transition success outcomes were measured. As a group, these nine schools were slightly more ethnically diverse and higher performing than the English school population, but were broadly representative of English secondary schools on a range of demographic characteristics: the proportion of pupils with Special Educational Needs (1.8% vs 1.9% England average), the proportion of pupils for whom English was not their first language (24% vs 12% England average), from economically disadvantaged

households (12% vs 16% England average), and pupil academic achievement at age 16 years as assessed by public examination results (the proportion of pupils achieving five A to C grades was 68% vs 59% England average).

At wave one, postal questionnaires were completed by 707 parents and 716 pupils (365 boys, 51%) who were an average age of 11 years and 3 months ($M = 135$ months, $SD = 3.5$). At wave three (one year later), 1640 pupils (867 boys, 53%) completed questionnaires and peer assessments at school during a class led by a member of the research team. Academic attainment and attendance data at the end of Year 7 were available from school records for 1803 and 1724 pupils, respectively. Children were an average age of 12 years and 3 months ($M = 147$ months, $SD = 3.6$) when they completed the end of Year 7 assessments.

Dataset two (pilot sample). Cross-validation tests of the transition success models derived from dataset one were carried out using this cross-sectional data collected at the end of Year 7. Pupils were from two mixed, non-selective secondary schools in a central Southern county in England. The two schools were a little below average in terms of pupil academic achievement at age 16, i.e., the proportion of pupils achieving five A to C grades was 44% and 30% compared to the concurrent England average of 48% (Department for Education, 2011).

In-school questionnaire and peer assessment measures were completed by 234 pupils (133 boys, 57%), who were an average age of 12 years and 3 months ($M = 147$ months, $SD = 3.7$). Academic attainment data and attendance data at the end of Year 7 were available from school records.

Measures of transition success

Performance (academic attainment). In STARS, academic attainment was measured as described in chapter two (see 2.4.1.). In the pilot sample academic attainment was measured as described in chapter two though both schools used the National Curriculum levels. Higher scores indicate higher attainment.

Behavioural involvement (school attendance). In both datasets, the percentage of school days attended and percentage of unauthorised absences were collected at the end of Year 7 (see 2.4.13.). Attendance data was standardised by school. Due to the highly skewed distribution of these variables they were transformed (total attendance data was log transformed and unauthorised absences data was reflected and inverse transformed). Higher scores indicate higher attendance and fewer unauthorised absences.

Behavioural involvement (classroom behaviour). In both datasets, children's classroom behaviour was measured using two peer-reported measures of cooperative and disruptive (reversed) behaviour (see 2.4.3.). Higher scores indicate more cooperative and less disruptive behaviour.

Perceptions of school (liking school). In both datasets, pupils' liking of school were measured using self-reports (see 2.4.7.). Higher scores indicate liking school more.

Social-affective experiences in school (loneliness at school) – STARS only. Children's loneliness at school was measured using children's self-reports (see 2.4.8.). Scores were reversed so that higher scores indicate less loneliness at school.

Measures of potential risk and protective factors – STARS only

Socio-demographic characteristics. Data from school records was used to measure children's age (see 2.4.16.), sex (see 2.4.16.), and eligibility for free school meals (FSM – a proxy for socioeconomic disadvantage, see 2.4.17.).

Home characteristics. At wave one, parents' self-reports of their depressive symptoms (see 2.4.9.), transition concerns (see 2.4.19.), and parenting behaviour (warmth and hostility, see 2.4.10.) were measured as described in chapter two.

Recent life events. At wave one, positive and negative life events were measured using a combination of child and parent reports (see 2.4.12.).

Child Characteristics. At wave one, children reported on their pubertal development (see 2.4.11.), learning motivation (see 2.4.6.), symptoms of mental health problems (see 2.4.18.), and transition concerns (see 2.4.19.). At wave one, parents' reported on children's self-control (see 2.4.15.). Data was available on children's cognitive ability (IQ, see 2.4.5.) from school records.

Data Analysis

Overview of analyses. Confirmatory Factor Analysis (CFA) was used to evaluate the proposed multidimensional model of 'transition success' as developed from the review of existing literature. Five measures were selected from dataset one (STARS) to correspond to the four domains of performance (one measure: academic attainment), behavioural involvement (two measures: school attendance and classroom behaviour), perceptions of school (one measure: liking school), and social-affective experiences in school (one measure: loneliness at school). The aim of these analyses was to assess whether more parsimonious models of transition success could be derived from the correlations between these five 'first-order' factors (e.g., figure 3.1). Step 1

explored the correlations between first-order factors only. Then two types of models containing higher-order factors were tested (steps 2 and 3). Step 2: a model including more than one higher-order factor, where higher-order factors were defined based on the observed pattern of correlations shown between the five first-order factors. Step 3: a more constrained single-factor model of ‘transition success’ consisting of all five first-order factors loading on to a single higher-order factor (figure 3.1). Dataset two (pilot sample) then served as an independent sample used to partially cross-validate the best solution derived from dataset one. Finally, once a satisfactory model for measuring transition success was established the primary dataset (STARS) was used to assess its construct validity. This comprised testing associations between the final measures of transition success and a number of risk and protective factors (measured pre-transition; e.g., child’s sex, transition concerns etc.) in a structural equation model framework.

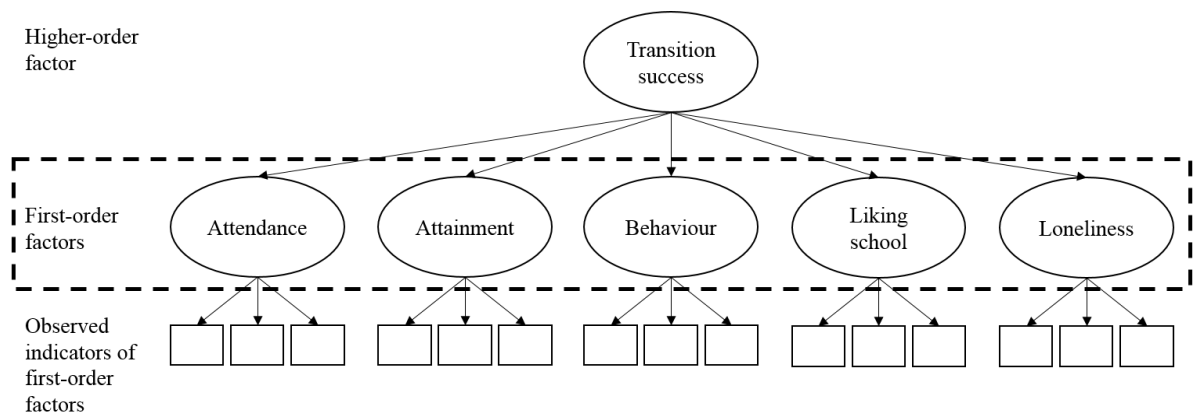


Figure 3.1. Example of higher-order factor structure to be tested.

Model specification and evaluation. The development of higher-order models of transition success was guided by the statistical principles of parsimony and goodness-of-fit to the data (Vandekerckhove, Matzke, & Wagenmakers, 2015). This means the analyses were not purely ‘confirmatory’ and were run in an iterative manner to derive a

solution that was both empirically informed and showed a good fit to the observed dataset. A series of models were tested in Mplus version 7 (Muthén & Muthén, 2010). Prior to CFA analyses, data were evaluated for univariate outliers, collinearity and multicollinearity. The robust weighted least squares (WLSMV) estimator in Mplus was used to provide weighted least square parameter estimates as the data included ordinal indicators of the dependent variables (i.e., liking school and loneliness). The input correlation matrices for both datasets are given in supplementary table 1 (appendix 1). Guided by suggestions provided in Hu and Bentler, acceptable model fit was defined by the following criteria: χ^2 (ideally $p > .05$, however smaller χ^2 values are better as they indicate smaller differences between the data and the model), RMSEA ($\leq .06$, upper 90% CI $\leq .06$), CFI ($\geq .95$) and TLI ($\geq .95$) (Hu & Bentler, 1999). Where the χ^2 was $p < .05$, the correlation residuals were inspected to identify sources of poor fit between the observed data and the model being tested. Mplus' ' χ^2 diff test' was used to compare nested models as absolute values of the WLSMV χ^2 cannot be directly compared in the same way as traditional χ^2 values.

Missing data. As described above, all analyses reported here used the WLSMV estimator as it is the most robust estimation procedure compatible with ordinal data. WLSMV analyses data using a 'pairwise present' method. While WLSMV facilitates the inclusion of ordinal dependent variables, it is less efficient and more susceptible to producing biased estimates where data are missing dependent on observed data compared to the full information maximum likelihood (FIML) approach. Therefore in a sensitivity analysis, the FIML estimator was used to overcome the limitations of how WLSMV handles missing data (Schafer & Graham, 2002). Sensitivity analyses involved including predictors of non-completion at wave one (the major source of missingness in the dataset) as auxiliary variables in FIML analyses. Three significant

predictors of non-completion were found: socio-economic disadvantage (FSM; $t = 2.236, p < .05, d = .11$), children's academic attainment (Year 7 attainment; $t = -4.55, p < .001, d = .22$), and children's symptoms of mental health difficulties (SDQ total difficulties score; $t = 4.02, p < .001, r = .21$). Where the results of sensitivity analyses substantively differed to the main analyses they are reported in the results section.

3.3. Results

Confirmatory Factor Analysis: dataset one (STARS)

Step 1. Exploring correlations between first-order factors. The measurement model showed acceptable fit to the data: $\chi^2(142) = 718.669, p < .001$, RMSEA = 0.05 (90% CI = 0.04 – 0.05), TLI = 0.96, CFI = 0.97, N = 1842 (no substantive correlation residuals were identified, see supplementary table 2 in appendix 1). The pattern of correlations among first-order factors suggested a two-factor higher-order structure within the data (see figure 3.2). The first of these higher-order factors was indicated by the moderate correlation between attainment and behaviour ($r = .53, p < .001$) as well as the slightly weaker relationships shown between both attainment and behaviour with attendance (r 's = .36 and .29, respectively, both $p < .001$). These are three key types of successful school behaviours that tend to receive attention from schools – i.e., good attainment (performance), attendance (behavioural involvement) and behaviour (behavioural involvement) – and subsequently this potential higher-order factor was labelled ‘Academic and Behavioural Adjustment’. The second higher-order factor was indicated by the moderate correlation between liking school and loneliness at school ($r = .40, p < .001$). As these were selected to measure pupils’ perceptions of their new school and their social-affective experiences in school (particularly regarding how socially integrated they are in their new school) this potential higher-order factor was labelled ‘School Bonding’.

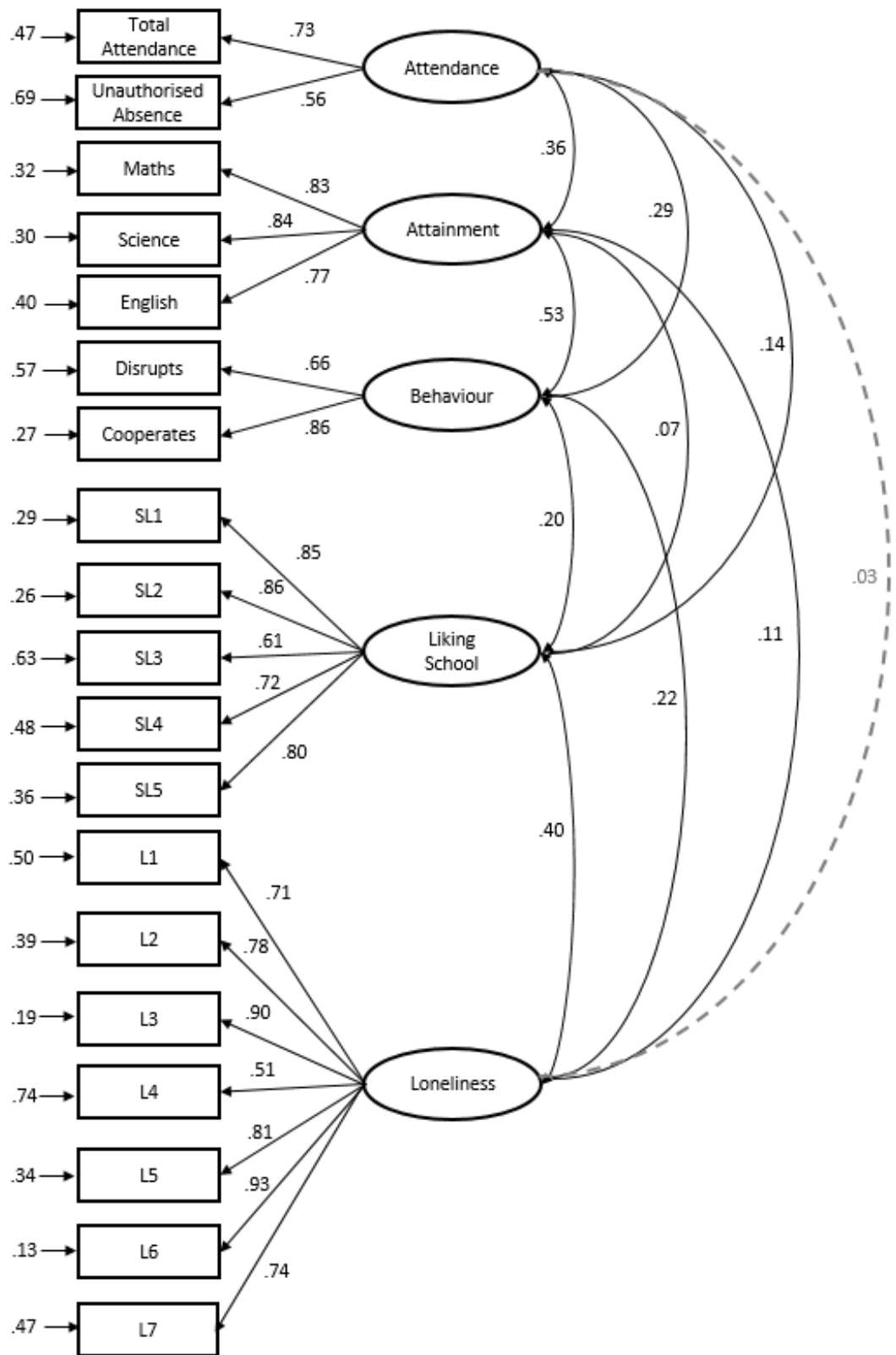


Figure 3.2. Measurement model of full transition success model.

Standardised estimates for dataset one, parameter estimates alongside solid lines are $p < .05$, parameter estimates alongside grey dashed lines are $p > .05$.

Step 2. Testing a two-factor higher-order model of (i) Academic and Behavioural Adjustment and (ii) School Bonding. The model consisting of the two higher-order factors ‘Academic and Behavioural Adjustment’ and ‘School Bonding’ (see figure 3.3) fit the data less well than the measurement model ($\chi^2_{diff}(4) = 24.99$, $p < .001$). However, it showed acceptable fit to the data and is more parsimonious than the measurement model: $\chi^2(146) = 688.94$, $p < .001$, RMSEA = 0.05 (90% CI = 0.04 – 0.05), TLI = 0.97, CFI = 0.97, N = 1842 (the pattern of correlation residuals matched those of the measurement model, see supplementary table 2 in appendix 1). Inspection of the higher-order factor of Academic and Behavioural Adjustment shows: behaviour loaded strongly (std. loading = .85), while attainment loaded moderately (std. loading = .63), and attendance loaded weakly but within typically accepted bounds (std. loading = .46). The first-order factors of liking school (std. loading = .60) and loneliness (std. loading = .66) loaded well on the higher-order ‘School Bonding’ factor. The two higher-order factors were moderately correlated ($r = .30$, $p < .001$).

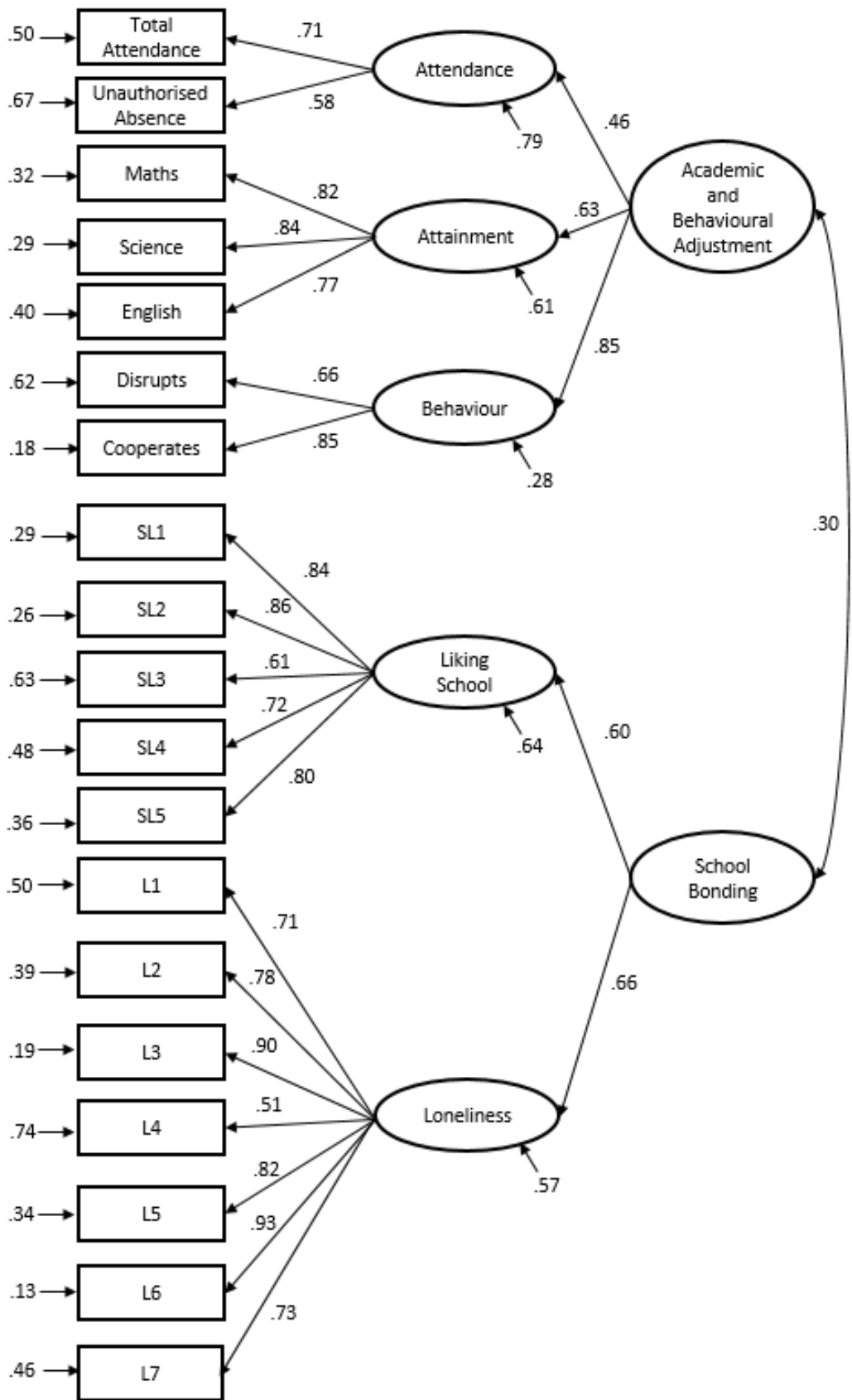


Figure 3.3. Confirmatory factor analysis of two higher-order transition success factors.

Standardised estimates from dataset one, all parameters are $p < .01$.

Step 3. Testing a single higher-order model of transition success. Taken as a group, the magnitude of correlations between all five first-order factors was not consistent with a single higher-order factor of transition success (for example, attainment showed very weak associations with both liking school, $r = .07$, and loneliness, $r = .11$). Formal testing of this model (i.e., where the five first-order factors all load onto a single higher-order factor) confirmed that this model provided a significantly worse fit to the data than the two factor higher-order model shown in figure 3.2 ($\chi^2_{diff}(1) = 194.35, p < .0001$). The single higher-order factor model also provided a poor fit to the data: $\chi^2(147) = 1561.49, p < .001$, RMSEA = 0.07 (90% CI = 0.07 – 0.08), TLI = 0.93, CFI = 0.92, N = 1842. Furthermore, inspection of the model parameters suggested that the single higher-order factor did not account for a substantively large amount of variance in two indicators in particular: attendance (std. loading = .32) and attainment (std. loading = .32).

Conclusions from CFA of the primary dataset (STARS). A balance of parsimony and good statistical fit to the data was found for the two-factor higher-order solution, whereby attainment, attendance and behaviour were indicators of Academic and Behavioural Adjustment and liking school and loneliness at school were indicators of School Bonding. Results did not change for sensitivity analyses or when the IMYC schools (where attainment was measured on a different scale) were excluded from analyses. Next, a similarly specified model was tested in dataset two to assess whether this pattern of results were found in an independent sample.

Confirmatory Factor Analysis: dataset two (pilot sample)

Step 1. Exploring correlations between first-order factors. The measurement model showed acceptable fit to the data: $\chi^2(48) = 86.05, p < 0.001$, RMSEA = 0.06

(90% CI = 0.04 – 0.08), TLI = 0.96, CFI = 0.97, N = 234, standardised factor loadings range = .62 to .92 (all $p < .001$). As was found in dataset one, there were notable correlations between a number of first-order factors suggesting a possible second-order factor of Academic and Behavioural Adjustment, whereby attainment was moderately correlated with behaviour ($r = .47, p < .001$) and attendance ($r = .39, p < .001$); attendance and behaviour also correlated moderately ($r = .31, p < .001$).

The loneliness at school measure was not included in this dataset, therefore the only measure of School Bonding in this analysis was the liking school scale. Liking school was a measure of pupils' feelings towards school and, as expected, showed its strongest associations with the two Academic and Behavioural Adjustment measures that had greater overlap with domains of School Bonding, i.e., behaviour ($r = .29, p < .001$) and attendance ($r = .17, p < .05$), compared to the weaker and non-significant association with the more distinct indicator of Academic and Behavioural Adjustment, i.e., attainment ($r = .10, p > .05$). Again, the interrelationships between liking school and the other factors in this model were not of sufficient magnitude to warrant it being included in the second-order factor of Academic and Behavioural Adjustment (i.e., in order to be included in a second-order factor there should be an average correlation of at least moderate magnitude with all other variables; Brown, 2006). Instead liking school was allowed to co-vary with the second-order factor in the next model.

Step 2. Testing a one-factor higher-order model of Academic and Behavioural Adjustment which correlated with the first-order liking school factor.

Consistent with the findings from dataset one, a CFA model was specified where the latent factors attainment, behaviour and attendance loaded onto the second-order latent factor of Academic and Behavioural Adjustment. The fit of this model did not significantly differ from the measurement model ($\chi^2_{diff}(2) = 5.32, p > .05$). This

solution showed acceptable fit to the data, $\chi^2(50) = 89.33, p < .001$, RMSEA = 0.06 (90% CI = 0.04 – 0.08), TLI = 0.96, CFI = 0.97, N = 234, standardised factor loadings range = .62 to .91, all $p < .001$. Evaluating the second-order factor loadings showed that behaviour loaded well on to Academic and Behavioural Adjustment (std. loading = .75), while attainment and attendance loaded more moderately but within typically accepted bounds (std. loadings = .60 and .51, respectively; all $p < .001$).

The correlation between Academic and Behavioural Adjustment and the single measure of School Bonding available in this dataset (liking school) was of the same magnitude found in dataset one ($r = .31, p < .001$).

Conclusions from CFA of pilot dataset. The findings from this dataset were broadly similar to those from the STARS dataset, whereby attainment, attendance and behaviour showed notable inter-correlations that were adequately accounted for in a higher-order factor structure, therefore offering a statistically robust and parsimonious measure of Academic and Behavioural Adjustment. It was not possible to re-test the higher-order School Bonding factor in this dataset as only one measure of School Bonding was available. However, the findings were consistent with those of dataset one, such that School Bonding is best conceptualised and measured as a distinct domain. These results were replicated in sensitivity analyses.

Construct validity: risk and protective factors

The primary dataset (STARS) was used to further assess the construct validity of the two transition success factors: (i) Academic and Behavioural Adjustment, and (ii) School Bonding. This was done by testing the associations between hypothesised risk and protective factors (measured pre-transition) with the two transition success factors (Table 3.1 and Table 3.2). This consisted of simultaneously entering all of the risk and protective factors into two structural equation models. In model one, risk and protective factors were allowed to correlate with both transition success factors (Table 3.1). In model two, the two transition success factors were regressed on to all risk and protective factors simultaneously (Table 3.2). Model two therefore adjusts for the effects of other predictor variables on the transition success factors.

Predictor variables tended to show the expected direction of correlation with the two transition success factors therefore providing some support for their convergent validity (i.e., factors are related to risk and protective factors in the expected direction; Table 3.1). The Academic and Behavioural Adjustment factor showed significant positive correlations with female sex, learning motivation, self-control, and IQ, as well as significant negative correlations with free school meals (FSM) eligibility, parent depressive symptoms, parent transition concerns, negative life events, children's symptoms of mental health problems, and transition concerns. The School Bonding factor showed positive correlations with parental warmth, learning motivation, and self-control, as well as significant negative correlations with parental hostility, negative life events, children's symptoms of mental health problems, and transition concerns.

Table 3.1. *Correlations between risk and protective factors and transition success factors: Academic and Behavioural Adjustment and School Bonding.*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Academic and Behavioural Adjustment																
2. School Bonding	.20 ***															
3. Age	.05	.08 **														
4. Female sex (vs male)	.20 ***	-.02	-.01													
5. Eligible for free school meals (vs not)	-.27 ***	-.03	.00	-.02												
6. Parent depressive symptoms	-.13 **	-.09	-.04	.00	.08											
7. Parent transition concerns	-.20 ***	-.13 *	-.10 **	.00	.09 *	.18 ***										
8. Parental warmth	.02	.26 ***	.01	-.02	.06	-.35 ***	-.02									
9. Parental hostility	-.09	-.17 **	-.02	-.10 *	.00	.29 ***	.18 ***	-.40 ***								
10. Positive events	.31 ***	.09	.03	-.07 *	-.15 ***	-.09 *	-.06	.08 *	-.07							
11. Negative events	-.10 *	-.20 ***	-.03	.05	.00	.15 ***	.20 ***	-.12 ***	.26 ***	.16 ***						
12. Pubertal development	.01	.05	.22 ***	.33 ***	.02	.01	.01	.03	-.03	.01	.11 **					
13. Learning motivation	.22 ***	.25 ***	.01	.08 *	-.05	-.09 **	-.11 **	.17 ***	-.16 ***	.16 ***	-.11 **	.05				
14. Self-control	.37 ***	.35 ***	.06	.16 ***	-.01	-.31 ***	-.27 ***	.33 ***	-.46 ***	.16 ***	-.29 ***	.07	.29 ***			
15. IQ	.94 ***	.06	-.06	.02	-.21 ***	-.09	-.11 **	-.07	-.01	.26 ***	-.01	-.06	.15 ***	.17 ***		
16. Symptoms of mental health problems	-.31 ***	-.39 ***	-.06	-.07	.06	.19 ***	.26 ***	-.21 ***	.31 ***	-.12 **	.42 ***	-.01	-.35 ***	-.49 ***	-.15 **	
17. Transition concerns	-.14 **	-.27 ***	-.04	.10 **	-.03	.14 ***	.21 ***	-.12 **	.15 ***	-.16 ***	.27 ***	.06	-.21 ***	-.23 ***	-.13 **	.42 ***

Notes: N (WLSMV) = 2151. * $p < .05$, ** $p < .01$, *** $p < .001$.

The discriminant validity of the two transition success factors (i.e., the two factors look partially different) is supported by differences in the predictors of each factor (Table 3.2). Academic and Behavioural Adjustment was overwhelmingly predicted by IQ as well by socio-demographic variables such as child's sex and FSM eligibility. In contrast, School Bonding was predicted by affective variables such as parental warmth, and children's symptoms of mental health problems. Children's self-control was the only variable which predicted both domains of transition success. School bonding was also negatively associated children's transition concerns at trend level ($p = .051$).

Sensitivity analyses, which provided estimates which are likely to be less affected by non-response bias, showed that self-control was not a significant predictor of school bonding ($\beta = .11, p = .123$) but children's transition concerns were ($\beta = -.12, p = .035$).

All other findings were replicated in sensitivity analyses.

Table 3.2. *Standardised regression coefficients between risk and protective factors and the two transition success factors: Academic and Behavioural Adjustment and School Bonding.*

Predictor variables	Academic and Behavioural Adjustment	School Bonding
	β	β
<i>Socio-demographic characteristics</i>		
Age	.09 **	.04
Female sex (vs male)	.17 ***	-.07 †
Eligible for free school meals (vs not)	-.07 **	-.04
<i>Home characteristics</i>		
Parent depressive symptoms	.03	.08
Parent transition concerns	-.03	-.01
Parental warmth	.06	.18 **
Parental hostility	.06	.06
<i>Recent life events</i>		
Positive events	.06	-.01
Negative events	-.05	-.03
<i>Child characteristics</i>		
Pubertal development	-.02	.05
Learning motivation	-.01	.08
Self-control	.15 **	.18 *
IQ	.89 ***	-.01
Symptoms of mental health problems	-.08	-.21 **
Transition concerns	.06	-.11 †
Variance explained (R^2)	98%	24%

Notes: † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Model fit statistics (N = 2151): $\chi^2(401) = 1319.20$, $p < 0.001$, RMSEA = 0.03 (90% CI = 0.03 – 0.03), TLI = 0.94, CFI = 0.96.

3.4. Discussion

This study developed a theoretically and empirically informed model for measuring transition success. Four realms of pupil adjustment were identified from literature on early school transitions – performance, behavioural involvement, perceptions of school, and social-affective experiences in school – and corresponding measures were selected based on a review of previous research into the secondary school transition. This model was operationalised using data from multiple methods and informants, where: performance was measured by teacher-rated attainment; behavioural involvement was measured by school records of attendance and peer-rated behaviour; perceptions of school were measured by children’s reports of how much they liked their school; and social-affective experiences in school were measured by children’s reports of their experience of being able to find and make friends at school.

Analysis of data from a large dataset of UK school pupils provided evidence that measures of three important school behaviours – attainment, behaviour and attendance – showed moderate interrelationships which were accounted for by a higher-order factor of academic and behavioural adjustment. Results also implicated a second higher-order factor which was identified as school bonding, consisting of measures of children’s liking of school and loneliness at school. These two domains were moderately related but distinct. Subsequently, two key findings were replicated in an independent sample. These were support for a higher-order factor of academic and behavioural adjustment and support for this factor being distinct from children’s liking of school (which was used as a single indicator of school bonding in the second sample).

Previous studies have not sufficiently defined a school-specific model of successful transition to secondary school which has left both researchers and practitioners with limited frameworks to draw upon in their work. The current chapter

attempted to address this gap and therefore provides both theoretical and practical implications for those examining the transition to secondary school. For instance, theoretical work on pupil adjustment and the transition research literature both indicate that successful school transition is multi-dimensional. Therefore, in order to fully capture children's transition success it seems prudent to measure elements of children's functioning across multiple domains. This is supported in the empirical analyses presented here in a three ways.

First, the data were consistent with a measurement model whereby academic and behavioural functioning (attainment, attendance, behaviour) could be distinguished from school bonding (self-reports of loneliness and perceptions of school). Second, hypothesised risk and protective factors showed the expected associations with the domains covered by the two higher-order measures of transition success. Third, there were coherent differences in the dominant predictors of each domain of transition success. Higher levels of academic and behavioural functioning were most strongly predicted by higher IQ, female sex and socio-economic advantage, while higher levels of school bonding were most strongly predicted by affective factors such as warm-supportive parenting and lower levels of child symptoms of mental health problems. Few studies of transition have examined more than one domain of school adjustment at a time, but the few that have also found some evidence of different predictors for each domain. For example, in a short longitudinal study of children's mental health and academic attainment during the first year at UK secondary schools, children's perceptions of school at the end of Year 7 were predicted by earlier symptoms of children's conduct problems, whilst children's school concerns at the end of Year 7 were predicted by earlier academic attainment (Riglin et al., 2013). These findings suggest that researchers and practitioners may miss pupils who are having problems in

other areas when they focus only on commonly used indicators of school success such as attainment, attendance, and behaviour. This emphasises the importance of accessing pupils' perspectives alongside external indicators of transition success. Similarly, gathering data on multiple aspects of children's transition success will enable practitioners to tailor interventions to children's specific needs.

There are some limitations to the current study. Whilst the two-factor higher-order measure of transition success developed here was to some extent theoretically informed, it was primarily derived through data-driven techniques and would benefit from being tested in new samples and with other measures representing its four domains in order to establish its validity and value. One aspect that requires investigation is whether the School Bonding factor was only found to be distinct from the Academic and Behavioural Adjustment factor due to rater differences. That is, the School Bonding factor may differ because it is based on child self-reports rather than any substantive difference in what it measures. This could be assessed in future research by gathering alternative sources of data on children's School Bonding, e.g., from peers, parents or teachers. It is also important to note that while the replication of the measurement model in an independent dataset is a strength of the study, it is nevertheless limited by the absence of a measure of social-affective school experiences (e.g., loneliness) in the replication sample.

This study identified a wide number of risk and protective factors that show longitudinal associations with children's transition success, however, the structural equation models presented are primarily tests of construct validity that did not account for the causal ordering of predictor variables and should therefore be interpreted with caution with regard to their role as antecedents of transition success. There were substantial correlations between many of the risk and protective factors tested here. For

instance, whilst parental characteristics such as parental depressive symptoms and parenting behaviour did not predict academic and behavioural functioning in the adjusted models, these parenting characteristics were associated with factors such as children's self-control which was robustly predictive of academic and behavioural adjustment. These relationships and processes are examined further in future chapters. In general, more research is needed into the pathways and processes which lead to transition success. For example, in identifying the important social and cognitive changes (e.g., to friendships) that occur during school transition and how these may then influence transition success. Changes to self-control are examined in chapter four and changes in friendships are considered in chapter six.

For this thesis, the main implication of this study is that the measurement of transition success would ideally cover the domains of academic and behavioural adjustment and school bonding. This is of particular relevance to researchers investigating resilience processes during school transitions as children may be doing well in one domain but not others (Kim-Cohen & Turkewitz, 2012; Rutter, 2012). This chapter has also highlighted a number of risk and protective factors that are associated with aspects of transition success (and with each other) that will be investigated further in the chapters that follow.

**CHAPTER 4: A longitudinal study of self-control at the transition to
secondary school: considering the role of pubertal status and parenting**

Abstract

Self-control predicted how well children settled in to secondary school (chapter three) and is also associated with a range of positive outcomes in adulthood. However, little is known about the naturalistic development of self-control and the factors that affect this, particularly in older children such as those being studied here. This chapter examines the development of self-control over the transition to secondary school using latent growth curve modelling. It then considers the role of individual differences in pubertal status and parenting style as theoretically important influences on stability and change in self-control. Children's self-control declined during the one-year study period as they moved from primary to secondary school. Declines in self-control were associated with aspects of children's transition success and mental health. More advanced pubertal status was associated with both lower initial levels of self-control as well as declines in self-control over time. After statistical controls for key confounders, parental hostility and warmth, but not discipline, were associated with initial levels of self-control. The effect of parental hostility attenuated over time, whilst the effect of parental warmth did not. The effects of parenting did not vary by pubertal status. These findings suggest self-control declines over the transition to secondary school, particularly for those experiencing puberty earlier than their peers, and that parental affect has important effects on self-control during this period.

4.1. Introduction

Self-control involves the ability to control attention, thoughts, impulses, and emotions and to direct behaviour towards long-term goals (Tangney et al., 2004). It is a strength that allows people to delay immediate gratification, consider consequences and take deliberate, considered action. High self-control is associated with favourable functioning in a range of domains including academics, work performance, psychological adjustment, health behaviours, and relationships (e.g., de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012; Moffitt et al., 2011; Tangney et al., 2004). Poor childhood self-control has been linked to poor health, financial problems and criminal convictions in adult life when statistically controlling for children's gender, social class and IQ (Moffitt et al., 2011). Longitudinal studies across middle childhood and early adolescence have consistently shown an association between children's self-control and later levels of externalising problems (e.g., Lengua, 2008; Ormel et al., 2005), and studies also indicate that higher self-control in children is related to greater social competence, empathy, self-esteem, and school grades (Duckworth & Seligman, 2005; Kiff et al., 2011). In chapter three, higher levels of self-control were found to be associated with more successful school transitions.

Adolescence is the period of physical, cognitive and social maturation between childhood and adulthood that generally starts around the onset of puberty (Dahl, 2004a). Research suggests that many of the adverse long-term effects of low childhood self-control are mediated by poor choices made in adolescence (Moffitt et al., 2011). Such findings are consistent with theoretical models that view puberty, and adolescence more generally, as a period characterised by vulnerability to reduced self-regulation and increased risk-taking, thought to be due to the combination of an immature cognitive control system operating alongside a hyper-sensitive reward system (Ernst et al., 2006;

Steinberg, 2005). In particular, changes to the limbic system which are initiated by a surge in gonadal hormones associated with the onset of puberty are believed to play a role in the increases in reward seeking seen during adolescence (Crone, 2009; Nelson, Leibenluft, McClure, & Pine, 2005; Steinberg et al., 2008). It is therefore plausible that aspects of adolescence, such as children's level of pubertal development – their pubertal *status* – may exert effects on their capacity for self-regulation. To date, however, there is little data demonstrating an empirical link between pubertal status and specific measures of self-control. Another aspect of pubertal development that has begun to receive attention is pubertal *tempo*. Research into pubertal tempo suggests that children who progress through puberty at a faster rate are at increased risk of poorer adjustment (Ellis, Shirtcliff, Boyce, Dearnorff, & Essex, 2011; Mendle, Harden, Brooks-Gunn, & Graber, 2010). Taken together, these findings emphasise the importance of understanding the developmental course of self-control during early adolescence and of considering the effects of puberty on self-control in young people.

Early adolescence coincides with children's transition from primary to secondary schooling. How well children adapt to their new school has potentially important ramifications for their future functioning (Felner et al., 1982; Rutter, 1989; Seidman & French, 2004; Vitaro & Tremblay, 2008; West et al., 2010). This transition involves changes in academic expectations and social structures (Bowes et al., 2013; Eccles, Midgley, et al., 1993). Self-control is likely to be an important strength that assists adaptation to the new school environment and social structures where greater academic independence and organisation is expected and relationships with peers and teachers change (Symonds & Galton, 2014). Individual variation in pubertal status may also play a role in children's adaption to secondary school (Monahan & Steinberg, 2011). While it is well-established that there are advantages of high self-control during

early adolescence, a number of basic developmental questions merit examination. First, there is little empirical evidence describing the normal development of self-control over time. In one study which examined changes in self-control over time in Korean children, self-control declined in a sample of primary school pupils between the ages of 10 and 12 years old, but increased in a second sample of older school pupils between the ages 14 and 17 years old (Yu, 2010). This study, however, did not include the primary to middle school transition which occurs between ages 12 and 13 in Korea. No studies appear to have reported on the pattern of self-control development in UK students in this age group. Second, there is still relatively little data assessing to what extent naturalistic changes in self-control are associated with children's transition success or more widely studied functional outcomes such as symptoms of psychopathology.

Given earlier findings that self-control is associated with transition success (chapter three) and numerous studies identifying childhood self-control as an important factor in later health and wealth outcomes, elucidating factors that influence childhood self-control and that could potentially be targeted in interventions is an important research aim (Israel et al., 2014; Moffitt, 2015). Self-control emerges as a trait early in childhood and shows modest stability in pre-school children (Ahadi & Rothbart, 1994; Roberts & DelVecchio, 2000). Nevertheless, as with other personality traits (Roberts & DelVecchio, 2000), naturalistic changes in self-control do occur (e.g., Moffitt et al., 2011) and commentators have highlighted the importance of understanding what factors promote naturalistic improvements in self-control (Duckworth, 2011). One potentially important factor is parenting, which was found to correlate with children's self-control in chapter three.

Parents use and style of affect (e.g., expressions of warmth and hostility) and discipline (e.g., its consistency, and whether it is punitive or supports autonomy) are the most commonly researched dimensions of parenting in relation to children's development (Cowan & Cowan, 2002). Authoritative parenting (parenting that is both warm and that sets limits) tends to be associated with greater child competence (e.g., higher school grades, higher self-esteem, lower substance abuse) compared to parenting that is authoritarian, permissive or indifferent (Baumrind, 1978; Steinberg, Lamborn, Dornbusch, & Darling, 1992). On the basis of theory and evidence regarding other child competence outcomes, parental warmth and non-punitive control would be expected to be associated with greater levels of self-control (e.g., Grolnick & Farkas, 2002; Spera, 2005). Previous research has found parental warmth and non-punitive discipline to be associated with greater levels of self-control in children, however, a number of important issues have still to be addressed.

First, there is a relative lack of longitudinal studies and many only consider a single aspect of parenting (e.g., harsh parenting). There is a need for longitudinal studies to include multiple measures of parenting in order to identify which elements are more important in the development of children's self-control. A number of studies have shown cross-sectional associations between adolescent self-control and various parenting characteristics (e.g., Brody & Ge, 2001; Finkenauer et al., 2005; Lengua, 2008). However, because children are known to evoke parenting effects (e.g., Ge, Xiaojia et al., 1996), longitudinal data are needed to examine questions of temporal precedence, an important first step in identifying potentially causal relations. There is some indication that parenting is associated with longitudinal changes in self-control at least in childhood. For instance, harsh parenting and negative feelings towards the child have been found to precede reductions in young children's (between 3 and 7 years of

age) self-control (Cecil, Barker, Jaffee, & Viding, 2012) and attentional-control (a component of self-control focusing on attention regulation and inhibitory control) has been found to partially mediate the association between composite measures of maternal parenting and externalizing behaviours in young children (children were studied between the ages of 4 and 9 years old; Belsky, Fearon, & Bell, 2007). However, longitudinal studies are yet to consider the relative association of different aspects of parenting, such as affect and discipline.

Second, there appear to be important age differences in the association between parenting and children's self-control. Indeed, evidence for relations between parenting and longitudinal change in self-control in early adolescence is less consistent than that focusing on childhood (Kiff et al., 2011) and the role of puberty has not been considered. For example, an association between negative parenting characteristics and subsequent change in effortful-control was not found in a sample of older children aged 8 to 12 years old (Lengua, 2006). Moreover, another longitudinal study that examined parenting and changes in effortful-control found different results depending on child age: positive parenting characteristics (warmth and expressivity) were found to be related to longitudinal change in children's effortful-control when children aged 7 to 12 years were followed up two years later at ages 9 to 14, but this pattern was not observed when children were followed-up again a further two years later at ages 11 to 16 (Eisenberg et al., 2005). These findings underscore the potential importance of considering the broader developmental context when assessing associations between parenting and self-control. The earliest external changes associated with puberty are apparent at an average age of 11 in both boys and girls in many developed countries (Parent et al., 2003; Patton & Viner, 2007) therefore it is possible that the onset of puberty may account for some of the inconsistencies in the literature to date. Thus,

there is evidence that relations between parenting and self-control during adolescence are less consistent than those in childhood and it therefore may be important to consider the moderating role of puberty.

Third, of the existing research only a handful of studies have controlled for mental health problems. This is important because mental health problems are known to be associated with parenting and impairments in aspects of self-control are common features of mental health problems (Fergusson, Boden, & Horwood, 2013; Krueger, Caspi, Moffitt, White, & Stouthamer-Loeber, 1996; Rothbaum & Weisz, 1994). Thus, in the present study statistical controls were employed to ensure that observed associations between parenting and self-control are not attributable to children's mental health problems. Additional statistical controls were also made for child's gender and parental socioeconomic status in line with previous research into children's self-control (Eisenberg et al., 2005; Fergusson et al., 2013; Moffitt et al., 2011; Yu, 2010)

The current study

This chapter examined the relations between multiple well-defined parenting dimensions and longitudinal change in children's self-control, including both negative (hostility and inconsistent discipline) and positive (warmth and inductive reasoning) aspects of parents' affect and discipline. As puberty is a developmental period thought to be associated with reduced self-control (Ernst et al., 2006; Steinberg, 2007), this chapter also examined whether individual differences in pubertal status and pubertal tempo had main effects on longitudinal change in children's self-control. Next, because it has been claimed that adolescence is characterised by changes to children's relationships with their parents (e.g., increased autonomy and parent-child conflict; Larson & Richards, 1991; Steinberg & Morris, 2001) and preliminary findings indicate

that the effects of parenting on children's self-control decrease as children approach adolescence (e.g., Eisenberg et al., 2005), this chapter examined whether individual differences in pubertal status moderate the relationship between parenting and self-control. The study focused on the transition from primary to secondary (elementary to middle) school as this ecological transition coincides with the average onset of puberty and is a time when self-control is likely to be a useful skill. Latent growth in children's self-control was examined using three waves of the STARS dataset. The following research questions (RQ) were assessed:

- RQ1.** How does self-control develop across the transition to secondary school and does this vary across individuals?
- RQ2.** Are baseline levels and longitudinal change in self-control associated with differences in transition success and symptoms of mental health problems?
- RQ3.** Are individual differences in pubertal status and pubertal tempo associated with children's self-control and longitudinal change in children's self-control?
- RQ4.** Are dimensions of parenting associated with children's self-control and longitudinal change in children's self-control?
- RQ5.** Are associations between parenting and children's self-control moderated by individual differences in pubertal status?

4.2. Method

Sample

This chapter used data collected from 750 children at wave one (35% of those invited to participate), 1712 at wave two (87% of those invited), and 1653 at wave three (85% of those invited). The first assessment was conducted when children were an average of 11 years and 3 months old ($SD = 0.29$ years). At wave 1, questionnaires were also obtained from 745 parents or guardians. At wave 3, questionnaires were obtained from 1594 teachers.

Measures

Following recommendations by Rutter et al. (2001) separate informants were used, where possible, to measure key predictor and outcome variables. Self-control was measured using self-report as these measures had the best data coverage (i.e., lowest levels of missing data). This meant that measures which were predicting or being predicted by self-control were selected from other informants wherever possible (e.g. symptoms of mental health problems). Scores for all scales described here were calculated so that higher scores indicate higher levels of the behaviour or construct. Means and standard deviations for all variables are shown in table 4.1.

Self-control. At all three waves, children's self-control was measured via self-reports (see 2.4.15.). The variable used here is the mean score for the 13-self-control items.

Parenting. Parenting was assessed at wave one with parents' reports on four scales: Warmth, Hostility, Inconsistent Discipline, and Inductive Reasoning (see 2.4.10.). Total scores for each subscale are used here.

Pubertal status. At all three waves, individual differences in children's pubertal status was assessed using children's self-reports on the Puberty Development Scale (PDS; see 2.4.11.). Total PDS scores were used to assess both pubertal status and pubertal tempo (see statistical analysis section).

Transition success. At wave three, five of the indicators of transition success presented in chapter three were used here. Academic attainment was measured using the average score for English, Maths, and Science assessments (higher scores indicate higher attainment, see 2.4.1.). School attendance was measured using the percentage of days attended in Year 7 (higher scores indicate higher attendance, see 2.4.13.). Classroom behaviour was measured using the average of peer-rated cooperative and disruptive (reversed) behaviour (higher scores indicate more cooperative and less disruptive behaviour, see 2.4.3.). School liking was measured as a total score (higher scores indicate liking school more, see 2.4.7.). Loneliness at school was measured as a total score (higher scores indicate more loneliness, see 2.4.8.).

Mental health problems. At wave three, symptoms of children's mental health problems were measured using teacher-reported total scores on the SDQ conduct problems and SDQ emotional problems subscales (see 2.4.18.).

Control variables. Statistical controls for age ($M = 134.58$ months, $SD = 3.54$) and symptoms of children's mental health problems (using parent reported total scores on the SDQ total difficulties scale, see 2.4.18.) were included to adjust for their potentially confounding effects on measures of pubertal status and self-control, respectively. Statistical controls for gender and parental education were included as previous research has found these demographic variables are related to levels of self-control and parenting. Gender was coded as 0 = male and 1 = female (54% male). Parental education was measured with parent self-reports of the highest parental

qualification obtained by either parent (0 = none, 4.8%; 1 = secondary school level, 28.5%; 2 = further education level, 22.2%; 3 = university undergraduate level, 28.8%; 4 = university postgraduate level, 15.6%).

Statistical Analysis

Analyses were conducted in Mplus version 7 (Muthén & Muthén, 2010). Latent growth curve modelling was used to investigate baseline levels and longitudinal change in children's self-control and pubertal status. Two main parameters are provided by growth curve models, the *intercept* and the *slope* for each variable of interest (Kline, 2011). For self-control, the intercept represents the level of self-control at baseline (i.e., wave one) and the slope represents the change in self-control over the three study waves. For pubertal status, the intercept represents individual differences in pubertal status at baseline (when children were on average aged 11 years and 3 months), and the slope represents pubertal 'tempo' (the speed of pubertal development) over the three study waves (Ellis et al., 2011). Guided by suggestions provided in Hu and Bentler, acceptable model fit was defined by the following criteria: χ^2 (ideally $p > .05$, however smaller χ^2 values are better as they indicate smaller differences between the data and the model), RMSEA ($\leq .06$), CFI ($\geq .95$) and sRMR ($\leq .08$) (Hu & Bentler, 1999). Gender differences were assessed with χ^2 difference tests which provide estimates of the statistical significance of parameter comparisons. Full information maximum likelihood (FIML) estimation was used to treat missing data, FIML uses all of the available information for each participant rather than deleting participants or imputing values (Schafer & Graham, 2002). FIML can provide unbiased estimates in the presence of missing data, particularly when the statistical model includes variables that correlate highly with the variables that have missing data (e.g., self-control measured at

waves two and three provide additional statistical information about the missing responses to the self-control scale at wave one; Graham, 2009).

Longitudinal changes in self-control and pubertal status over the one-year study period were investigated using latent growth curve models (research questions 1 and 3). Associations between self-control and children's transition success and mental health problems (measured at wave three) were assessed in a structural equation model where the intercept and slope of self-control were the predictors of all seven outcome variables simultaneously (research question 2). The associations between parenting measures, pubertal status and self-control (research questions 3 and 4) were assessed in a structural equation model where baseline measures of parenting and the pubertal status growth curve parameters were predictors of the intercept and slope of children's self-control. For these analyses, first, the unadjusted associations for each predictor variable (i.e., parental warmth, parental hostility, inconsistent discipline, inductive reasoning, pubertal status, pubertal tempo) and each control variable (i.e., gender, age, parental education, total difficulties) were assessed separately (akin to simple regression). Next, these associations were assessed simultaneously in a multivariate model in order to evaluate whether the predictors accounted for unique variation in self-control after controlling for the effects of each other and the control variables (akin to multiple regression). Finally, to test whether the effects of parenting on children's self-control were moderated by baseline pubertal status (research question 5) four interaction terms were computed (one for each parenting variable) and these were simultaneously added to the multivariate model. β is used throughout to indicate standardised regression coefficients. B is used throughout to indicate unstandardised regression coefficients.

Table 4.1. Means, standard deviations, and correlations for study variables.

Variable	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
1. Self-control W1	3.79	0.65																				
2. Self-control W2	3.68	0.67	.63***																			
3. Self-control W3	3.63	0.67	.54***	.66***																		
4. Puberty (PDS) W1	7.57	2.15	.00	-.09*	-.11**																	
5. Puberty (PDS) W2	8.42	2.31	-.02	-.12***	-.15***	.70***																
6. Puberty (PDS) W3	9.17	2.50	-.03	-.05	-.16***	.62***	.72***															
7. Parental warmth W1	37.99	4.55	.25***	.21***	.14**	.02	.02	.03														
8. Parental hostility W1	10.97	3.90	-.40***	-.27***	-.16***	-.02	.00	.00	-.41***													
9. Inconsistent discipline W1	10.45	4.31	-.28***	-.16***	-.18***	-.05	-.01	-.06	-.27***	.43***												
10. Inductive reasoning W1	24.37	3.33	.17***	.07	.06	.01	-.03	.02	.51***	-.30***	-.25***											
11. Attainment W3	-0.01	0.88	.22***	.20***	.21***	.03	-.03	.00	-.01	-.07	-.10*	.03										
12. Attendance W3	94.57	6.39	.07	.08*	.11***	-.05	-.07*	-.08*	.00	.01	.02	-.05	.20***									
13. Classroom behaviour W3	0.70	0.17	.27***	.27***	.33***	.05	-.04	-.01	.08	-.16***	-.11*	.06	.42***	.14**								
14. School liking W3	16.57	2.78	.18***	.29***	.33***	-.05	-.10***	-.06*	.09*	-.07	-.09	.05	.06*	.08**	.17***							
15. Loneliness at school W3	11.76	4.49	-.31***	-.27***	-.31***	.02	.08**	.06*	-.20***	.17***	.13**	-.05	-.16***	-.05	-.19***	-.29***						
16. Emotional problems W3	1.08	1.97	-.03	-.06	-.09**	-.03	.05	-.02	-.01	.05	.14**	.00	-.26***	-.14***	-.17***	-.14***	.21***					
17. Conduct problems W3	0.71	1.52	-.06	-.24***	-.25***	-.04	.07*	.04	.02	.07	.07	.02	-.28***	-.12***	-.51***	-.15***	.06	.30***				
18. Sex (male reference)	0.46	0.50	.18***	.19***	.12***	.30***	.23***	.22***	-.01	-.11**	-.06	-.04	.10***	.03	.26***	.03	.02	.01	-.18***			
19. Age (months)	134.58	3.54	.02	-.03	-.09*	.22***	.24***	.16***	.03	-.05	-.02	-.02	.05	-.01	.04	-.04	-.09*	-.03	-.01	.02		
20. Parental education	2.15	1.16	-.05	-.01	.00	-.02	-.09*	-.07	-.05	.04	-.03	.03	.28***	.07	.15**	.01	.03	-.08	-.08	-.03	-.03	
21. Total difficulties scale W1	7.65	5.73	-.53***	-.34***	-.29***	-.06	-.04	.01	-.24***	.37***	.34***	-.18***	-.36***	-.13**	-.34***	-.05	.30***	.15**	.19***	-.15***	-.11*	-.09*

Notes. W1 = wave one, W2 = wave two, W3 = wave three, * = $p < .05$, ** = $p < .01$, *** = $p < .001$. Statistics presented here were calculated using FIML ($N = 2290$), these statistics may vary slightly compared to those reported in the text of the results section due to a slightly reduced sample when covariates are not included in the model.

4.3. Results

Descriptive statistics for all study variables are shown in Table 4.1.

RQ1. How does self-control develop across the transition to secondary school and does this vary across individuals?

The mean level of children's self-control decreased between each wave of data collection (see Table 4.1). A latent growth curve model fit the data well, χ^2 ($N = 1815, 3$) = 10.35, $p = .02$, RMSEA = .04, CFI = .99, SRMR = .098. At wave one, the average score on the self-control scale was 3.78 (range 1 to 5) with significant variability in these scores across individuals (*intercept variance* = .30, $p < .001$). On average, scores on the self-control scale declined by .07 between each assessment (*slope mean* = -.07, $p < .001$). Slopes showed significant variation across individuals (*slope variance* = .02, $p = .002$), suggesting that individuals changed at different rates.

RQ2. Are baseline levels and longitudinal change in self-control associated with differences in transition success and symptoms of mental health problems?

In line with previous research findings, higher levels of self-control at wave one were associated with transition success in a range of areas, including: higher school attainment ($\beta = .27, p < .001$), higher school attendance ($\beta = .12, p < .01$), better classroom behaviour ($\beta = .37, p < .001$), higher school liking ($\beta = .34, p < .001$), less loneliness at school ($\beta = -.38, p < .001$). Higher self-control at wave one was also associated with fewer symptoms of mental health problems in two areas: emotional problems ($\beta = -.09, p < .05$) and conduct problems ($\beta = -.27, p < .001$).

The rate of change (i.e., slope) of self-control across the transition predicted some aspects of transition success and mental health, such that less decline in self-

control was associated with better classroom behaviour ($\beta = .29, p < .001$), higher school liking ($\beta = .38, p < .001$), and fewer symptoms of conduct problems ($\beta = -.30, p < .01$). Change in self-control was not significantly associated with academic attainment ($\beta = .05, p = .56$), school attendance ($\beta = .11, p = .22$), loneliness at school ($\beta = -.15, p = .052$), or symptoms of emotional problems ($\beta = -.12, p < .24$).

To assess the practical significance of the effect sizes for attainment, analyses were re-run using the National Curriculum (NC) attainment data only which was available for 7 of the participating schools (see chapter two). These analyses showed that a one unit increase in the self-control score (which was the mean score based on 13 items with a 5 point response scale) was associated with an increase of one NC sublevel ($B = 0.98, p < .001$).

RQ3. Are individual differences in pubertal status and pubertal tempo associated with children's self-control and longitudinal change in children's self-control?

The mean scores on the Pubertal Development Scale (PDS) increased between each wave of data collection (see Table 4.1). A latent growth curve model fit the data well, $\chi^2 (N = 1750, 3) = 4.39, p = .22, RMSEA = .02, CFI = 1.00, SRMR = .028$. At wave one, the average score on the PDS was 7.60 with significant variability in these scores across individuals (*intercept variance* = 3.39, $p < .001$), suggesting individuals were showing different levels of pubertal development at the end of primary school. On average, PDS scores increased by .77 between each assessment ($p < .001$). Slopes showed significant variation across individuals (*slope variance* = .31, $p < .001$), suggesting that individuals were showing different rates of 'pubertal tempo' across the school transition. Girls' mean PDS scores at baseline ($M = 8.24, variance = 4.11$) were significantly higher and more varied (both $p < .001$) compared to those of boys ($M =$

7.03, *variance* = 2.03), but there were no significant gender differences in the mean levels or variances of pubertal tempo (p 's = .39 and .45, respectively).

The unadjusted model where individual differences in pubertal status at wave one and pubertal tempo were the sole predictors of the intercept and slope of self-control indicated only one significant association such that more advanced pubertal status at the end of primary school predicted faster decreases in self-control over the school transition period ($\beta = -.26, p < .01$; Table 4.2). However, it is important to control for the effects of age and for gender in this model given the gender differences in pubertal status identified at baseline. After controlling for age and gender and a number of other covariates (see Table 4.2), more advanced pubertal status at baseline was associated with lower self-control at baseline ($\beta = -.12, p = .006$) whilst still predicting faster decreases in self-control over time ($\beta = -.23, p = .04$; figure 4.1c). Pubertal tempo did not significantly predict the slope of self-control ($\beta = -.18, p = .18$; Table 4.2).

Table 4.2. *Standardised associations between predictors and self-control (intercept and slope).*

Predictor variables	Unadjusted models ^a		Multivariate model ^b	
	Intercept	Slope	Intercept	Slope
Warmth	.32***	-.21*	.10*	.08
Hostility	-.49***	.51***	-.23***	.39***
Inconsistent Discipline	-.32***	.22*	-.03	-.09
Inductive Reasoning	.20***	-.23*	-.01	-.11
Puberty				
<i>Intercept/status</i>	-.05	-.26**	-.12**	-.23*
<i>Slope/tempo</i>	-	-.18	-	-.18
Gender (male reference)	.23***	-.13	.18***	.02
Age	.02	-.22*	-.02	-.14
Parental Education	-.07	.10	-.09*	.08
Total Difficulties	-.62***	.54***	-.49***	.40***

Notes. * = $p < .05$, ** = $p < .01$, *** = $p < .001$. ^aUnadjusted models show the association for the intercept and slope of self-control regressed on each predictor separately (n.b. the intercept and slope of puberty are assessed simultaneously). ^bThe multivariate model shows the associations for the intercept and slope of self-control regressed on all predictor and control variables simultaneously.

RQ4. Are dimensions of parenting associated with children's self-control and longitudinal change in children's self-control?

All four parenting variables showed statistically significant unadjusted associations with both the intercept and slope of children's self-control (Table 4.2). As expected, higher levels of parental warmth and greater use of inductive reasoning were associated with higher baseline levels of self-control ($\beta = .32, p < .001$ and $\beta = .20, p < .001$, respectively), whilst higher levels of parental hostility and greater use of inconsistent discipline were associated with lower baseline levels of self-control ($\beta = -.49, p < .001$ and $\beta = -.32, p < .001$, respectively). Slope estimates for all four parenting variables were in the opposite direction to intercepts (Table 4.2), this indicates that the effects of parenting (which was measured at wave one) on self-control tended to attenuate over time.

After simultaneously entering all four parenting variables into the model and controlling for a number of covariates (gender, age, parental education, children's total difficulties, and puberty), the only parenting variables associated with children's self-control were parental hostility and warmth (Table 4.2). The strongest parenting predictor of children's self-control was hostility, whereby higher levels of parental hostility were associated with lower self-control at baseline ($\beta = -.23, p < .001$). This effect of hostility on self-control attenuated over time ($\beta = .39, p < .001$; Figure 4.1a). Parental warmth also remained a significant predictor of baseline levels of children's self-control ($\beta = .10, p = .04$). In contrast to the findings for parental hostility, the effects of parental warmth showed no evidence of attenuating over time ($\beta = .08, p = .47$; Figure 4.1b). For example, when comparing children experiencing high levels of warmth (1 *SD* above the mean) to children experiencing low levels of warmth (1 *SD* below the mean), children of high warmth parents have significantly higher self-control

at wave three (M [95% CI] = 3.71 [3.64, 3.79]) compared to children of low warmth parents (M [95% CI] = 3.56 [3.49, 3.63]) (shown in Figure 4.1b).

RQ5. Are associations between parenting and children's self-control moderated by individual differences in pubertal status?

To test whether parenting has differential effects on children's self-control according to individual differences in children's pubertal status at baseline four interaction terms were computed (one for each parenting variable) and were added to the multivariate model shown in Table 4.2. There was no evidence of pubertal status moderating the effects of warmth ($\beta_{intercept} = -.04, p = .41; \beta_{slope} = -.08, p = .46$), hostility ($\beta_{intercept} = .004, p = .94; \beta_{slope} = .01, p = .92$), inconsistent discipline ($\beta_{intercept} = -.01, p = .89; \beta_{slope} = .07, p = .53$), or inductive reasoning ($\beta_{intercept} = -.04, p = .42; \beta_{slope} = .10, p = .34$).

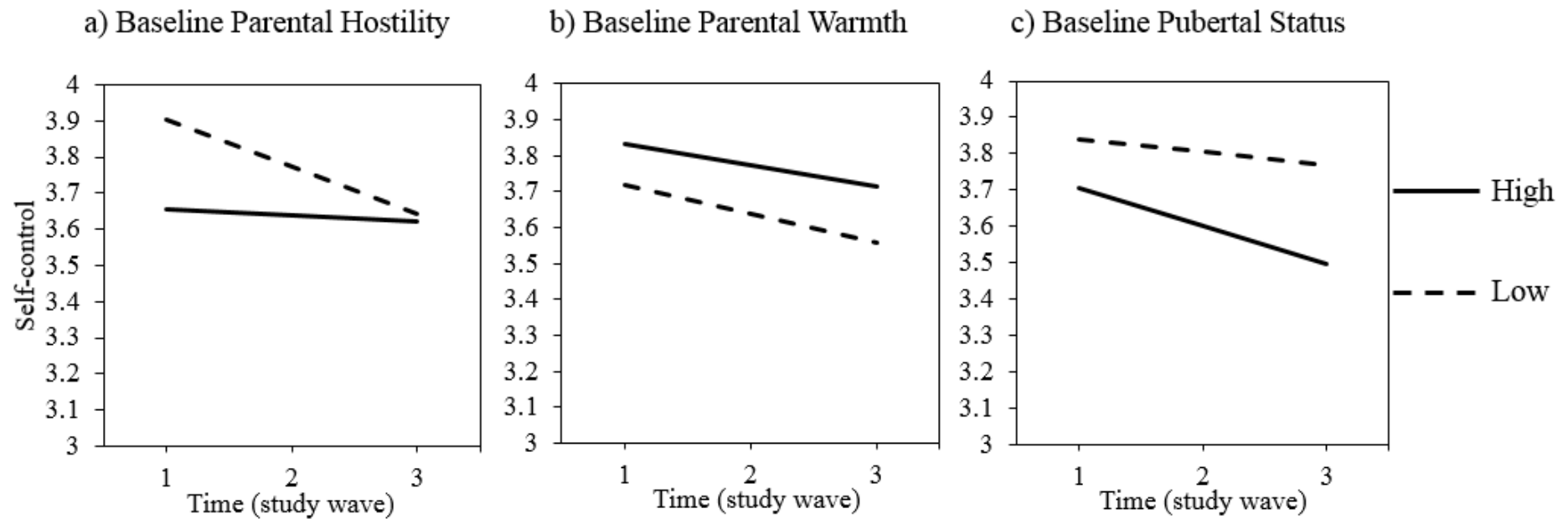


Figure 4.1. Model estimated slopes of longitudinal change in self-control.

Covariates shown in multivariate model in table 4.2 are held at mean levels. Separate slopes are plotted for high (one standard deviation above the mean) and low (one standard deviation below the mean) levels of (a) baseline parental hostility (b) baseline parental warmth (c) baseline pubertal status.

4.4. Discussion

This study presents a number of novel contributions to the understanding of children's self-control during early adolescence. In answering the first research question, a descriptive but informative finding was that self-control decreased between the ages of 11 and 12, i.e., over the transition to secondary school. Such basic knowledge about the developmental course of children's self-control is an initial step in understanding the causes of the development of self-control (Rutter, 2007). Few studies have explicitly examined how levels of self-control tend to develop during early adolescence, though there is some empirical evidence pointing to decreases in self-control during this period similar to those reported in this chapter (Yu, 2010). In relation to the second research question, self-control was favourably related to a range of outcomes, indicating that self-controlled children performed better academically, attended school more, were better behaved in the classroom, liked school more, felt less lonely at school, and had fewer symptoms of conduct and emotional problems. This is consistent with previous research (e.g., de Ridder et al., 2012; Duckworth & Seligman, 2005; Tangney et al., 2004). Importantly results extended previous findings by showing that changes over time in the level of children's self-control were associated with a number of these outcomes, in particular classroom behaviour as rated by peers, self-reports of liking school and conduct problems as rated by children's school teachers. These findings add to a growing literature suggesting the importance of better understanding the development of self-control and how it can be promoted, with the hope that this knowledge can be translated into effective interventions for children at risk of transition difficulties and mental health problems (Blair & Diamond, 2008; Shields, Cicchetti, & Ryan, 1994).

In relation to the third research question, using a sample of children who were all of similar age and were at the average age of onset for the first external signs of puberty (Parent et al., 2003; Patton & Viner, 2007), this study found that children who were at more advanced stages of pubertal development at baseline had lower self-control and were also more likely to show a decline in self-control over time. This is an empirical demonstration that is consistent with theoretical work about adolescence (Ernst et al., 2006; Steinberg, 2007). There was no evidence of an association between pubertal tempo and changes in self-control. This suggests the age of onset of puberty may have a more consistent effect on children's self-control than the rate at which puberty unfolds at least in the age period of 11-12 which was the focus of this study. Thus, individual differences in early pubertal status were associated with change in self-control over time.

In relation to the fourth research question, simple associations indicated that parents who expressed higher levels of warmth and lower levels of hostility towards their child and who attempted to discipline their child consistently and through reasoning tended to have children who were more self-controlled. However, after controlling for a range of potential confounders, only parental warmth and parental hostility measured at baseline were robustly associated with children's self-control, though in different ways. Parental warmth measured at baseline had a concurrent effect on children's self-control, and this effect did not attenuate over the one-year study period. While parental hostility had a stronger concurrent effect on self-control, this effect did attenuate over the one-year study period. Thus parental warmth, but not parental hostility, had a persistent effect on children's self-control over the transition to secondary school.

These results converge with previous findings that show negative parenting characteristics have stronger cross-sectional associations with self-control than positive parenting (Finkenauer et al., 2005). Hostile or rejecting parents may negatively impact children's self-control by acting as poor role models for good self-control and also by arousing negative affect in their children which diverts children's attention towards soothing their negative emotions and away from self-regulation strategies (Moilanen, Rasmussen, & Padilla-Walker, 2014). Research in a slightly older sample of adolescents also found that negative parenting is associated with rank-order declines in children's self-control (Moilanen et al., 2014). However, in this chapter it was the positive parenting characteristic of parental warmth which showed evidence of persistent effects on children's self-control across the studies duration. In this respect, these results are consistent with previous theory that stresses the importance of supportive and involved parenting for facilitating children's internalisation of their parents' values and goals (Grolnick & Farkas, 2002). The current results also concur with studies that found parental warmth and expressivity predicts longitudinal variations in self-control during late childhood/early adolescence (Eisenberg et al., 2005). The current results also extend understanding of this association in two ways: (i) this association exists in the context of children's decreasing self-control during this period, (ii) parental warmth maintains an important association with self-control that is not explained by children's mental health difficulties.

In line with previous research this study found no support for parental discipline predicting longitudinal variations in self-control (Eisenberg et al., 2005; Lengua, 2006). It was particularly interesting to find inductive reasoning did not show a robust association with children's self-control. Previous authors have emphasised the role of adult guidance in developing children's capacity to self-regulate (Grolnick & Farkas,

2002), so it might be hypothesised that parents explaining their decisions and discipline would result in children learning to reflect on their own actions and behaviour and subsequently be motivated to internalise their parent's guidance. However, adolescents' impulsivity (i.e., low self-control) is not typically a reflection of inadequate cognitive abilities, but a consequence of adolescents' sensitivity to social and affective influences (Steinberg, 2005). This sensitivity may extend to the broader domain of self-control and explain why parental affect had stronger effects on children's self-control than parental discipline. It is therefore possible that parenting behaviours that aid children's emotional processing, such as 'emotion-coaching' (Ramsden & Hubbard, 2002), may play an important role in the development of self-control in adolescents.

In relation to the fifth research question, findings were presented that indicated the effects of parenting on children's self-control were not affected by individual differences in pubertal status at 11 years old as shown by the absence of significant interactions between parenting and puberty. A moderating effect of pubertal status was hypothesised based on previous empirical findings suggesting the association between positive parenting and self-control attenuates between late childhood and adolescence (Eisenberg et al., 2005) and theoretical accounts that characterise adolescence as a period in which children begin to increase their autonomy from parents (Steinberg & Morris, 2001). Thus, the current results suggest the influence of positive parenting on children's self-control during adolescence does not attenuate due to individual differences in early pubertal status. One possible reason for not finding a moderating effect of pubertal status is the small window of pubertal development studied here. Puberty is a long developmental period consisting of numerous endocrine events that continue into the early 20s (Blakemore, Burnett, & Dahl, 2010) as well as a range of biological events that have notable social and psychological meaning (e.g., menarche,

growth spurts). This means that it was not possible to rule out the possibility that pubertal development influences self-control at other ages. An alternative explanation is that the diminished role of parenting during adolescence has been overstated. Numerous findings point to an important protective role for parents in relation to reducing risky adolescent behaviours such as substance misuse, affiliating with deviant peers, and sexual behaviour (DeVore & Ginsburg, 2005; Hummel, Shelton, Heron, Moore, & van den Bree, 2013). More work is needed to establish whether the effects of parenting on children's self-control truly attenuate, though the current findings indicate they continue to play a role in children of 11-12 years old, many of whom have begun to show signs of early pubertal development.

The limitations of this study include its reliance on questionnaire reports and the relatively short study period which meant the extent of naturalistic changes in self-control and pubertal development may be relatively low. Pubertal development may also differ across the full range of the pubertal period. As noted earlier, the assessments of pubertal development did not cover the full range of puberty (a period of development that occurs over a much longer period), rather they refer to individual differences in pubertal status and tempo at an age generally considered to be the average age of onset of puberty (approx 11 years; Dahl, 2004a; Parent et al., 2003; Patton & Viner, 2007) – although some have suggested this may occur slightly later in boys (approx 12 years; Blakemore et al., 2010) which concurs with the results in this chapter where girls had higher pubertal status scores.

The study design also limited the ability to test whether the effects of parenting attenuate during adolescence. To more fully answer this question future studies should follow children through the whole of puberty or utilise a design that compares prepubertal children with adolescents. The study's reliance on a baseline assessment of

parenting behaviour also prevented the assessment of whether longitudinal change in parenting predicts longitudinal change in self-control, a question that will need to be addressed in future research. Note, this could have been examined in the STARS dataset via child-reports of parenting but was not done due to shared method variance. A further limitation was the lower study participation rate at wave one, but as participation was near complete at waves two (87%) and three (85%) equivalent measures collected at later waves were incorporated into the statistical models to limit potential bias due to non-response using FIML procedures (Graham, 2009). Therefore the measurement of self-control is unlikely to have been biased by non-response. The strengths of this research include its use of multiple-informants and the ability to statistically control for a number of alternative explanations such as co-occurring mental health problems. Additionally, the use of a sample largely similar in age meant that the effects of pubertal status could be examined relatively independent of age (Blakemore et al., 2010).

Conclusion

Results from this study indicate that self-control decreases across ages 11 to 12 as children in the UK make the transition from primary to secondary school. This has important implications because greater decreases in self-control during this period are associated with aspects of poorer school-related functioning and poorer mental health at the end of the first year of secondary school. One risk factor for low self-control during this period is advanced pubertal status at age 11, suggesting that children experiencing puberty earlier than their peers may comprise a vulnerable group. Finally, parental affect but not parental discipline is one way through which parents influence older children's self-control. In particular, these findings suggest that parents may be able to

buffer developmental declines in their children's self-control through demonstrations of warmth and affection.

**CHAPTER 5: Parenting, self-control and academic attainment during
the transition to secondary school. Examining the additional role of
maternal depressive symptoms.**

Abstract

Self-control predicts children's transition success (chapters 3 and 4) and academic attainment (Duckworth & Seligman, 2005). In chapter four, aspects of parenting were found to be related to children's self-control over the transition period highlighting that social-contextual factors outside of the school may influence children's adjustment at school. The parental context is explored further by considering the role of maternal depressive symptoms as a factor that may reduce the quality of parenting and subsequent functioning of children as they make the transition to secondary school. Research has established good evidence for links between maternal depression and children's emotional and behavioural problems, but much less is known about how parental depression may affect children's cognitive and educational outcomes, particularly in older children. This chapter examines the influence of maternal depressive symptoms on children's academic attainment, paying attention to the potential role of both mums' and dads' parenting behaviour and children's self-control in mediating this association. Possible gender differences are also explored. This chapter used data from all three waves of STARS to temporally separate the predictor (maternal depressive symptoms), mediator (parenting and children's self-control), and outcome (academic attainment) variables. Higher maternal depressive symptoms were associated with children's later academic attainment. This effect operated in part through reducing children's self-control. Higher maternal depressive symptoms were associated with lower maternal warmth, lower paternal warmth, and higher paternal hostility which, in turn, were associated with children's self-control and subsequent academic attainment.

5.1. Introduction

In chapter three, children's level of self-control was found to predict academic and behavioural adjustment at secondary school. These findings correspond to previous research which suggests self-control is an important predictor of children's academic attainment (Duckworth & Seligman, 2005; Poropat, 2014). In chapter four, parental warmth and parental hostility predicted children's self-control implicating a possible mechanism through which the family context influences children's academic attainment. Parental mental health is a known determinant of parenting quality (Rutter & Quinton, 1984), in particular, maternal depressive symptoms are associated with lower levels of warmth and higher levels of hostility (Downey & Coyne, 1990; Lovejoy et al., 2000). Correlations presented in chapter three supported those found in earlier research whereby levels of depressive symptoms amongst parents were associated with parental warmth and parental hostility as well as children's self-control and academic adjustment. Furthermore, the negative association between parental depressive symptoms and children's academic and behavioural adjustment attenuated and became non-significant in the multivariate model tested in chapter three, therefore indicating the potential for mediating mechanisms (Baron & Kenny, 1986). These mechanisms are explored in this chapter.

Depressive disorder and depressive symptoms are common and both are associated with impairment in work and social roles (Backenstrass et al., 2006; Bothwell & Weissman, 1977; Lerner & Henke, 2008; Thapar, Collishaw, Pine, & Thapar, 2012; World Health Organization, 2013). Lifetime prevalence rates indicate that one in ten men will experience treatment-worthy depression in their lifetime, but rates are twice as high amongst women (Kessler et al., 2005). Depressive disorders tend to be recurrent and chronic (Glass, 1999). The core symptoms of depression are

persistent low mood and loss of pleasure or interest in most activities. Additional symptoms include fatigue, attention problems, psychomotor problems and sleep disturbances (American Psychiatric Association, 2013). Social impairment is also a major problem for people experiencing depression, this includes impaired functioning in close interpersonal relationships such as those with romantic partners and offspring (Bothwell & Weissman, 1977; Burke, 2003; Coyne, 1976; Weissman et al., 1971). Symptoms of depression that do not reach the diagnostic threshold are also associated with impairment in interpersonal relationships (Ferriter, Eberhart, & Hammen, 2010; McKnight & Kashdan, 2009).

The children of depressed mothers are at increased risk of maladaptive developmental outcomes (Rice, Harold, & Thapar, 2002) and such risk appears to act through both environmental and genetic mechanisms (Harold et al., 2011; Rice, Harold, & Thapar, 2005; Silberg, Maes, & Eaves, 2010; Tully, Iacono, & McGue, 2008). There is substantial evidence highlighting maternal depression as a risk factor for emotional problems in offspring (Goodman & Gotlib, 1999; Klein, Lewinsohn, Rohde, Seeley, & Olin, 2005; Weissman, Wickramaratne, et al., 2006) and, to a slightly lesser extent, behavioural problems in offspring (Foster, Webster, Weissman, Pilowsky, Wickramaratne, Rush, et al., 2008; Harnish, Dodge, & Valente, 1995; Mars et al., 2012; Radke-Yarrow, Nottelmann, Martinez, Fox, & Belmont, 1992). Some support for maternal depression playing an important role in relation to children's negative outcomes comes from findings showing effective antidepressant treatment of maternal depression reduced children's internalising and externalising symptoms as rated by parent-ratings on the Child Behaviour Checklist (Achenbach, 1991; Weissman, Pilowsky, et al., 2006). Exploratory analyses have suggested such medication-based changes may operate via improvements in the mothers' parental functioning in areas

such as “being able to talk to and listen to my child” (Weissman et al., 2015).

Functional difficulties such as this are likely to reduce mothers’ abilities to support their children as they try to adapt to the new secondary school environment. While many studies have assessed the link between maternal depression and children’s emotional and behavioural problems, there has been less work exploring how maternal depression may effect children’s cognitive and educational outcomes (Connell & Goodman, 2002; Goodman & Gotlib, 1999; Goodman et al., 2011). This is one of the questions examined in this chapter.

There is some existing evidence pointing to maternal depression as a risk factor for poor educational outcomes. Compared to healthy controls or those reporting low levels of depressive symptoms, the children of mothers with depression have been found to have lower grade-point averages and lower academic performance (Hammen et al., 1987; Tannenbaum & Forehand, 1994). Mothers’ reports of psychological distress on a two-item screening measure about sad and anxious mood have also been linked to a higher likelihood of school dropout in offspring (Ensminger, Hanson, Riley, & Juon, 2003). Studies into post-natal depression (PND) are also informative because several studies to date have used longitudinal prospective designs, taken a developmental focus, and examined a broad range of child outcomes including IQ and school achievement. This contrasts with the majority of studies of the offspring of depressed mothers which have tended to focus on children’s psychiatric outcomes. Maternal depression in the postnatal period appears to have negative effects on children’s IQ both during childhood and adolescence (Hay, Pawlby, Waters, & Sharp, 2008; Milgrom, Westley, & Gemmill, 2004; Sharp et al., 1995). Other skills have also shown evidence of impairment in the offspring of mothers who experienced depression. These include executive functions and related abilities such as attention, memory, and problem solving abilities (Cogill,

Caplan, Alexandra, Robson, & Kumar, 1986; Hay & Kumar, 1995; Hughes, Roman, Hart, & Ensor, 2013). These findings concur with the correlations shown in chapter three, where parental depressive symptoms were associated with children's academic adjustment and self-control. Given that maternal depression appears to place children at risk of adverse cognitive development and educational outcomes, understanding the mechanisms underlying such effects may be useful for prevention and intervention efforts.

The transition to secondary school is a period of substantial social and environmental changes (Simmons et al., 1987), potential academic difficulties (Alsbaugh, 1998), and where access to parental support is likely to be particularly valuable (Simmons & Blyth, 1987; Symonds & Galton, 2014). Depressive symptoms may interfere with mothers' attempts to support and protect their children as they try to adapt to their new school. For instance, depressive symptoms may reduce mothers' abilities to exert the sustained effort required to boost children's self-esteem (e.g., though praise), alter how their children interact with risks (e.g., help with planning how to deal with challenges presented by secondary school), monitor and adequately intervene in response to risk (e.g., contacting schools about concerns), and provide additional opportunities for positive development (e.g., help with homework or providing extra-curricular activities) (Downey & Coyne, 1990; Jindal-Snape & Miller, 2008; Rutter, 1987; Symonds & Galton, 2014).

How parenting behaviour is influenced by maternal depressive symptoms

People experiencing depression often show impaired relationships and social functioning (Barnett, Barnett, & Gotlib, 1988; Rao, Rao, Hammen, & Daley, 1999; Weissman, Klerman, Paykel, Prusoff, & Hanson, 1974), therefore depressed parents

may have difficulties establishing good quality relationships with their children and adequately responding to their children's social and emotional needs (Bandura, 1977; Beardslee, Versage, & Gladstone, 1998; Bowlby, 1969; Vygotsky, 1930/1978; Vygotsky, 1934/1962). Empirical data supports this view, as depressed parents display poorer quality parenting behaviour during interactions with their children. For example, depressed parents tend to be less positive, warm and responsive and more negative, hostile and irritable (Bettes, 1988; Campbell, Cohn, & Meyers, 1995; Field, Healy, Goldstein, & Guthertz, 1990; Gordon et al., 1989; Lovejoy et al., 2000; Murray, Kempton, Woolgar, & Hooper, 1993; Orvaschel, Weissman, & Kidd, 1980; Tarullo, DeMulder, Martinez, & Radke-Yarrow, 1994). Parents experiencing depression and depressive symptoms are also more likely to exert negative or unconstructive methods of control over their children (Cummings, Keller, & Davies, 2005; Kochanska, Kuczynski, Radke-Yarrow, & Welsh, 1987; Susman et al., 1985). Strong evidence that depression adversely impacts parenting is provided by the observation that mothers who respond positively to treatment show increases in the levels of warmth and acceptance they exhibit towards their children (Foster, Webster, Weissman, Pilowsky, Wickramaratne, Talati, et al., 2008; Weissman et al., 2015). Therefore, ample evidence shows depressed parents exhibit impaired parenting.

While it is unsurprising that research on maternal depression has tended to focus on maternal parenting, it is important to acknowledge that the mother-child relationship does not occur in isolation. A systems theory perspective suggests that the impaired interpersonal style associated with maternal depression will not only apply to interactions with children, but also those with other family members (Cox & Paley, 1997). A significant component of the family system that is often overlooked is the father (e.g., Goodman & Gotlib, 1999). This is particularly important because

supportive and involved parenting from fathers exerts unique effects independently of maternal parenting on children's cognitive development and academic achievement (Flouri & Buchanan, 2004; Harris, Furstenberg, & Marmer, 1998; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004). While it has been established that features of the depressed mother's relationship with her partner, such as levels of conflict and support, will influence her parenting (Biglan et al., 1985; Hughes et al., 2013; Shelton & Harold, 2008), here, attention is paid to the question of how maternal depressive symptoms might affect the father's ability to adequately parent his children.

To date, studies assessing how mothers' depression might influence fathers' parenting have provided mixed results. Firstly, it has been suggested that children's interactions with their fathers may not be adversely affected by maternal depression (Hossain et al., 1994) and that fathers may even play a compensatory role by being more caring towards children when mothers are depressed (Hops et al., 1987). In contrast to this compensatory view, other researchers have found that more negative affective expression occurs across all family members in families that contain a stressed or depressed parent, i.e., if one parent is depressed even the non-depressed parents' relationships with their adolescent children are negatively affected (Jacob & Johnson, 1997). There is also evidence from a large community sample of two-parent families that found some aspects of fathers' interactions with their infants vary according to the mothers' depression status (Paulson, Dauber, & Leiferman, 2006). In particular, Paulson et al. found that fathers were less likely to sing with their infant children when mothers were depressed, though no differences were found regarding the frequency fathers read to their child, told their child stories, took their child on errands, or played with their child.

In summary, there is good reason to believe that maternal depression impairs mothers' parenting but further investigation is required to establish its hypothesised negative influence on fathers' parenting of young adolescents. Attention is now turned to the pathways through which impaired parenting may have adverse effects on children's cognitive development.

The relationship between parenting and children's cognitive development in the families of depressed mothers

Positive parent-child relationships in general and warm-responsive parenting styles in particular have been linked to higher academic attainment in children (Estrada, Arsenio, Hess, & Holloway, 1987; Hess, Holloway, Dickson, & Price, 1984; Hirsh-Pasek & Burchinal, 2006; Morrison, Rimm-Kauffman, & Pianta, 2003). Research into the impact of maternal depression on children's cognitive development indicates that these effects are at least partially explained by mothers' interactions with their infants. Findings from both intervention and cohort studies suggest that depressed mothers are generally less responsive and engaged with their infants (Field, 1995; Murray, Hipwell, Hooper, Stein, & Cooper, 1996; Murray et al., 1993; Sohr-Preston & Scaramella, 2006). Furthermore, interventions targeting parent-child interactions have shown that the cognitive and language skills of young children of depressed mothers can be improved (Sohr-Preston & Scaramella, 2006). Promising interventions described in Sohr-Preston and Scaramella's review include: (1) a psychotherapy informed intervention which aimed to increase opportunities for fostering children's cognitive development by improving maternal responsiveness (Cicchetti, Rogosch, & Toth, 2000); (2) a reading-based initiative that increased the time mothers spent talking and reading to their children (Bigatti, Cronan, & Anaya, 2001). Therefore, the parent-child relationship may

be an important mechanism by which maternal depression influences children's cognitive outcomes.

Environments that offer less cognitive stimulation are associated with lower cognitive ability in children and these effects are likely to operate in part through the amount of emotional warmth and cognitive stimulation provided by parents (Kim-Cohen, Moffitt, Caspi, & Taylor, 2004). There is evidence that current maternal depression results in lower quality support during joint parent-child tasks, such as homework, and that this may contribute to children's lower academic achievement (Gordon et al., 1989; Murray et al., 2006). Additionally, one study found post-natal depression is associated with school exam performance during adolescence and this effect was partially mediated through mothers' attempts to cognitively stimulate children during shared laboratory tasks at ages 5 and 8 years old (Murray et al., 2010). Therefore, the effect of maternal depression on children's cognitive ability likely arises, in part, due to disruptions to the social interactions between the mother and child that normally facilitate cognitive development such as interactions that display and promote problem-solving and attentional control (Cogill et al., 1986; Hay & Kumar, 1995).

As detailed earlier, fathers also influence children's cognitive and academic development (Flouri & Buchanan, 2004; Harris et al., 1998; Tamis-LeMonda et al., 2004). Therefore, whilst the link between maternal depression and the parenting exhibited by fathers is less clear, fathers likely play a role in promoting children's cognitive and educational outcomes.

The effects of parenting on children's academic achievement are likely to be indirect, that is, parenting supports the development of skills, abilities and behaviour in children which in turn facilitate learning and academic attainment (e.g., Feldman & Wentzel, 1990; Pettit, Dodge, & Brown, 1988). Self-control is one such ability that has

consistently been predicted by the parent-child affective relationship while also being identified as an important predictor of academic success (e.g., Cecil et al., 2012; Duckworth & Seligman, 2005; Lengua, 2008). Self-control refers to an individual's ability to control their attention, thoughts, impulses and emotions and to direct behaviour towards long-term goals. Results presented in chapter four showed that two measures of parenting were associated with children's self-control – warmth and hostility – with evidence that the effect of parental warmth on self-control persisted over time.

Higher levels of warm-responsive parenting and low levels of hostility facilitate the development of self-control in a number of ways. First, it provides a stable emotional base from which the child can explore the world, including difficult and challenging tasks. The absence of a supportive and available parent may result in the child becoming wary of approaching new experiences and therefore reduce opportunities for developing self-control strategies (Alessandri & Lewis, 1996; Estrada et al., 1987). Second, many behaviours relating to self-control are learned socially, such as the value of persisting with a demanding task or understanding what constitutes appropriate expressions of emotional distress (Schaffer, 1996). Affectively warm relationships may support the learning of these social norms by facilitating the flow of information between the parent and child (Estrada et al., 1987). For example, when relationships are positive and rewarding parents may give more informative feedback about children's problem-solving attempts, whilst children may also feel more able to draw on help and resources from adults (Estrada et al., 1987). Conversely, hostile parents provide poor role-models for exercising self-control (Bandura, 1977). Hostile parenting also arouses negative emotions in children and dealing with such emotions is

likely to consume resources that could otherwise be used for developing strategies of self-control (Moilanen et al., 2014).

This chapter aims to extend the association between self-control and parenting and children's self-control found in chapter four by testing the hypothesis that the effects of maternal depressive symptoms on children's academic outcomes are mediated through parenting and children's self-control.

An additional factor that shows associations with many of the factors under examination here is socioeconomic disadvantage. Socioeconomic disadvantage is associated with higher levels of depression in women (Dohrenwend et al., 1992; Goodman & Gotlib, 1999), more authoritarian parenting (Aunola, Nurmi, Onatsu-Arviolommi, & Pulkkinen, 1999), and lower levels of academic attainment amongst children (Ermisch & Francesconi, 2001; Save the Children, 2012). Therefore, the associations observed between this chapter's main study variables may simply reflect a shared association with socioeconomic disadvantage. It is important that the hypotheses tested here take into account the potentially confounding effects of socioeconomic disadvantage.

The role of gender

There are a number of reasons to consider gender differences when examining the mechanisms by which maternal depression influences children's educational outcomes.

First, there are indications that boys may comprise a particularly vulnerable group. Previous research shows that the sons of depressed mothers have lower levels of academic performance compared to daughters (Murray et al., 2006) and are twice as likely to drop out of school compared to boys who do not have depressed mothers,

whereas no such effect was found in girls (Ensminger et al., 2003). Similarly, effects of maternal postnatal depression on children's IQ are generally stronger in boys than girls (Hay et al., 2008; Milgrom et al., 2004; Sharp et al., 1995). A comparable gender difference has also been observed for paternal depression, where boys exhibit poorer behaviour and lower teacher-rated functioning at school (Ramchandani, Stein, Evans, & O'Connor, 2005; Thomas & Forehand, 1991). It is unclear exactly why boys' cognitive development may be more vulnerable to maternal depression, but one mechanism implicated by previous research is that boys seem to be more negatively impacted by less responsive maternal interactions (Murray et al., 2010). These gender differences have analytical implications, for example main effects based on mixed-gender samples may mask heterogeneous effects in boys and girls, and also have practical implications. For instance, where effects only exist for boys, intervention efforts may need to be targeted. It is therefore important to consider whether the effects of maternal depression impacts the cognitive development and academic attainment of adolescent boys and girls differently.

A second reason to consider gender differences is that it is possible the relationships between parents and children of the same sex are more important for children's outcomes (Chodorow, 1978; Freud, 1938; Kochanska et al., 1987). For example, during adolescence, fathers appear to be more involved with their son's lives (Harris et al., 1998; Lasko et al., 1996; Videon, 2005), whilst girls report more intimacy with their mothers (Field, Lang, Yando, & Bendell, 1995). Additionally, there is some indication that longitudinal changes in adolescents' well-being are more strongly related to the parent-child relationship within father-son and mother-daughter dyads (Videon, 2005).

The current study

This chapter aims to expand understanding of the association between children's self-control and their academic attainment. This is done by examining the role of maternal depressive symptoms and parenting as key social-contextual influences on self-control and attainment. Four primary hypotheses are tested:

- 1) Maternal depressive symptoms are associated with children's academic attainment.
- 2) The association between maternal depressive symptoms and children's academic attainment is partially mediated through children's self-control.
- 3) The association between maternal depressive symptoms and children's academic attainment is partially mediated through *maternal* parenting and children's self-control (see conceptual model shown in figure 5.1).
- 4) The association between maternal depressive symptoms and children's academic attainment is partially mediated through *paternal* parenting and children's self-control (see figure 5.1).

Additional analyses were performed to test for gender differences in a number of the associations assessed here. First, based on previous research which has found boys are more negatively impacted by maternal depression, the association between maternal depressive symptoms and academic attainment was tested for evidence that this effect was stronger for boys compared to girls. The more exploratory questions of whether fathers' parenting was more strongly related to boys' self-control and mothers' parenting was more strongly related to girls' self-control were also tested.

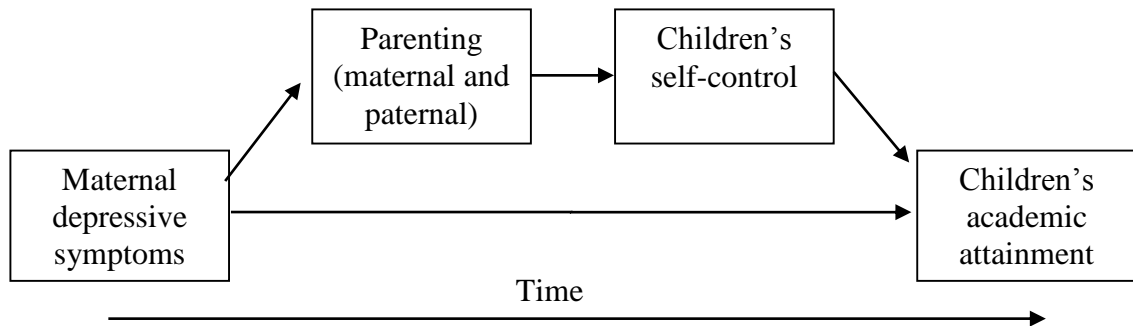


Figure 5.1. Conceptual model showing the hypothesised pathways from maternal depressive symptoms through to children's academic attainment.

5.2. Method

Sample

Data reported in this chapter were collected from parents at wave one (n = 745, 34% of those eligible), children at wave two (n = 1712, 88% of those eligible) and school records at wave three (n = 1796, 92% of those eligible). The study design required only one parent to respond for each participating child. Of the 745 responding parents (605 mothers, 105 fathers, 4 other relatives, 31 unknown) this study only uses the data collected from mothers due to the focus on maternal depressive symptoms (n = 605). Non-participation at wave one was largely due to non-response (discussed in more detail below), whilst non-participation and missing data at waves two and three were largely due to children being withdrawn from the study. Data for at least one of the main study variables were available for 1938 children (1029 boys).

Measures

Maternal depressive symptoms. At wave one (see figure 5.1), mothers reported on their own current depression symptoms using the Hospital Anxiety and Depression Scale (HADS, see 2.4.9.). A total score is used here.

Parenting. At wave two, maternal and paternal parenting was assessed with children's reports on the Warmth and Hostility parenting subscales (see 2.4.10.). Total scores for each subscale are used here.

Self-control. At wave two, self-control was assessed via children's self-reports (see 2.4.15.). The variable used here is the mean score for the 13 self-control items.

Academic attainment. At wave three, academic attainment was measured using the average score for English, Maths, and Science assessments (see 2.4.1.)

Covariates. To account for the possible effects of socioeconomic deprivation on all aspects of the hypothesised model an index of socioeconomic deprivation was computed (range = 0 to 3) using parent reports of three indicators of socioeconomic status: economic, social and work (see 2.4.17.; Adler et al., 1994; Conger et al., 2010). In line with suggestions in Adler et al., economic status was measured by family income (if in poverty/<£20k; 25%) (poverty is defined as a household income below 60% of the median regional income; Department for Work and Pensions, 2015; Office for National Statistics, 2012), social status was measured by education level (if both parents did not complete secondary education; 5%), and work status was measured by employment status (if both parents were unemployed; 6%).

Table 5.1. *Socio-demographic characteristics of the total available sample and wave one respondents.*

	Total sample	Wave one sample
Characteristic	n/total available n (%)	n/total available n (%)
Eligible for free school meals	264/1653 (16%)	89/653 (14%)
Female gender	1059/2290 (46%)	354/745 (48%)
First language is not English	477/1653 (29%)	176/653 (27%)
Non-white ethnicity	651/1614 (40%)	232/645 (36%)
Special Educational Needs	38/1652 (2%)	9/653 (1%)

Notes. Total sample refers to data collected from secondary schools at wave two, except for child's gender which was collected alongside children's contact details at all waves.

Missing data

There was substantial non-response at wave one (65%), however, wave one respondents were similar to the total sample on a range of demographic characteristics (see table 5.1). For the current study, the main variable of interest at wave one was maternal depressive symptoms. There was no indication that those who responded at wave one were unrepresentative of the total sample in terms of depressive symptoms. First, there was substantial variance in responses to the HADS depression subscale at wave one ($M = 3.48$, $SD = 3.08$, range = 0 to 21). Second, there was no significant difference between wave one respondents' ($M = 3.48$, $SD = 3.08$) and wave one non-respondents' ($M = 3.39$, $SD = 3.25$) levels of depressive symptoms when using data from parental responses to the HADS depression scale at all available waves ($n = 1126$; $t(1124) = -.536$, $p = .59$). Neither were wave one respondents significantly different from non-respondents in terms of child-reported maternal warmth and hostility or paternal warmth (all $p > .05$). Wave one respondents did show lower levels of child-reported paternal hostility ($M = 9.99$, $SD = 5.10$) than non-respondents ($M = 10.67$, SD

= 5.51), though these differences were small ($n = 1485$; $t(1315.5) = 2.451$, $p < .01$, $d = .3$). Third, the associations between parental depressive symptoms and parenting were very similar, though slightly attenuated, when using either wave one depressive symptoms alone or depressive symptom scores available from any wave (e.g., for maternal warmth: $r = -.12$ and $r = -.14$, respectively). Taken together, these analyses suggested that associations based on wave one responses alone may be slightly attenuated. Previous analyses (chapters two and three) also showed that wave one responses correspond to a slightly more cognitively able subgroup of the sample (e.g. they have higher academic attainment) and therefore all of this information was used to inform the missing data strategy employed in this chapter.

Full information maximum likelihood (FIML) estimation was used to handle missing data, FIML uses all of the available information for each participant rather than deleting participants or imputing values (Schafer & Graham, 2002). FIML can provide unbiased estimates in the presence of missing data, particularly when using auxiliary variables that correlate highly with variables that have missing data (e.g., maternal depressive symptoms measured at waves two and three where wave one is missing) (Graham, 2009). The following were used as auxiliary variables: wave two and three maternal depressive symptoms, wave one and three parental warmth, wave one parental hostility, wave one and three self-control, and wave one academic attainment.

Correlations amongst the main study variables using both listwise deletion and FIML estimates are shown in table 5.2. Essentially, correlations using both estimation methods were very similar in terms of direction and effect size. The main difference was that some of the FIML estimated effects were slightly larger suggesting listwise deletion provides attenuated estimates. Only two correlations differed in terms of statistical significance when FIML estimates are used instead: (1) the correlation

between maternal depressive symptoms and paternal hostility changes from trend level significance ($r = .08, p < .074$) to significant ($r = .11, p = .018$); (2) the correlation between socioeconomic deprivation and children's self-control changes from non-significant ($r = -.07, p = .132$) to significant ($r = -.12, p = .019$).

Statistical Analysis

First, the association between maternal depressive symptoms at wave one and academic attainment at wave three was tested (hypothesis 1). This was followed by testing a model where self-control at wave two mediated the association between maternal depressive symptoms and academic attainment (hypothesis 2). Next, the previous model was extended and two separate models were tested where (i) maternal parenting (hypothesis 3) and (ii) paternal parenting (hypothesis 4) mediated the association between maternal depressive symptoms and children's self-control (see figure 5.1). Hypotheses 2, 3 and 4 were evaluated by testing the indirect effects of maternal depressive symptoms on children's academic attainment via the hypothesised mediators (Mackinnon & Dwyer, 1993). All indirect effects were assessed using bootstrapped significance tests (10,000 bootstraps) (Hayes & Scharkow, 2013). All analyses were run for the whole sample and then for boys and girls separately. Supplementary sensitivity analyses were also run controlling for the effects of socioeconomic deprivation on all mediator and outcome variables, these results are presented in appendix 2 and where substantive differences were found they are reported in the text of the results. Supplementary analyses were also carried out for hypothesis 4, where associations for paternal parenting with maternal depression and child self-control were compared for families with and without resident fathers. β is used

throughout to indicate standardised regression coefficients. B is used throughout to indicate unstandardised regression coefficients.

Analyses were conducted in Mplus version 7 (Muthén & Muthén, 2010). The MLR estimator was used which provides maximum likelihood parameter estimates with standard errors and chi-square test statistics which are robust to non-normality. Guided by suggestions provided in Hu and Bentler, acceptable model fit was defined by the following criteria: χ^2 (ideally $p > .05$, but where $p < .05$ smaller χ^2 values are better as they indicate smaller differences between the data and the model), RMSEA ($\leq .06$), CFI ($\geq .95$), and sRMR ($\leq .08$) (Hu & Bentler, 1999). Gender differences were assessed with a scaled chi-square difference test which provides an estimate of the statistical significance of parameter comparisons.

5.3. Results

Descriptive statistics

Of the 578 mothers who reported on their depressive symptoms, 42 (7.3%) met the criteria for possible caseness (scores of 8 to 10) and 17 (2.9%) met the criteria for caseness (scores of 11+) (Snaith, 2003). The average score on the depressive symptoms scale was 3.38 (range = 0 to 16) suggesting a low level of depressive symptoms in the sample (table 5.2).

Based on FIML estimates (the upper diagonal of table 5.2) which are likely to be less biased than their listwise deletion equivalents, correlation tests showed that higher levels of maternal depressive symptoms were correlated with lower academic attainment ($r = -.14, p < .001$) and lower self-control ($r = -.16, p < .001$) in children as well as lower child-reported warmth from mothers ($r = -.13, p = .013$) and fathers ($r = -.13, p = .005$) and higher child-reported hostility from fathers ($r = .11, p = .018$; table 5.2). Higher levels of self-control were correlated with higher academic attainment ($r = .18, p < .001$). Children's perceptions of higher parental warmth (mums: $r = .26, p < .001$; dads: $r = .28, p < .001$) and lower parental hostility (mums: $r = -.40, p < .001$; dads: $r = -.37, p < .001$) were correlated with higher self-control in children (table 5.2).

Hypothesis 1: Maternal depressive symptoms are associated with children's academic attainment.

Maternal depressive symptoms at wave one were longitudinally associated with children's academic attainment at wave three ($\beta = -.12, p = .002$). Fit statistics are not available as this model is saturated. This was stronger for girls ($\beta = -.17, p = .004$) than boys ($\beta = -.09, p = .079$), but this difference was not statistically significant ($\chi^2 \text{diff} (1) =$

0.81, $p = .37$). Results were slightly attenuated but substantively similar after controlling for the effects of socioeconomic deprivation (shown in appendix 2).

Analyses using National Curriculum (NC) level data for the combined (mean) English, Maths and Science scores show that a one-unit increase in maternal depression scores was associated with a decrease of .09 NC sublevels in these subjects ($B = -.09$, $p = .012$). A child with a mother who had a depressive symptom score of 11, the cut-off used to define caseness, would therefore have NC scores one whole sublevel lower in all three subjects (compared to a mother with a depressive symptom score of zero).

Table 5.2. Descriptive statistics and correlations for main study variables.

Study variable	<i>M</i>	<i>SD</i>		1.	2.	3.	4.	5.	6.	7.	8.
1. Maternal depressive symptoms (w1)	3.38	2.98	<i>r</i>	1	-.13	.07	-.13	.11	-.16	-.14	.16
			<i>p</i>		.013	.122	.005	.018	.001	.001	.001
			<i>N</i>	578	1938	1938	1938	1938	1938	1938	1938
2. Maternal warmth (w2)	37.00	6.67	<i>r</i>	-.12	1	-.39	.62	-.28	.26	.07	-.08
			<i>p</i>	.008		.000	.000	.000	.000	.011	.060
			<i>N</i>	507	1636	1938	1938	1938	1938	1938	1938
3. Maternal hostility (w2)	10.65	5.01	<i>r</i>	.06	-.39	1	-.32	.66	-.40	-.11	.00
			<i>p</i>	.173	.000		.000	.000	.000	.000	.981
			<i>N</i>	509	1629	1636	1938	1938	1938	1938	1938
4. Paternal warmth (wave 2)	35.33	7.96	<i>r</i>	-.11	.61	-.31	1	-.43	.28	.03	-.12
			<i>p</i>	.024	.000	.000		.000	.000	.394	.018
			<i>N</i>	456	1456	1450	1477	1938	1938	1938	1938
5. Paternal hostility (w2)	10.40	5.36	<i>r</i>	.08	-.28	.66	-.42	1	-.37	-.14	.01
			<i>p</i>	.074	.000	.000	.000		.000	.000	.845
			<i>N</i>	460	1464	1460	1473	1485	1938	1938	1938
6. Childs self-control (w2)	3.69	0.73	<i>r</i>	-.13	.26	-.40	.29	-.38	1	.18	-.12
			<i>p</i>	.005	.000	.000	.000	.000		.000	.019
			<i>N</i>	488	1568	1563	1430	1430	1603	1938	1938
7. Childs academic attainment (w3)	0.00	0.88	<i>r</i>	-.12	.07	-.12	.01	-.13	.17	1	-.24
			<i>p</i>	.006	.005	.000	.756	.000	.000		.000
			<i>N</i>	504	1543	1543	1391	1398	1512	1796	1938
8. Socioeconomic deprivation	0.45	0.59	<i>r</i>	.15	-.08	-.02	-.11	.01	-.07	-.22	1
			<i>p</i>	.001	.079	.656	.020	.859	.132	.000	
			<i>N</i>	467	497	498	470	471	488	499	580

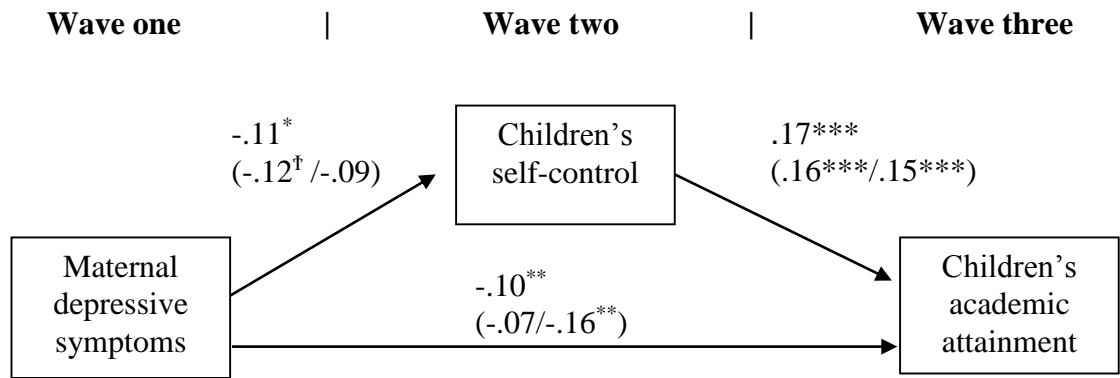
Notes. Correlation coefficients below the diagonal use pairwise deletion. Correlation coefficients above the diagonal use FIML estimates.

Hypothesis 2: The association between maternal depressive symptoms and children's academic attainment is partially mediated through children's self-control.

Hypothesis 2 was tested using the model shown in figure 5.2. Fit statistics are not available as this model is saturated. Higher levels of maternal depressive symptoms were associated with lower levels of self-control in children ($\beta = -.11, p = .013$). Higher self-control was, in turn, associated with higher levels of academic attainment ($\beta = .17, p < .001$). There were no statistically significant gender differences in any individual paths in figure 5.2 (all $p > .05$). Results were similar after controlling for the effects of socioeconomic deprivation (shown in appendix 2).

There was an indirect effect of maternal depressive symptoms on children's academic attainment through children's self-control ($\beta = -.020, p = .010$; table 5.3). This indirect effect was similar for boys ($\beta = -.018, p = .052$) and girls ($\beta = -.017, p = .070$).

The indirect effect through self-control was also analysed using National Curriculum (NC) levels data. Results showed that a one-unit increase in maternal depression scores was associated with a decrease of .01 NC sublevels in English, Maths and Science ($B = -.013, p = .022$).



Notes. $^\dagger p < .10$, $* p < .05$, $** p < .01$, $*** p < .001$. $N = 1937$ (FIML), 1028 boys and 909 girls. Standardised statistics are presented for the whole sample then by gender in parentheses (boys/girls).

Figure 5.2. Path analysis examining whether children's self-control mediates the longitudinal association between maternal depressive symptoms and children's attainment.

Table 5.3. Results of bootstrapped tests of indirect effects from maternal depressive symptoms to children's academic attainment.

Hypothesis/Model	Path	Sample	β	p
Hypothesis 2: Children's self-control as a mediator	MD→SC→AA	all	-.020	.010
	MD→SC→AA	boys	-.018	.052
	MD→SC→AA	girls	-.017	.070
Hypothesis 3: Maternal parenting and children's self-control as mediators	MD→MH→SC→AA	all	-.003	.152
	MD→MW→SC→AA	all	-.002	.034
	Total indirect effect	all	-.006	.040
	MD→MH→SC→AA	boys	-.002	.476
	MD→MW→SC→AA	boys	-.002	.161
	Total indirect effect	boys	-.004	.267
	MD→MH→SC→AA	girls	-.004	.160
	MD→MW→SC→AA	girls	-.003	.080
	Total indirect effect	girls	-.007	.0499
Hypothesis 4: Paternal parenting and children's self-control as mediators	MD→PH→SC→AA	all	-.006	.010
	MD→PW→SC→AA	all	-.003	.020
	Total indirect effect	all	-.009	.004
	MD→PH→SC→AA	boys	-.005	.0501
	MD→PW→SC→AA	boys	-.004	.042
	Total indirect effect	boys	-.009	.021
	MD→PH→SC→AA	girls	-.005	.087
	MD→PW→SC→AA	girls	-.002	.175
	Total indirect effect	girls	-.007	.063

Notes. MD=maternal depressive symptoms; SC=child's self-control; AA=child's academic attainment; MH=maternal hostility; MW=maternal warmth; PH=paternal hostility; PW=paternal warmth.

Hypothesis 3: The association between maternal depressive symptoms and children's academic attainment is partially mediated through *maternal* parenting and children's self-control.

The model shown in figure 5.3 was run to assess whether *maternal* parenting (measured as children's perceptions of the level of hostility and warmth their mothers express towards them) mediated the association between maternal depressive symptoms and children's self-control and subsequent children's academic attainment. The model showed adequate fit to the data for the whole sample (N = 1937): $\chi^2(3) = 6.968, p = .073, RMSEA = .026, CFI = .992, sRMR = .032$. The model also showed adequate fit to the data when split by gender (1028 boys, 909 girls): $\chi^2(6) = 18.202, p = .006, RMSEA = .046, CFI = .975, sRMR = .041$.

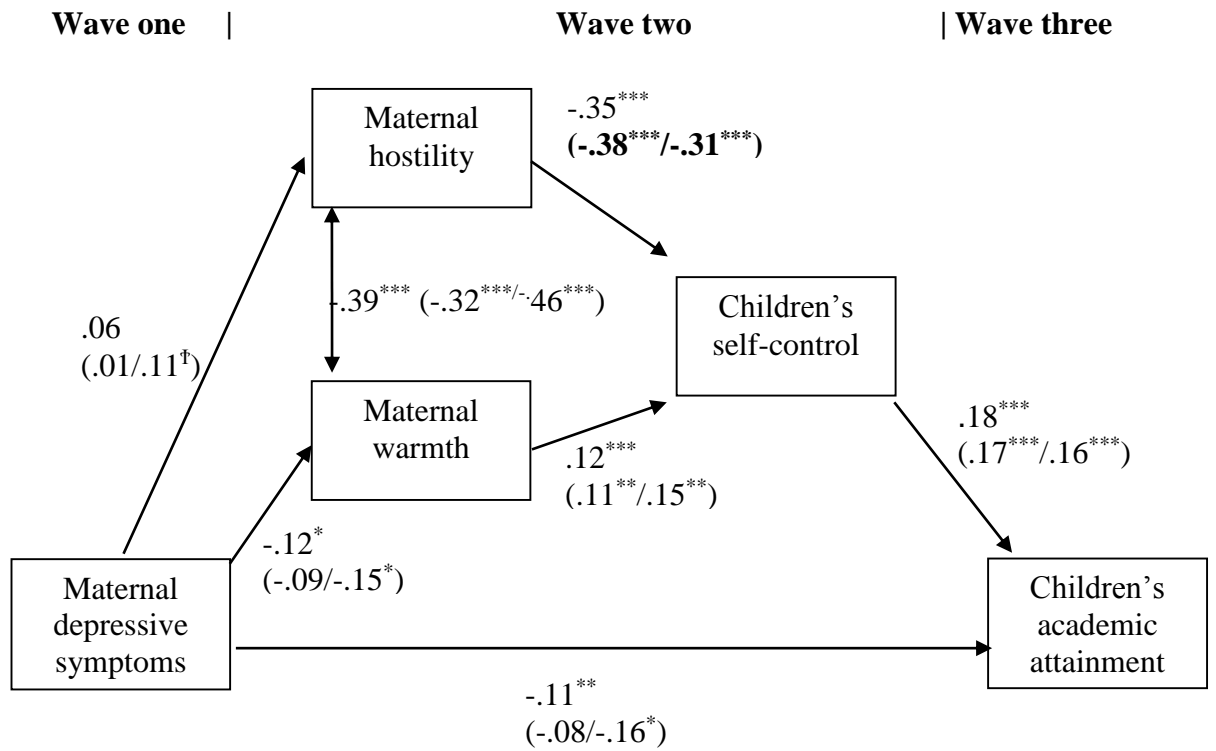
Maternal depressive symptoms were associated with less maternal warmth ($\beta = -.12, p = .015$) but not significantly associated with maternal hostility ($\beta = .06, p = .142$). Higher maternal warmth ($\beta = -.35, p < .001$) and lower hostility ($\beta = -.12, p < .001$) were associated with better self-control in children. Higher self-control was associated with higher attainment and there was also a direct effect of maternal depressive symptoms on attainment (see figure 5.3). Results were similar after controlling for the effects of socioeconomic deprivation (shown in appendix 2).

Though maternal depressive symptoms did not show a significant association with maternal hostility amongst boys, maternal hostility was a stronger (negative) predictor of boys' self-control compared to girls' self-control ($\chi^2 \text{ diff}(1) = 5.23, p = .022$).

There was a significant (total) indirect effect from maternal depressive symptoms to attainment through both measures of maternal parenting and the child's self-control ($\beta = -.006, p = .040$; table 5.3). This indirect effect was significant for girls

($\beta = -.007, p = .0499$) but not boys ($\beta = -.004, p = .267$). The total indirect effect is made up of two specific indirect effects. One through maternal hostility ($\beta = -.003, p = .152$) and one through maternal warmth ($\beta = -.002, p = .034$), only the path through warmth independently reached statistical significance. Neither of these specific paths were statistically significant when tested individually for boys and girls ($p > .05$; table 5.3).

When analysed using National Curriculum (NC) data only, the total indirect effect through maternal parenting and children's self-control showed that a one-unit increase in maternal depression scores was associated with a decrease of .004 NC sublevels in English, Maths and Science ($B = -.004, p = .057$).



Notes. $^\dagger p < .10$, $* p < .05$, $** p < .01$, $*** p < .001$. Estimates are presented for the whole sample and by gender (boys/girls) – parentheses in bold indicate a significant gender difference. Single-headed arrows are regression paths, double-headed arrows are correlations.

Figure 5.3. Path analysis examining whether maternal parenting and child's self-control mediate the association between maternal depressive symptoms and attainment.

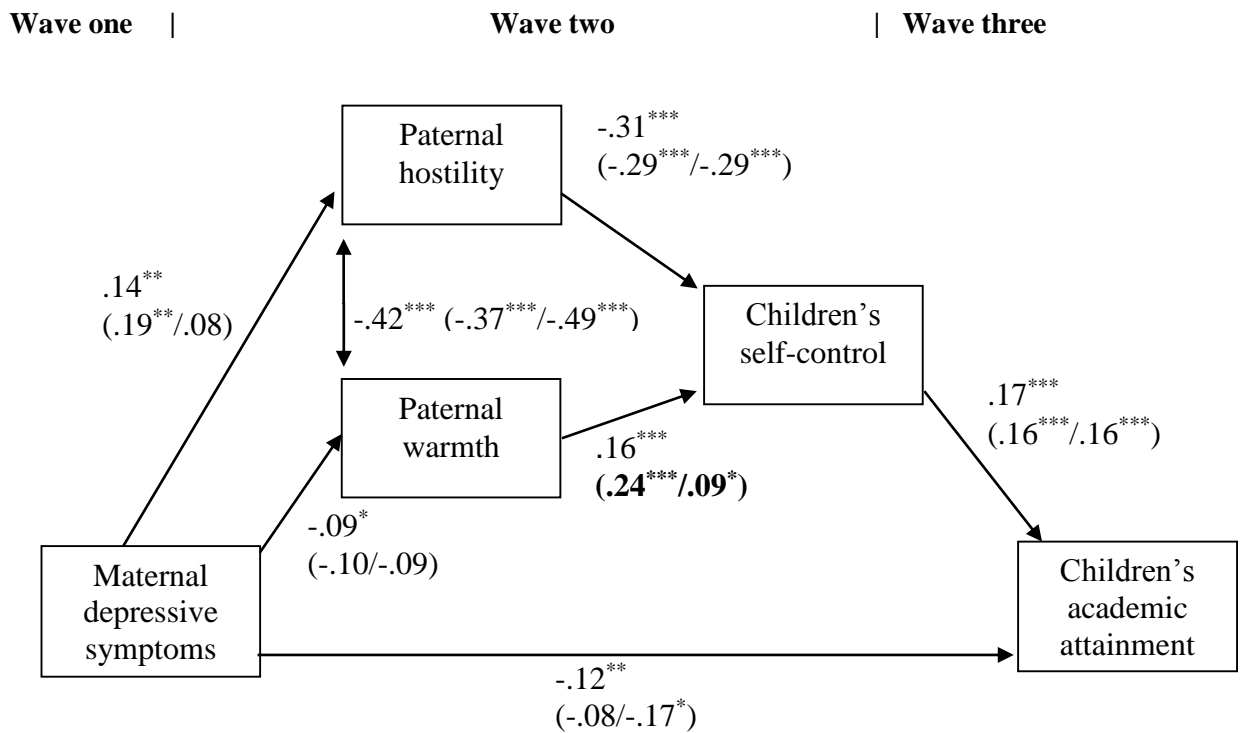
Hypothesis 4: The association between maternal depressive symptoms and children's academic attainment are partially mediated through *paternal* parenting and children's self-control.

The model shown in figure 5.4 was tested to assess whether *paternal* parenting (measured as children's perceptions of the level of hostility and warmth their fathers express towards them) mediated the association between maternal depressive symptoms and children's self-control and children's subsequent academic attainment. The model showed adequate fit to the data for the whole sample (N=1938): $\chi^2(3) = 16.001$, $p = .0011$, RMSEA = .047, CFI = .976, sRMR = .032. The model also showed adequate fit to the data when split by gender (1029 boys, 909 girls): $\chi^2(6) = 18.762$, $p = .0046$, RMSEA = .047, CFI = .977, sRMR = .033.

Higher levels of maternal depressive symptoms were associated with more paternal hostility ($\beta = .14$, $p = .003$) and less paternal warmth ($\beta = -.09$, $p = .040$) towards the child. Higher paternal warmth ($\beta = -.31$, $p < .001$) and lower hostility ($\beta = -.16$, $p < .001$) were associated with better self-control in children. Paternal warmth was a stronger predictor of boys' self-control than it was girls' self-control ($\chi^2 \text{ diff}(1) = 10.08$, $p = .002$). As per results from hypotheses 2 and 3, higher self-control was associated with higher attainment and there was a direct effect of maternal depression on attainment (see figure 5.4). Results were almost identical after controlling for the effects of socioeconomic deprivation (shown in appendix 2), except for one notable difference where the statistical significance of the effect of maternal depressive symptoms on paternal warmth reduced to trend level ($\beta = -.09$, $p = .065$).

There was a significant (total) indirect effect from maternal depressive symptoms on children's attainment through paternal parenting and the child's self-control ($\beta = -.009$, $p = .004$; table 5.3). The indirect effect was statistically significant

for boys ($\beta = -.009, p = .021$) but not girls ($\beta = -.007, p = .063$). The total indirect effect is made up of two specific indirect effects. One statistically significant effect through paternal hostility ($\beta = -.006, p = .010$) and one statistically significant effect through paternal warmth ($\beta = -.003, p = .020$). When tested separately for boys, the indirect effect through paternal warmth was statistically significant ($\beta = -.004, p = .042$) and the indirect effect through paternal hostility was borderline significant ($\beta = -.005, p = .0501$). Neither of these specific indirect effects was significant for girls ($p > .05$; table 5.3).



Notes. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. Estimates are presented for the whole sample and by gender (boys/girls) – parentheses in bold indicate a significant gender difference. Single-headed arrows are regression paths, double-headed arrows are correlations.

Figure 5.4. Path analysis examining whether paternal parenting and child's self-control mediate the association between maternal depressive symptoms and attainment.

When analysed using National Curriculum (NC) data only, the total indirect effect through paternal parenting and children's self-control showed that a one-unit increase in maternal depression scores was associated with a decrease of .007 NC sublevels in English, Maths and Science ($B = -.007, p = .005$).

Additional sensitivity analyses were run to assess whether the residency of fathers influenced the associations with paternal parenting reported here. These analyses were only available for a subgroup of the overall sample as they were dependent on household make-up data collected from parents at waves one (available $n = 553$, including 69 non-resident fathers) and two (available $n = 480$, including 63 non-resident fathers). The association between higher maternal depressive symptoms and higher paternal hostility was not found amongst non-resident fathers ($\beta = -.24, p = .216$), this differed from resident fathers ($\beta = .12, p = .021$) but at trend level significance only ($\chi^2 \text{ diff } (1) = 3.05, p = .081$). In contrast, the association between higher maternal depressive symptoms and lower paternal warmth appeared to be stronger for non-resident fathers ($\beta = -.42, p = .023$) compared to resident fathers ($\beta = -.12, p = .017$), again this comparison reached trend level significance only ($\chi^2 \text{ diff } (1) = 3.40, p = .065$). Associations did not significantly differ dependent on father residency for paternal hostility and child self-control ($\chi^2 \text{ diff } (1) = 0.09, p = .765$) or for paternal warmth and child self-control ($\chi^2 \text{ diff } (1) = 2.36, p = .124$).

Summary of results

To aid comparison across genders and across parental roles, path coefficient for all models described above are shown together in table 5.4. Hypothesis 1 was supported by the finding that higher levels of maternal depressive symptoms were longitudinally associated with lower academic attainment in children. Hypothesis 2 was also supported as higher levels of maternal depressive symptoms were associated with children's lower self-control which in turn was associated with lower academic attainment. Hypothesis 3 was supported by findings that maternal depressive symptoms were associated with children's lower academic attainment in part through its associations with lower child-perceived *maternal* warmth which was associated with lower child self-control and lower subsequent child attainment. Hypothesis 4 was supported by findings that maternal depressive symptoms were associated with children's lower attainment in part through its associations with higher child-perceived *paternal* hostility and lower child-perceived *paternal* warmth, both of these were associated with lower child self-control and subsequent attainment.

Gender differences. Maternal depressive symptoms were not more strongly related to academic attainment in boys compared to girls. Children's perceptions of *maternal* hostility and *paternal* warmth were more strongly associated with children's self-control in boys compared to girls.

Within-gender parent-child dyads. Exploratory analyses provided modest support for the idea that father-son and mother-daughter relationships are particularly important. For example, when testing indirect effects of maternal depressive symptoms on children's attainment, there was a significant indirect effect through *paternal* parenting for boys but not girls. In contrast, there was a significant indirect effect

through *maternal* parenting for girls but not boys. Although it should be noted that the effect sizes were similar for boys and girls in both of these cases.

Table 5.4. *Summary table of regression coefficients from all four path models, shown for whole sample and boys and girls separately.*

Hypothesis/Model Path	Whole sample		Boys only		Girls only	
	β	p	β	p	β	p
Hypothesis 1. Longitudinal association between maternal depressive symptoms and children's academic attainment.						
MD → AA	-.12	.002	-.09	.079	-.17	.004
Hypothesis 2. Children's self-control as a mediator of the association between maternal depressive symptoms and children's academic attainment.						
MD → AA	-.10	.008	-.07	.173	-.16	.009
MD → SC	-.11	.013	-.12	.059	-.09	.192
SC → AA	.17	<.001	.16	<.001	.15	<.001
Hypothesis 3. <i>Maternal</i> parenting and children's self-control as mediators of the association between maternal depressive symptoms and children's academic attainment.						
MD → AA	-.11	.007	-.08	.142	-.16	.022
MD → MH	.06	.142	.01	.931	.11	.094
MD → MW	-.12	.015	-.09	.238	-.15	.027
MH ↔ MW	-.39	<.001	-.32	<.001	-.46	<.001
MH → SC	-.35	<.001	-.38	<.001	-.31	<.001
MW → SC	.12	<.001	.11	.002	.15	.001
SC → AA	.18	<.001	.17	<.001	.16	<.001
Hypothesis 4. <i>Paternal</i> parenting and children's self-control as mediators of the association between maternal depressive symptoms and children's academic attainment.						
MD → AA	-.12	.005	-.08	.119	-.17	.017
MD → PH	.14	.003	.19	.004	.08	.210
MD → PW	-.09	.040	-.10	.114	-.09	.128
PH ↔ PW	-.42	<.001	-.37	<.001	-.49	<.001
PH → SC	-.31	<.001	-.29	<.001	-.29	<.001
PW → SC	.16	<.001	.24	<.001	.09	.028
SC → AA	.17	<.001	.16	<.001	.16	<.001

Notes. MD=maternal depressive symptoms; SC=child's self-control; AA=child's academic attainment; MH=maternal hostility; MW=maternal warmth; PH=paternal hostility; PW=paternal warmth; →=regression path; ↔=correlation. Results shown in bold refer to a significant difference for boys and girls.

5.4. Discussion

Following up findings that self-control was an important predictor of academic and behavioural adjustment in school (chapter three) and that parenting influences the development of self-control (chapter four), this chapter aimed to extend understanding of the social-contextual factors that influence the relationship between children's self-control and academic attainment over the transition to secondary school. The data supported a model where maternal depressive symptoms reduced parenting quality, which was associated with lower self-control, which in turn was associated with lower academic attainment.

Mothers' levels of depressive symptoms at baseline were associated with children's academic attainment one year later. This result remained when controlling for socioeconomic disadvantage. Results suggest that compared to children with mothers reporting depressive symptom scores of zero, children with mothers who reach the criteria for depression caseness would be expected to score one National Curriculum sublevel lower in English, Maths and Science. This is roughly equivalent to the expected progress over half a school year. Whilst most previous work in this area has focused on the cognitive ability of young children, the current findings add support to the small body of work from the US that finds maternal depressive symptoms also influence older children's school attainment (e.g., Hammen et al., 1987; Tannenbaum & Forehand, 1994). Therefore, maternal depressive symptoms are associated with poorer scholastic attainment.

In line with previous studies (e.g., Duckworth & Seligman, 2005), self-control was found to be an important antecedent of academic attainment. Furthermore, maternal depressive symptoms were found to partially exert their negative effect on attainment through children's self-control. This may have implications for attempts to

reduce the impact of parental depression on children's academic attainment, because intervention efforts aimed at increasing school attainment have had reasonable success when targeting children's self-control (Diamond, 2012). Indeed, they have generally been more successful than those directly targeting intelligence (Heckman, 2011). Thus, this work extends previous research by identifying self-control as one process through which maternal depressive symptoms disrupt children's academic attainment.

One of the ways maternal depression is believed to negatively influence children is via impairments in mothers' parenting behaviour (Goodman & Gotlib, 1999). The results here support this. More specifically, the current study found a significant indirect path from maternal depressive symptoms to children's academic attainment through children's perceptions of maternal warmth but not maternal hostility. These findings are in line with previous research (Gordon et al., 1989; Murray et al., 2006) that suggests the effects of maternal depression on older children's attainment come about by reducing positive maternal parenting (such as warmth, support and responsiveness), rather than by increasing negative maternal parenting towards the child. Despite finding this effect through parenting, there remained a direct effect of maternal depressive symptoms on children's attainment suggesting that there are other processes linking these factors that are not measured in this study.

Findings about the role of fathers' parenting within the context of maternal depressive symptoms offer new insight into an area of uncertainty. Two competing perspectives characterise the relationship between maternal depression and fathers' parenting: (i) fathers compensate for depressed mothers by being more caring towards children, (ii) fathers are adversely influenced by maternal depression and this impairs their parenting. This study provides some evidence in support of the second perspective, that is, children perceive their fathers to be more hostile and less warm

when mothers reported higher levels of depressive symptoms. However, the association between maternal depressive symptoms and fathers warmth became non-significant when controlling for socioeconomic disadvantage, indicating that this association may partly reflect a shared link to socioeconomic hardship. Taken together, these findings suggests that maternal depressive symptoms disrupt the family system beyond simply impairing the mother's own parenting. The current study suggests maternal depressive symptoms are associated with negative affect in other parts of the family.

Supplementary analyses indicated that maternal depressive symptoms have heterogeneous effects on paternal parenting which depended on fathers' residency. If the father lived separately to the mother and child, there was some preliminary indication that fathers were less affected by maternal depressive symptoms as shown through lower levels of hostility, but also lower levels of warmth expressed towards the child. This suggests that non-resident fathers are less susceptible to reacting negatively to maternal depressive symptoms but also less likely to try and compensate by acting more warmly towards the child. However, these findings come from a small proportion of the current sample and also only reached 'trend-level' significance meaning more research in this area is required before firm conclusions can be made.

These findings extend those from chapter four to show that children's perceptions of both their mothers' and their fathers' warmth and hostility were associated with children's self-control, which was associated with children's subsequent academic attainment. Compared to girls, boys' self-control was more strongly related to their perceptions of *maternal* hostility and *paternal* warmth, indicating that the parent-child relationship may play a more important role in boys' self-control compared to girls. The current findings point to a role for fathers as well as mothers in fostering

children's self-control and academic attainment during early adolescence (e.g., Flouri & Buchanan, 2004; Harris et al., 1998; Tamis-LeMonda et al., 2004).

There was some indication of gender differences in the association between maternal depressive symptoms and children's academic attainment. There was no evidence that maternal depressive symptoms affected the academic attainment of boys more negatively than girls. In fact, the current findings tentatively suggest the opposite was more likely in this age group as the association with attainment for girls was stronger than that for boys, however this difference was not statistically significant. Whilst these effects were both small, they were almost twice as strong in girls compared to boys. This contrasts with a number of previous findings (e.g., Ensminger et al., 2003; Murray et al., 2010; Murray et al., 2006) but corresponds to suggestions that girls are more likely to be negatively impacted by maternal depression because they have closer, more intimate relationships with their mothers compared to sons (Field et al., 1995; Kochanska et al., 1987). Nevertheless, it is difficult to make direct comparisons between the current findings and those from previous studies because most previous research has tended to focus on socially disadvantaged samples and maternal depressive symptoms in the clinical range (e.g., Ensminger et al., 2003; Murray et al., 2010; Murray et al., 2006), whilst the current study was a broadly representative community sample and examined variation in maternal depressive symptoms.

The pattern of findings in the current study provides some limited support for the importance of mother-daughter and father-son relationships in the effects of maternal depressive symptoms on children's self-control and academic attainment. Girls' attainment was most consistently affected by the indirect effect of maternal depressive symptoms through children's perceptions of mothers' parenting rather than fathers' parenting, whilst the opposite was found for boys. Thus, maternal depressive

symptoms may exert a stronger direct effect on girls' rather than boys' academic attainment, and the indirect effects through parenting and children's self-control may operate to a slightly stronger extent within mother-daughter and father-son relationships. Whether the effects of maternal depressive symptoms are mirrored for paternal depressive symptoms warrants investigation in future studies and was not possible to address here because the study design only required one parental informant, which tended to be mothers.

This study has a number of strengths, including the use of multiple informants; temporal separation of the independent variable, mediator variables and dependent variable; measures relating to both mothers' and fathers' parenting; and, a large sample that allowed the examination of gender differences and complex indirect effects over three study waves.

There are also a number of limitations to this study. Depressive symptoms were measured via a questionnaire and symptoms were only studied within the normal range therefore findings may not apply to the families of mothers with depressive disorder. Father's mental health was not assessed in this study, these analyses therefore provide only partial coverage of the family environment. Further study of mothers and fathers mental health simultaneously would shed light on whether there are true effects of maternal depressive symptoms on paternal parenting or if the associations found here are possibly due to other factors that may result in impaired parenting amongst the partners of depressed women such as assortative mating for psychopathology (Kim-Cohen et al., 2004). As with all of the chapters in this thesis, these analyses were based on a low response rate at wave one. This likely resulted in a somewhat healthier sample of mothers potentially limiting the generalisability of these findings to mothers with higher levels of depressive symptoms. As some of the findings outlined here contrast

with previous findings (e.g., girls' academic attainment was more negatively impacted than boys') and others were more exploratory in nature (e.g., the importance of father-son and mother-daughter relationships) it would be wise to replicate these analyses in other datasets to verify their robustness. More research is also required to increase confidence in the causal validity of the effects investigated here, this includes longitudinal designs that examine change over time and intervention studies.

The measures of parenting used here were child reports of warmth and hostility, which is not necessarily equivalent to actual parenting behaviour. However, children's perceptions of parenting are likely to be meaningful to the child as they represent children's perceived emotional security, which has been proposed as a key link between aspects of family functioning and children's outcomes (Davies et al., 2002). Using this measure also reduced the impact of common rater bias that would arise from using parent self-reports of parenting alongside parent-rated depressive symptoms, while also playing to the study's strengths of temporally separating the key predictor and mediator variables alongside utilising the large child response rate at wave two.

The size of the indirect effects found here were modest and there remained a substantial direct negative association between maternal depressive symptoms and children's attainment (even after controlling for socioeconomic deprivation) that is yet to be fully explained. Other factors that might be important in explaining this association include children's own mental health and exposure to other stressful life experiences, both of which are associated with having a depressed parent (Goodman & Gotlib, 1999) and have been shown to relate to academic attainment (Riglin et al., 2014).

Conclusion

There are both direct and indirect effects of maternal depressive symptoms on children's academic attainment. In part, maternal depressive symptoms appear to impair children's academic attainment at secondary school though their negative effects on the mother-child and father-child relationships which, in turn, reduces children's capacity to exercise self-control and succeed academically. Therefore aspects of the family environment influence children's secondary school adjustment.

**CHAPTER 6: Friendship stability over the transition to secondary
school**

Abstract

Good quality friendships are associated with better mental health and school outcomes in children. The effects of friendlessness and friendship quality have been well researched but less is known about the role of friendship stability – an aspect of friendship which is likely to be interrupted by the transition to secondary school. This chapter examined whether friendship stability influenced children’s transition success and mental health. Data from STARS was used to examine friendship stability over the secondary transition. Results indicated that children who kept the same best friend or more of their top three friends had higher academic attainment and lower levels of conduct problems. There was no evidence of interactions between best friendship stability and quality. Interactions with quality were found for two of the eight outcome variables for top three friends stability, where children who kept more of their top three friends had lower school connectedness and higher levels of emotional problems if the quality of these friendships was low. Exploratory analyses indicated that secondary school policies on friendships may provide a useful method for increasing friendship stability.

6.1. Introduction

Good quality friendships provide children with closeness, intimacy, companionship, and support and are associated with a range of developmental advantages in terms of mental health and school outcomes (compared to children without friends or with low quality friendships; Hartup, 1989). Compared to friendless children, children with friends have lower levels of loneliness, internalising problems, and externalising problems (Ladd & Troop-Gordon, 2003; Laursen, Bukowski, Aunola, & Nurmi, 2007; Parker & Seal, 1996). Additionally, amongst children who do have friends, higher quality friendships are linked to better functioning in a range of domains, including higher levels of school involvement and lower levels of depressive symptoms, loneliness, and behavioural problems (Berndt & Keefe, 1995; Ladd, Kochenderfer, & Coleman, 1996; Parker & Asher, 1993; Windle, 1994). Childhood friendships provide many of the formative experiences through which children learn social and relationship skills (Hartup, 1996; Rubin, Fredstrom, & Bowker, 2008). Therefore friendships have both immediate and long-term effects on development. For example, compared to children with friends or who are not socially rejected, friendless and socially rejected children have poorer adult functioning in a range of areas, including higher levels of criminality and depressive symptoms and lower levels of success in work and education (Bagwell, Newcomb, & Bukowski, 1998; Nelson & Dishion, 2004). There is substantial empirical work detailing the consequences of friendlessness and on the effects of friendship quality on children's adjustment, but much less is known about the stability of children's friendships - the maintenance of a friendship over time – and whether this influences psychological adjustment independently of any effects of friendship quality (Poulin & Chan, 2010).

Friendships are likely to require some level of stability if they are to be of benefit to children (Hartup, 1989; Poulin & Chan, 2010). This is supported by empirical work identifying a moderating role for friendship stability in associations between friendship quality and child outcomes (Berndt, Hawkins, & Jiao, 1999). There is also reason to believe that stability may have unique effects on children's adjustment. For example, the stability of children's friendships correlates with higher levels of school involvement, higher grades, and lower levels of disruptiveness (Berndt & Keefe, 1995; Ladd, 1990). It is difficult to disentangle the effects of friendship stability from other characteristics of the friendship (Hartup, 1996) as stable friendships also tend to have more positive qualities, including higher levels of positive feedback and support and lower levels of conflict (Ladd et al., 1996). Natural experiments are events or policies that act to pull apart variables of empirical interest that typically co-occur (Rutter et al., 2001). The transition to secondary school is a developmental period that is particularly well suited to investigating the influence of friendship stability on children's psychological adjustment because it shares features of a natural experiment wherein friendships are in a state of flux due to an externally imposed change. For instance, school transition separates variables that ordinarily occur together such as friendship stability and quality, at least to some degree.

Schoolchildren in the UK and Northern Ireland typically move from primary to secondary school when they are 11 years old and similar early-adolescent school transitions occur in many other countries (World Bank, 2006). Adapting to this transition can be stressful as it introduces simultaneous changes in school environments, social relationships, and academic expectations. Despite a common focus on changes to learning and academic achievement during the secondary school transition, children say that friendships are an important area of change for them with some of their most

commonly cited concerns during this transition relating to social changes such as losing old friends, fears about bullying, and being in a school with older pupils (Pratt & George, 2005; Rice et al., 2011). The transition to secondary school typically involves moving to a much larger school where children are not confined to a single classroom, and therefore increases children's exposure to and opportunity for interaction with a much wider range of peers. Children who were friends at primary school may not attend the same secondary school and even when they do there is no guarantee they will be placed in the same class as each other (Evangelou, 2008). Therefore, the transition to secondary school normally results in children losing at least some, if not many, of their primary school peers whilst simultaneously gaining many new peers (Pratt & George, 2005).

The transition to secondary school coincides with the onset of adolescence, a developmental period associated with a range of biological, cognitive and social changes (Dahl, 2004a) and a time when peer relationships are thought to be particularly important to children's development of personal competence and identity (Dishion & Tipsord, 2011; Sullivan, 1953). Given that early adolescence is an important time for children's peer relationships, the changes to children's social networks brought about by the secondary school transition may be particularly disruptive to children's psychological and school adjustment (Eccles, 1999; Véronneau & Dishion, 2010).

As well as its developmental significance, several factors confer methodological advantages to studying friendship stability at the transition to secondary school. First, as already noted, this transition is an externally imposed change which addresses some of the issues of disentangling event effects on the person from person effects on the environment (Rutter et al., 2001). Second, schools differ in their organisational approach to dealing with pre-existing friendships. For example, in deciding which

pupils to allocate to which class/form groups some schools allow children and parents to nominate friends that they would like to remain with, whilst other schools disallow input from children and parents (Keay, Lang, & Frederickson, 2015). In combination, these features reduce the likelihood that unstable friendships are entirely due to characteristics of the friendships (e.g., due to poor quality) or the characteristics of the child (e.g., due to an aggressive temperament). School transition therefore provides the opportunity to examine how friendship stability influences children's psychological adjustment relatively independently of other aspects of the friendship and of the child's adjustment.

The current study

As with chapters three and four, this chapter examines children's school transition success and mental health outcomes at the end of Year 7 (wave three) as the transition to secondary school involves a period of adaptation that unfolds over time (Anderson et al., 2000; Elias et al., 1992; Leonard & Elias, 1994). Given that school transition is a normative stressor, the central hypothesis of the current study is that stable pre-existing friendships may provide emotional and social support which confer psychological adjustment benefits for children. This is in line with previous suggestions that friendship stability may be important in providing continued support during stressful developmental transitions such as school transitions (Berndt et al., 1999; Ladd, 1990). It is generally assumed that stability is a desirable characteristic of friendships (Berndt & Hoyle, 1985), however there is also good reason to consider that the hypothesised beneficial effects of stability may depend on the quality of the friendships concerned (Berndt et al., 1999; Hartup, 1996; Poulin & Chan, 2010). Therefore this

study also tested the hypothesis that beneficial effects of friendship stability only occur for high quality friendships. Three primary hypotheses were tested:

- 1) The transition to secondary school is associated with instability in children's friendships.
- 2) Children who have more stable friendships over the transition will have superior adjustment over time.
- 3) The benefits of friendship stability on children's adjustment will vary depending on the quality of the friendship.

This chapter also carries out exploratory analyses to assess whether the characteristics of secondary schools are associated with the stability of children's friendships.

6.2. Method

Participants

The analyses reported here predominantly focus on data from 593 children who completed questions about their friendships at both wave one (baseline) and wave three (follow-up). The demographic make-up of this subsample indicated it was broadly representative of the local population of schoolchildren from which it was drawn in terms of: eligibility for free school meals (13% in this subsample vs 14% in the local population), non-white ethnicity (36% vs 33%), English as an additional language (26% vs 21%), special educational needs (1% vs 2%), but with slightly higher levels of primary school attainment in English (measured as reaching National Curriculum level 4 at Key Stage 2: 90% vs 82%) and Maths (90% vs 81%) (Department for Education, 2011).

Measures

Friendships. At all three waves, children reported and ranked their three best friends (see 2.4.4.). This was used to calculate two measures of friendship stability: ‘best friend’ stability and ‘top three friends’ stability. For best friend stability, children were coded as having a stable best friend if they identified the same best friend at baseline and follow-up (binary scale: 0 = unstable, 1 = stable). Top three friends stability was calculated by counting the number of friends who were identified at both baseline and follow-up (ordinal scale: ranging from 0 to 3 friends). The primary variable of interest was friendship stability from baseline (wave one/primary school) to follow-up (wave three/end of first year of secondary school), but for descriptive purposes, both friendship stability variables were also calculated from baseline to wave 2 (first term of secondary school) to examine rates of change in friendship stability over the transition period (table 6.1).

Children were also asked to rate how happy they were with each of their friendships on a 5-point scale based on unhappy and happy faces (coded so that ☹☹ = 1, ☹ = 2, 😐 = 3, 😊 = 4, 😊😊 = 5). At wave one, scores on this scale for children’s best friend were used to assess children’s best-friendship quality. To assess the quality of children’s top three friendships, the scores for all three friends were averaged ($\alpha = .71$). High scores represent higher quality friendships.

For best friends only, friendship quality was additionally assessed using a 12-item measure of friendship quality (total score) at wave one (see 2.4.2.).

At wave one, children were also asked whether each friend attended the same primary school as them and whether they would be attending the same secondary school.

Transition success. At wave three, five of the indicators of transition success presented in chapter three were used here. Academic attainment was measured using the average score for English, Maths, and Science assessments (higher scores indicate higher attainment, see 2.4.1.). School attendance was measured using the percentage of days attended in Year 7 (higher scores indicate higher attendance, see 2.4.13.). Classroom behaviour was measured using the average of peer-rated cooperative and disruptive (reversed) behaviour (higher scores indicate more cooperative and less disruptive behaviour, see 2.4.3.). School liking was measured as a total score (higher scores indicate liking school more, see 2.4.7.). Loneliness at school was measured as a total score (higher scores indicate more loneliness, see 2.4.8.).

At wave three, a total score for children's self-reports of school connectedness (see 2.4.14.) were used as an additional indicator of school bonding. This measure was added because it was also measured at baseline (wave one) and therefore provided the ability to control for earlier levels of school bonding in analyses.

Mental health problems. At wave three, symptoms of children's mental health problems were measured using self-reported total scores on the SDQ conduct problems and SDQ emotional problems subscales (see 2.4.18.). Self-reports were used here as they provided the best sample coverage at both wave one and wave three.

Covariates. Children's gender was coded as 0 = male, 1 = female. Other covariates include: wave one measures of academic attainment (see 2.4.1.), self-reported school connectedness (see 2.4.14.), self-reported loneliness at school (see 2.4.8.), self-reported emotional problems (see 2.4.18.), and self-reported conduct problems (see 2.4.18.).

School characteristics. An index of school size was provided by the number of children in Year 7 (range: 120 to 300). The number of feeder primary schools attended

by participants for each secondary school was also calculated (range: 8 to 23). During semi-structured interviews secondary school staff responsible for the transition to secondary school were asked (1) whether the school separated children into different classes based in academic ability (i.e., academic setting/streaming) (No = 0, Yes = 1) and (2) whether the school allocated children to classes based on the children's requests to be kept with specific friends (No = 0, Yes = 1).

Statistical analysis

The level of friendship stability in the sample was first assessed and gender differences were tested with chi-square tests. In order to identify potentially confounding variables to control for in the main analyses, zero-order correlations were used to examine associations between a range of baseline characteristics and friendship stability. Linear regression was used to test for associations between friendship stability and each of the eight outcome variables assessed at wave three (academic attainment; school attendance; classroom behaviour; school liking; school connectedness; loneliness at school; emotional problems; conduct problems). Regression models were run separately for best friend stability and top three friends stability. Regressions were run in three steps in order to test: (1) the simple lagged association between stability and outcome (2) the lagged association between stability and outcome controlling for prior level of the outcome variable (where available) (3) the lagged association between stability and outcome controlling for prior level of the outcome and potential confounding variables. Next, tests of moderation were performed to assess whether the effects of friendship stability on children's functioning were dependent on children's level of friendship quality. This was done by entering stability, quality and their

interaction term (i.e., stability x quality) into each of the regression models described above.

Two sensitivity analyses were conducted to examine (1) whether the results were influenced by the clustering of data within schools and (2) whether results varied when a validated multiple-item measure of friendship quality was used. The first sensitivity analysis repeated the fully adjusted regression analyses (model 3) using linear mixed modelling. The second sensitivity analysis repeated all of the regression analyses for best friend stability replacing the single-item friendship quality measure with the twelve-item extended best friendship quality measure.

Finally, descriptive data are provided relating to the 10 secondary schools participating in this study along with a discussion of how school-level factors may be related to friendship stability. Associations between school-level factors and friendship stability were tested with simple linear and logistic regression analyses, using Stata's 'cluster' command to account for the clustering of data. Analyses were performed in SPSS version 20 (IBM Corp, 2011) and Stata version 13 (StataCorp, 2013). β is used throughout to indicate standardised regression coefficients. B is used throughout to indicate unstandardised regression coefficients.

6.3. Results

Hypothesis 1. The transition to secondary school is associated with instability in children's friendships

There was substantial instability in children's friendships as they moved from primary to secondary school (table 6.1). Only a quarter of children kept the same best friend until the end of the first year of secondary school (i.e., wave 3; 27%). Only 3% of children kept all of their top three friends, with the majority of children keeping only one friend (41%) or losing all of their top three friends from primary school over this period (38%).

As would be expected, six month friendship stability between waves one and two was slightly higher but similar to one-year instability. About a third (38%) of children kept the same best friend until the end of the first school term (i.e., wave two). About 6% of children kept all of their top three friends, with most children losing all of their top three primary school friends (28%), or keeping one (37%) or two friends (29%) over this period. Reductions between wave two and wave three were statistically significant for both best friend stability (McNemar test: $p < .001$) and top three friends stability ($t(557) = 8.24, p < .001$).

These findings indicate that most children start to lose friends quite quickly after starting secondary school (i.e., by the end of the first secondary school term / wave two) but some children continue to lose their pre-transition friends through to the end of the academic year (wave three). Descriptive statistics show that stability in this sample was slightly higher amongst boys (table 6.1), however, there were no statistically significant gender differences in stability (all $p > .05$).

Table 6.1. *Descriptive statistics showing frequency of friendship stability across the transition from primary to secondary school.*

	Six month stability: Wave 1 to 2			One year stability: Wave 1 to 3		
	All n(%)	Boys n(%)	Girls n(%)	All n(%)	Boys n(%)	Girls n(%)
Number of top three friends kept:						
0	178 (28%)	92 (29%)	86 (27%)	226 (38%)	104 (36%)	122 (40%)
1	235 (37%)	109 (35%)	126 (39%)	241 (41%)	111 (39%)	130 (43%)
2	171 (29%)	89 (29%)	92 (29%)	108 (18%)	61 (21%)	47 (15%)
3	39 (6%)	22 (7%)	17 (5%)	16 (3%)	10 (3%)	6 (2%)
Same best friend:						
No	398 (62%)	190 (60%)	208 (65%)	432 (73%)	206 (72%)	226 (74%)
Yes	240 (38%)	126 (40%)	114 (35%)	161 (27%)	81 (28%)	80 (26%)

Predictors of stable friendships (table 6.2)

Before testing hypothesis 2, characteristics associated with friendship stability were examined in order to identify factors that may confound the association between stability and children's outcomes (table 6.2). A range of indicators of children's school adjustment and mental health measured at primary school were associated with friendship stability (table 6.2). Children who had lower academic attainment ($r = .09, p < .05$), were lonelier at primary school ($r = -.08, p < .05$), were less connected to school ($r = .12, p < .01$), had more symptoms of emotional problems ($r = -.10, p < .05$) and conduct problems ($r = -.09, p < .05$) were less likely to have stable best friends over the transition to secondary school (table 6.2). A very similar pattern was found for children's top three friendships, where children who had lower academic attainment ($r = .14, p < .001$), were less connected to school ($r = .09, p < .05$), and had more symptoms of emotional problems ($r = -.11, p < .05$) maintained fewer of their top three best friendships over the transition to secondary school (table 6.2). These results show that children who were functioning less well at primary school tend to lose friends more readily.

A number of characteristics relating to children's pre-transition friendships were also associated with friendship stability (table 6.2). Higher quality best friendships were more likely to be stable, this association was shown for both the single-item ($r = .09, p < .05$) and twelve-item ($r = .17, p < .001$) measures of quality (table 6.2). However, the quality of children's top three friendships was not associated with the stability of these friendships ($p > .05$).

Children's best friendships were less stable when the best friend attended the same primary school as the child, compared to when best friends were outside of the primary school ($r = -.11, p < .01$). This negative influence of attending the same primary school

on best friend stability is presumably due to these friendships being more likely to be disrupted by the transition than friendships based outside of school. Best friendships were more stable when the best friend attended the same secondary school as the child ($r = .12, p < .01$). Children's top three friendships were more stable when more of those friends attended the same secondary school as the child ($r = .21, p < .001$). Therefore, friendships are more likely to be preserved when children's friends attend the same secondary school as them.

Table 6.2. *Correlations between friendship stability (wave 1 to wave 3), covariates measured pre-transition (i.e., wave 1, primary school), and post-transition adjustment outcomes (i.e., wave 3, end of first year of secondary school)*

	<i>M</i>	<i>SD</i>	Range	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Best friend stability (i.e., kept best friend)	.27	.45	0-1	1								
2. Top 3 friends stability (i.e., No. kept)	.85	.81	0-3	.51***	1							
3. Primary school academic attainment W1	4.32	.67	1-6	.09*	.14***	1						
4. Primary school connectedness W1	25.30	4.23	6-30	.12**	.09*	.16***	1					
5. Loneliness at primary school W1	10.97	3.99	7-34	-.08*	-.07	-.14***	-.56***	1				
6. Emotional problems W1	2.10	2.11	0-10	-.10*	-.11**	-.18***	-.31***	.44***	1			
7. Conduct problems W1	1.40	1.51	0-8	-.09*	-.06	-.09*	-.38***	.33***	.28***	1		
8. Friendship quality (best friend - single item measure) W1	4.83	.48	1-5	.09*	.07	-.01	.15***	-.16***	-.09*	.00	1	
9. Friendship quality (average for top three friends) W1	4.63	.47	1-5	.03	.03	-.01	.22***	-.24***	-.12**	-.06	.76***	1
10. Friendship quality (best friend - twelve item measure) W1	48.99	7.24	22-60	.17***	.16***	-.07	.25***	-.19***	-.01	-.15***	.35***	.29***
11. Best friend attended same primary school (vs. not) W1	.87	.34	0-1	-.11**	-.10*	.01	.11**	-.11**	.00	-.04	-.01	.03
12. Best friend attending same secondary school (vs. not) W1	.57	.50	0-1	.12**	.14***	.03	.06	-.05	-.07	.00	.07	.04
13. No. of top 3 friends attended same primary school W1	2.70	.60	0-3	-.08	-.08	-.05	.03	.01	-.06	.07	.01	-.02
14. No. of top 3 friends attending same secondary school W1	1.63	1.12	0-3	.12**	.21***	.00	-.01	.02	-.06	.06	.06	.03
15. Academic attainment W3	.19	.86	-3.83-2.26	.13**	.16***	.79***	.13**	-.11**	-.11**	-.11**	-.03	-.01
16. School attendance W3	95.79	4.02	47-100	-.08	-.01	.17***	.08	-.11**	-.09*	-.08*	-.02	.03
17. Classroom behaviour W3	.74	.15	0.10-1	.14**	.10*	.27***	.24***	-.15***	-.11*	-.24***	.08	.11*
18. School liking W3	16.79	2.66	7-20	.10*	.00	.04	.26***	-.20***	-.10*	-.17***	.10*	.14***
19. School connectedness W3	23.99	3.79	6-30	.10*	.01	.09*	.40***	-.31***	-.18***	-.23***	.13**	.17***
20. Loneliness at school W3	11.35	4.06	7-30	-.03	.02	-.12**	-.28***	.46***	.26***	.18***	-.15***	-.23***
21. Emotional problems W3	2.10	2.15	0-10	-.06	.03	-.03	-.16***	.33***	.56***	.17***	-.02	-.09*
22. Conduct problems W3	1.48	1.58	0-8	-.18***	-.09*	-.11**	-.21***	.16***	.22***	.46***	.00	-.06
23. Female gender (vs male)	.52	.50	0-1	-.02	-.08	-.01	.08	.05	.18***	-.18***	.03	-.03

Notes. * $p < .05$, ** $p < .01$, *** $p < .001$.

	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
1. Best friend stability (i.e., kept best friend)													
2. Top 3 friends stability (i.e., No. kept)													
3. Primary school academic attainment W1													
4. Primary school connectedness W1													
5. Loneliness at primary school W1													
6. Emotional problems W1													
7. Conduct problems W1													
8. Friendship quality (best friend - single item measure) W1													
9. Friendship quality (average for top three friends) W1													
10. Friendship quality (best friend - twelve item measure) W1	1												
11. Best friend attended same primary school (vs. not) W1	-.04	1											
12. Best friend attending same secondary school (vs. not) W1	.09*	.21***	1										
13. No. of top 3 friends attended same primary school W1	-.03	.66***	.18***	1									
14. No. of top 3 friends attending same secondary school W1	.04	.06	.71***	.17***	1								
15. Academic attainment W3	-.02	.00	.01	-.07	.01	1							
16. School attendance W3	.00	.01	.01	-.02	-.04	.19***	1						
17. Classroom behaviour W3	.12**	.05	-.01	-.05	-.01	.37***	.15***	1					
18. School liking W3	.12**	.05	.05	.01	.01	.07	.06	.14**	1				
19. School connectedness W3	.15***	.02	.03	-.02	-.02	.10*	.08	.23***	.61***	1			
20. Loneliness at school W3	-.11**	-.02	.04	.00	.01	-.11**	-.05	-.22***	-.32***	-.46***	1		
21. Emotional problems W3	.08	.03	.01	-.02	-.01	.02	-.10*	.04	-.20***	-.28***	.41***	1	
22. Conduct problems W3	-.02	-.01	.00	.01	.01	-.16***	-.06	-.28***	-.28***	-.32***	.22***	.30***	1
23. Female gender (vs male)	.26***	-.03	-.02	-.09*	-.04	.06	.03	.25***	.02	.02	.08	.27***	-.14***

Notes. * $p < .05$, ** $p < .01$, *** $p < .001$.

Hypothesis 2. Children who have more stable friendships over the transition will have superior adjustment over time

Given that the aim was to assess the effect of friendship stability relatively independently of characteristics of the child and the friendship, pre-transition factors that were found to significantly correlate with stability were controlled for (table 6.2), these were: primary school attainment, primary school connectedness, loneliness at primary school, emotional problems at primary school, conduct problems at primary school, and friendship satisfaction at primary school. Gender was also controlled for due to its association with a number of the outcome variables (table 6.2).

Best friend stability (table 6.3). Having a stable best friend was associated with higher academic attainment ($\beta = .13, p < .01$) and fewer symptoms of conduct problems ($\beta = -.17, p < .001$). For attainment and conduct problems, these associations were robust to controls for baseline levels of the outcome variable and confounders ($\beta_{attainment} = .06, p < .05$; $\beta_{conduct\ problems} = -.12, p < .01$). Unstandardised regression results indicate these effects are equivalent to scoring 0.2 National Curriculum (NC) sublevels higher in the end of Year 7 English, Maths and Science assessments ($B = .196, p = .224$) and scoring 0.4 symptoms lower on the SDQ conduct problems subscale ($B = -.426, p = .002$).

After controlling for confounders, best friend stability was also associated with lower school attendance ($\beta = -.10, p < .05$). Unstandardised regression results suggest this effect is equivalent to 1% lower attendance over the whole school year ($B = -.929, p = .015$). These findings were in the opposite direction to those hypothesised. Because this association only reached trend-level significance before controlling for confounders ($\beta = -.08, p = .07$) and the attendance variable was negatively skewed (skew = -4.88) this association was followed up with logistic regression analyses where attendance was

recoded as either meeting expected targets ($\geq 95\%$) or below target ($< 95\%$). Both unadjusted (Odds Ratio = 1.11, $p = .59$) and adjusted (Odds Ratio = 1.21, $p = .37$) associations were non-significant so the findings related to attendance are treated with caution.

These results show that children who maintain a stable best friend over the first year of secondary school do better academically and have fewer symptoms of conduct problems.

The unadjusted associations of best friend stability with classroom behaviour ($\beta = .12, p < .01$), school liking ($\beta = .08, p < .05$), and school connectedness ($\beta = .09, p < .05$) were no longer significant after controls for confounders (all $p > .05$). There was no evidence of a main effect of best friend stability on loneliness at school or emotional problems (both $p > .05$).

Table 6.3. *Associations between best friend stability and children's post-transition functioning.*

Area of functioning	Predictor variable	Unadjusted β	Adjusted β^a	Adjusted β^b
Academic attainment	Best friend stability	.13**	.06*	.06*
	Stability*Quality	.07	.05	.05
School attendance	Best friend stability	-.08	-	-.10*
	Stability*Quality	-.07	-	-.07
Classroom behaviour	Best friend stability	.12**	-	.07
	Stability*Quality	.01	-	-.02
School liking	Best friend stability	.08*	-	.05
	Stability*Quality	.01	-	.01
School connectedness	Best friend stability	.09*	.04	.03
	Stability*Quality	.05	.03	.04
Loneliness at school	Best friend stability	-.02	.03	.05
	Stability*Quality	-.04	-.04	-.04
Emotional problems	Best friend stability	-.06	-.01	-.01
	Stability*Quality	.03	.01	.01
Conduct problems	Best friend stability	-.17***	-.13***	-.12**
	Stability*Quality	.02	.02	.03

Notes. β = standardised regression coefficients; * $p < .05$; ** $p < .01$; *** $p < .001$; “-” denotes variables where baseline equivalents were not available. ^a = model adjusted for equivalent measure of functioning at baseline (where available). ^b = model adjusted for equivalent measure of functioning at baseline (where available and applicable), primary school attainment, primary school connectedness, loneliness at primary school, emotional problems at primary school, conduct problems at primary school, friendship satisfaction at primary school, gender.

Table 6.4. Associations between top three friends stability and children's post-transition functioning.

Area of functioning	Predictor variable	Unadjusted β	Adjusted β^a	Adjusted β^b
Academic attainment	Stability of top three friends	.16***	.05	.06*
	Stability*Quality	.07	.05	.05
School attendance	Stability of top three friends	-.01	-	-.04
	Stability*Quality	-.01	-	-.02
Classroom behaviour	Stability of top three friends	.10*	-	.06
	Stability*Quality	.04	-	.02
School liking	Stability of top three friends	-.01	-	-.03
	Stability*Quality	.05	-	.03
School connectedness	Stability of top three friends	-.01	-.03	-.04
	Stability*Quality	.13**	.09*	.09*
Loneliness at school	Stability of top three friends	.03	.06	.08*
	Stability*Quality	-.10*	-.06	-.06
Emotional problems	Stability of top three friends	.02	.09*	.09*
	Stability*Quality	-.11**	-.08*	-.08*
Conduct problems	Stability of top three friends	-.10*	-.08*	-.07
	Stability*Quality	.03	.02	.03

Notes. β = standardised regression coefficients; * $p < .05$; ** $p < .01$; *** $p < .001$; “-” denotes variables where baseline equivalents were not available. ^a = model adjusted for equivalent measure of functioning at baseline (where available). ^b = model adjusted for equivalent measure of functioning at baseline (where available and applicable), primary school attainment, primary school connectedness, loneliness at primary school, emotional problems at primary school, conduct problems at primary school, friendship satisfaction at primary school, gender.

Stability of top three friends (table 6.4). Children who kept more of their top three friends had higher academic attainment ($\beta = .16, p < .001$), fewer symptoms of conduct problems ($\beta = -.10, p < .05$), and better peer-rated behaviour ($\beta = .10, p < .05$; see table 6.4). For academic attainment, this association was robust when controlling for baseline levels of attainment and confounders ($\beta = .06, p < .05$). For conduct problems, this association was robust to controls for baseline levels of conduct problems ($\beta = -.08, p < .05$), but reduced to trend level significance after controls for additional confounders ($\beta = -.07, p = .07$). For peer-rated behaviour, this association was not robust to controls for confounders ($\beta = .06, p = .13$).

There was no evidence of an association between the stability of children's top three friends on children's school attendance or school liking (both $p > .05$).

The main findings relating to hypothesis two were similar across both types of friendship stability, that is, stability was most strongly associated with higher academic attainment and lower levels of conduct problems (although the effect of best friend stability on conduct problems was robust to control for confounders).

Hypothesis 3. The benefits of friendship stability on children's adjustment will vary depending on the quality of the friendship

There was no evidence that the associations between best friend stability and any of the indicators of children's adjustment differed across levels of friendship quality, shown by the non-significant interaction terms in table 6.3 (stability*quality; all $p > .05$).

There was, however, a significant interaction between the stability of children's top three friends and the quality of these friendships for models predicting children's school connectedness ($\beta = .13, p < .01$), loneliness at school ($\beta = -.10, p < .05$), and

emotional problems ($\beta = -.11, p < .01$; see table 6.4). This interaction was robust to controls for baseline levels and confounders for two of these outcomes: school connectedness ($\beta = .09, p < .05$) and emotional problems ($\beta = -.08, p < .05$). These two findings were followed-up with simple slopes analyses.

Meaningful values of the predictor variables were selected for the simple slopes analyses (Dawson, 2014). As the median number of top three friends maintained across the transition was one, simple slopes were plotted for children maintaining none of their friends and two friends to represent low and high stability respectively. The mean level of friendship quality was 4.63 on a five-point scale, therefore simple slopes were plotted for children with high quality friendships at 5 (corresponding to a response of 😊😊) and low quality as 3 (corresponding to a response of 😊).

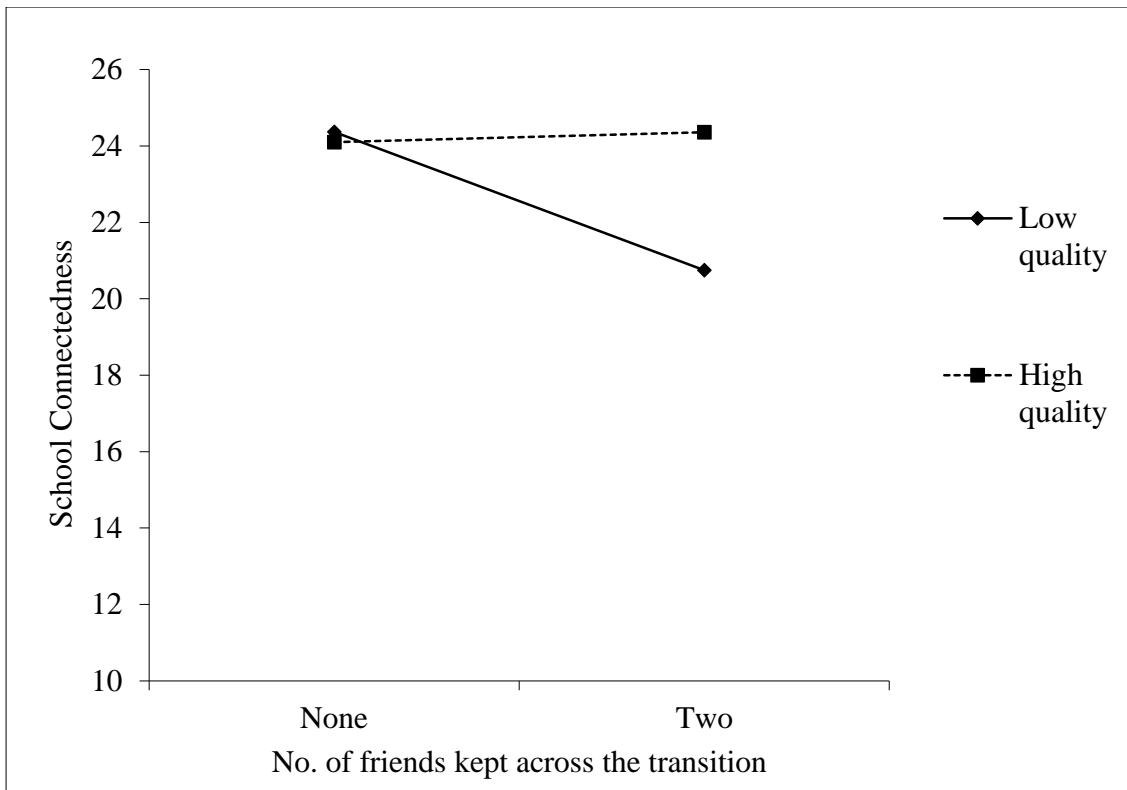


Figure 6.1. Simple slopes analysis: association between stability in children’s top three friends and school connectedness for high (5/😊😊) and low (3/😊) levels of friendship satisfaction.

Simple slopes analysis (figure 6.1) indicated that greater stability in children’s top three friends was associated with lower school connectedness when children had low quality friendships ($t = -2.55, p < .05$), but there was no effect of stability on school connectedness if children were in high quality friendships ($t = 0.58, p = .57$). To illustrate, children who kept two high quality best friends (high stability) scored 3.6 units higher on school connectedness (based on a 24 point scale) than those who kept two low quality best friends.

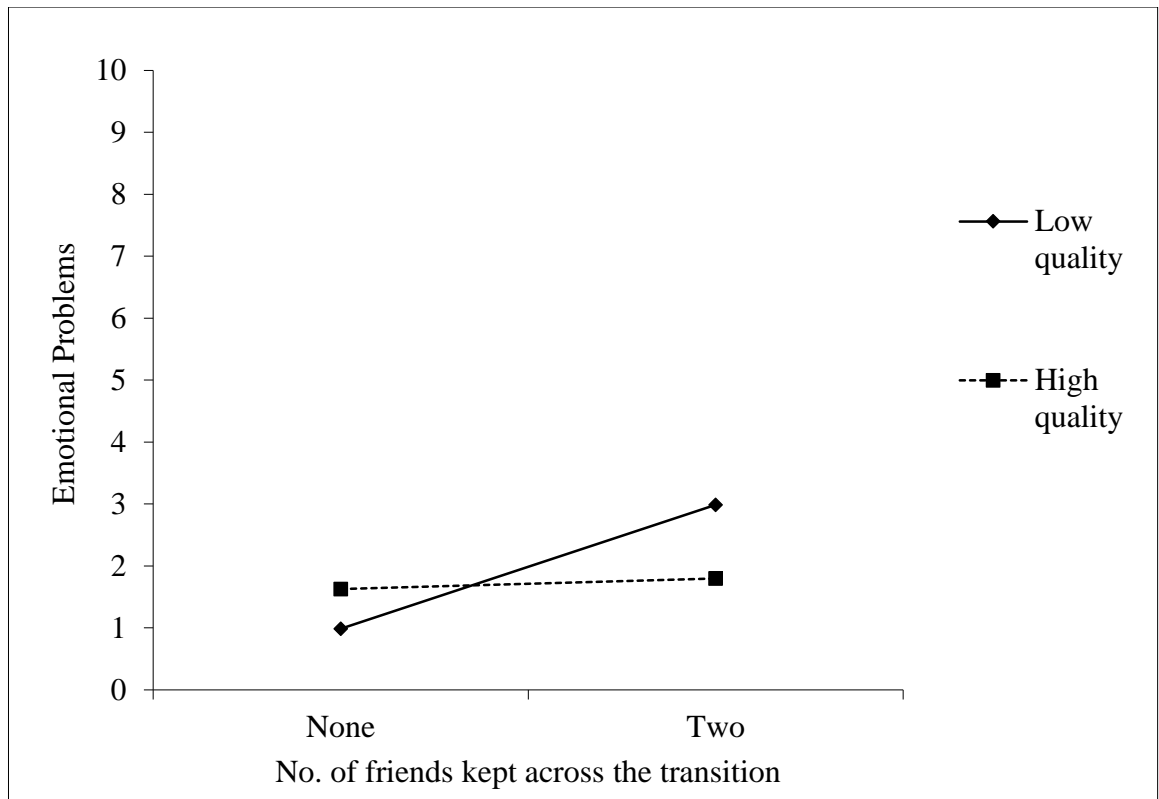


Figure 6.2. Simple slopes analysis: association between stability in children’s top three friends and symptoms of emotional problems for high (5/😊😊) and low (3/😊) levels of friendship satisfaction.

Simple slopes analysis (figure 6.2) indicated that greater stability in children’s top three friends was associated with higher levels of emotional problems if children were in low quality friendships ($t = 2.81, p < .01$), but there was no effect of stability on emotional problems if children were satisfied with their friendships ($t = 0.73, p = .47$). To illustrate, children who kept two high quality best friends (high stability) scored 1.2 units lower on the SDQ emotional problems scale (based on a 10 point scale) than those who kept two low quality best friends.

The main finding relating to hypothesis three was that there was generally little evidence of interactions between friendship stability and quality, especially for best friend stability. However, two interactions were found where children who maintained low quality friendships with their top three friends over the transition showed decreased school connectedness and increased symptoms of emotional problems.

Sensitivity analyses

Analysis one. Linear mixed modelling was used to re-run the fully adjusted regression models relating to hypotheses 2 and 3, this approach assessed whether the clustered nature of the data (i.e., pupils were clustered within schools) affected the results. All statistically significant effects shown in tables 6.3 and 6.4 were replicated with one exception whereby the effect of top three friends stability on academic attainment reduced to trend level significance ($p = .099$).

Analysis two. All regression analyses shown in table 6.3 were re-run replacing the single-item friendship quality control variable with a twelve-item measure of friendship quality. All statistically significant effects in the fully adjusted model were replicated. The only substantive difference in these results was that the previous finding of a trend level ($p = .07$) unadjusted association between best friend stability and school attendance was now statistically significant in these sensitivity analyses ($p < .05$).

What do the characteristics of secondary schools tell us about the stability of children's friendships?

As well as collecting individual-level data, this study collected descriptive data about participating secondary schools and their policies, therefore providing an opportunity to explore the effect of school-level characteristics on individuals'

friendships. Four school characteristics were explored: (1) the size of the school; (2) the number of feeder primary schools; (3) whether children were allocated to classes based on academic ability (i.e., academic setting); and (4) whether schools placed children together in tutor groups based on children's friendship requests. These characteristics were selected as they were objectively measured, and because they theoretically and intuitively might influence the level of opportunities children have to interact with their existing friends. For example, going to a larger school or to a school where children come from a greater number of primary feeder schools might reduce the probability that children will be placed in classes with children they know and are friends with. That is, unless secondary schools have specific policies to keep children together with someone with whom they are friends.

Table 6.5. *Characteristics and rates of friendship stability in STARS secondary schools.*

	Stability: % children keeping best friend	Stability: mean number of top 3 friends kept	Size: number of pupils in Year 7	Number of feeder primary schools	Setting of some classes by academic ability?	Tutor group allocation based on children's friendship requests?
	% (rank)	<i>M</i> (rank)	N (tertile)	N (tertile)		
	38% (1)	0.88 (6)	120 (Low)	8 (Low)	No	No
	35% (2)	0.90 (5)	272 (High)	15 (Medium)	Yes	Yes
	32% (3)	1.04 (2)	271 (High)	19 (High)	Yes	Yes
	31% (4)	0.94 (4)	200 (Medium)	8 (Low)	No	No
	29% (5)	0.83 (7)	279 (High)	17 (High)	Yes	No
	27% (6)	1.02 (3)	121 (Low)	8 (Low)	No	No
	22% (7)	0.75 (8)	186 (Medium)	15 (Medium)	No	No
	19% (8)	0.69 (9)	197 (Medium)	23 (High)	Yes	No
	17% (9)	1.09 (1)	160 (Low)	8 (Low)	-	-
	16% (10)	0.59 (10)	300 (High)	14 (Medium)	No	No
Median	28%	0.89	198.5	14.5		
Range	16-38%	0.59-1.09	120-300	8-23		

Notes. Data on academic setting and children's friendship requests were not available for school 5 as this school did not participate in this aspect of the study.

The descriptive statistics relating to this analysis are shown in table 6.5. Schools are listed based on their rates of best friend stability as the results presented thus far suggest this has the most robust associations with children's outcomes.

The most obvious pattern that emerges from the data presented in table 6.5 is that schools which used friendship requests to allocate children to form groups tended to have higher levels of best friendship stability – the two schools which had this policy had the 2nd (35%) and 3rd (32%) highest level of best friend stability. This observation was supported by a logistic regression analysis (accounting for school clustering) which indicated that children in these schools were, on average, 50% more likely to have stable best friends compared to children in other schools (Odds Ratio = 1.50, $p < .05$). Children at these two schools also tended to maintain more of their top three friends compared to children at schools who did not use friendship requests – they were ranked 2nd ($M = 1.04$) and 5th ($M = 0.90$) in this sample of schools ($B = 0.19$, $p < .05$).

There is no clear pattern of association between school size and friendship stability, with both small (low tertile) and large (high tertile) schools featuring at the top and bottom of the rankings shown in table 6.5. Tests of association confirmed that school size was not associated with either best friend stability (Odds Ratio = 1.00, $p = .73$) or top three friends stability ($B = -0.0001$, $p = .46$). A similar finding was found for the number of feeder primary schools that each secondary school had, where this factor was not associated with either best friend stability (Odds Ratio = 0.99, $p = .48$) or top three friends stability ($B = -0.01$, $p = .55$).

Both of the schools which used friendship requests also used academic setting in some of their classes, however, the two schools which used academic setting alone tended to report more modest levels of friendship stability (see table 6.5) and there was

not a significant association between academic setting and best friend stability (Odds Ratio = 1.28, $p = .29$) or top three friends stability ($B = 0.10$, $p = .37$).

Even in this small sample of schools there is a large amount of variation in friendship stability and in the use of policies that appear to support friendship stability. For example, rates of best friend stability for the ten schools range from 16% up to 38%. Only two schools used children's friendship requests to inform which children were put in the same tutor groups, this suggests that there is scope for altering school practices that might lead to increased friendship stability over the transition.

6.4. Discussion

This study aimed to assess the levels of stability in children's friendships across the transition from primary to secondary school. It also aimed to assess whether stability was associated with children's functioning in three domains: (1) academic and behavioural adjustment, (2) school bonding, (3) mental health. The hypothesis that the influence of stability varied according to friendship quality was also tested. Finally, exploratory analyses were conducted to assess whether school characteristics and policies were associated with stability in children's friendships.

High levels of instability in children's friendships were found across the transition providing support for the first hypothesis. Rates of instability were similar to those found in previous studies with North American samples which tend to indicate about 50% to 60% of best friends are lost over a 6 month period within a school year (Bowker, 2004; Bowker, Rubin, Burgess, Booth-LaForce, & Rose-Krasnor, 2006). Over the entire length of the current study, slightly higher levels of instability in best friends were found (73%), but over the shorter six month periods between waves 1 to 2 (62%) and between waves 2 to 3 (60%) rates of best friend stability were in line with these previous studies. Other researchers have found that rates of change in friendship groups across school transitions were similar to rates of change found within the school year. For example, in a Canadian sample, approximately 60% of pre-transition peers were not mentioned after the junior high school transition, but the same percentage were also not mentioned across the subsequent between-year change within junior high school (Cantin & Boivin, 2004). Friendships appear to change a lot during early adolescence, however the high levels of instability shown in previous studies may be an ongoing effect of the social disturbances caused by the transition to secondary school. Despite change in friendships occurring throughout adolescence, the transition to

secondary school is a period where children consistently report being concerned about losing friends (Rice et al., 2011; Rice et al., 2015) and a time when social support is likely to be especially beneficial (Symonds & Galton, 2014). The transition is a useful period for studying friendships as it represents a substantial environmental discontinuity and shares features of natural experiments where children have limited influence over the stability of their friendships.

A number of findings support the second hypothesis that stable friendships were associated with superior functioning over time, particularly best friendships. Children with stable best friends over the transition from primary to secondary school had higher academic attainment and fewer symptoms of conduct problems at secondary school. These findings were robust to a number of statistical controls which indicate that these effects were not driven by characteristics of the child (e.g., previous academic success and previous mental health) or by characteristics of their friendships (e.g., due to children with stable friendships having especially good quality friendships). This extends simple correlational evidence obtained with slightly older children ($M = 13$ years old) of an association between stable friendships and children's school grades and disruptive behaviour (Berndt & Keefe, 1995). Findings relating to the stability of children's broader group of friends (their top 3 friends) were similar and also supported an association with academic attainment and conduct problems. This contrasts with a previous study of 101 children transitioning from US elementary school to junior high (Berndt et al., 1999) which found no evidence of main effects of stability on change in children's (teacher-rated) behavioural problems or (peer-rated) social behaviour over time. In sum, stable friendships aided children's adaptation to secondary school and mental health in terms of academic attainment and conduct problems.

In relation to the third hypothesis, the main finding was that there was generally little evidence for the idea that the influence of stable friendships is dependent on the quality of those friendships. No interactions were found for best friend stability (where quality is generally high) and only two of the eight outcomes examined showed interactions for top three friends stability. So, for attainment and conduct, the outcomes most robustly associated with friendship stability, there was no interaction between stability and quality. Interactions were found between quality and top three friends stability for two outcomes, specifically, maintaining low quality friendships was detrimental to children's school connectedness and symptoms of emotional problems. Maintaining a greater number of high quality friends did not appear to effect children's school connectedness or symptoms of emotional problems. Therefore, rather than the maintenance of good friends acting as a protective factor, it was the maintenance of poor-quality friends that acted as a risk factor. This is in line with previous findings where friendship stability and quality interact to predict change in peer-ratings of positive social behaviour (e.g., leadership, friendliness) over the elementary to junior high transition (Berndt et al., 1999). To some extent, these findings point to an issue many schools are aware of, for example, secondary school staff often place pupils into separate classes where primary school teachers have identified problematic relationships (Keay et al., 2015).

The findings presented in this chapter have implications for school policies aiming to support children's school adjustment and mental health. For example, facilitating best-friendship stability may result in better behaved and higher performing pupils. School-based prevention and intervention programmes generally have quite modest effects (Stallard, 2013), therefore, simple systemic interventions that promote, rather than hinder, children's development may offer useful and economic approaches

to improving children's health and functioning. One such example implicated by the findings of the current study would be to incorporate children's friendship preferences into the configuration of their new form groups.

Limitations

The questionnaires used in the current study limited friendship nominations to children's top three friends. Researchers have suggested this may underestimate the total stability of children's friendships across the transition (Berndt & Hoyle, 1985). Future research may address this limitation by using measures which allow children to nominate a larger number of friendships or by using a social network approach.

The main focus of this study was to examine individual-level factors and proximal interpersonal factors contributing to successful school transition and the research design therefore focussed on sampling a large number of children from a small number of secondary schools. Whilst the small number of participating secondary schools is not ideal for examining school-level characteristics - for example, multilevel analyses using this data are likely to be underpowered with ten schools - this is useful preliminary data indicating directions for future research on how school-level characteristics might influence the stability of children's friendships.

Analyses were limited to children who reported on their best friendships at waves one and three. This was a slightly higher academically performing subgroup on average, however, this group included children from the full range of possible levels of academic attainment (from those below the minimum National Curriculum level of 2 up to the highest level of 6) and on most measures, this subsample was broadly representative of the local population from which it was drawn, including socioeconomic disadvantage, ethnic composition, and special educational needs.

Conclusion

Children who maintain their best friends over the transition have better academic attainment and lower levels of behavioural problems. Schools may be able to increase the stability of children's best friendships by incorporating children's friend requests into decisions about form group allocations. Children who maintain multiple low-quality friendships over the transition show reduced school connectedness and increased emotional problems. The secondary transition may be a useful time to break ties to a wider group of low-quality friends, although maintaining best friendships appear to confer some benefits for pupils.

CHAPTER 7: General Discussion

7.1. Summary of main findings

This thesis examined children's transition from primary to secondary school in a prospective longitudinal design. Chapter three presented a model for measuring transition success consisting of two broad domains of functioning at school: (1) academic and behavioural adjustment, and (2) school bonding. Successful academic and behavioural adjustment was predicted by higher IQ, female sex, being older (relative age), and socio-economic advantage. Successful school bonding was predicted by affective factors such as parental warmth and lower levels of child mental health problems. Higher self-control was associated with transition success in both domains, and predictive of academic and behavioural adjustment after controls for a range of other predictors including IQ. Chapter four examined self-control in more detail, finding that it decreased over the secondary transition and that these declines were associated with aspects of poorer functioning at secondary school including poorer classroom behaviour, liking school less, and more symptoms of conduct problems. Advanced pubertal status before the school transition was a risk factor for lower self-control, whilst parental warmth appeared to buffer against children's declines in self-control. Parental context was further examined in chapter five, where higher levels of maternal depressive symptoms were associated with impaired parenting in both mothers and fathers, which was associated with reduced self-control and subsequent attainment among children. Finally, chapter six showed that maintaining friends across the transition was associated with positive academic functioning and fewer symptoms of conduct problems, whilst maintaining multiple low quality friends across the transition was associated with reduced school connectedness and increased emotional problems. School policies were found to influence the stability of children's friendships.

7.2. Contributions to the study of school transition

This study is one of very few longitudinal prospective studies of school transition which uses a UK sample. Previous studies have tended to use small samples (e.g., Bailey & Baines, 2012; Riglin et al., 2013) and tend to be based on only two waves of data collection (e.g., Bailey & Baines, 2012; Evangelou, 2008; Riglin et al., 2013). The current study extends this work by using a moderately large sample and including three waves of data covering a period of one year. This provided more statistical power to detect small effect sizes which are common in longitudinal designs (Adachi & Willoughby, 2014) and also provided analytical benefits such as the ability to examine change over time (e.g., chapter four) and temporally separate key variables (e.g., chapter five).

The transition to secondary school is an important period of adaptation. The transition arouses anxiety for many children and requires effort from children in order to adapt to new environmental, social, and academic demands. The secondary school transition (and its international equivalents) has stimulated a substantial research literature, but no single study has empirically explored this transition from a broader developmental psychopathology perspective incorporating well-defined outcome measures alongside a comprehensive set of risk and protective factors. Chapter three aimed to address this gap. Guided by previous research into school adjustment and other school transitions, the first empirical chapter of this thesis focused on how to define transition success in a multidimensional framework. This model is likely to be helpful to transition researchers for a number of reasons. First, it provides a focus for organising and understanding research into the processes and factors related to school transition success. Second, the model focuses on school-specific adjustment, providing a potentially useful measure for assessing the influence of school transition on other

important outcomes such as children's mental health or their educational achievement at the end of secondary school. Third, this model provides a framework for researchers and professionals aiming to develop tools to assess children's transition success. Such tools would be useful for evaluating intervention efforts, assessing how well individual pupils have settled in to secondary school, and for identifying pupils who may be at risk of unsuccessful transitions.

In the introduction to this thesis a number of individual-level characteristics were discussed as possible risk and protective factors in relation to successful transitions to secondary school. Many of these risk and protective factors were found to be associated with transition success, but there were differences in the pattern of factors associated with each domain of transition success. For example, children's cognitive ability (IQ) was very strongly associated with children's academic and behavioural adjustment at secondary school, but it did not explain variation in children's school bonding. The reverse pattern was found for children's symptoms of mental health problems, which explained variation in school bonding but not in children's academic and behavioural functioning at secondary school. This supported the rationale for a two-factor model of transition success but also highlights that different processes may lead to successful transition in each domain. These findings also show how children's prior development influences their adaptation to secondary school (Sroufe & Rutter, 1984), for instance, academic and behavioural adjustment appears to be largely based on children's earlier cognitive development. Additionally, there is the possibility of accumulating disadvantage over the transition as children with pre-existing difficulties tend to have poorer transitions and this in turn is likely to place them at further risk of poor development and poor outcomes. Therefore, as has been suggested elsewhere (Monahan & Steinberg, 2011; Rutter, 1996), the secondary transition may act to

reinforce continuities in development and therefore accentuate individual differences between those who are doing well and those who are struggling.

The main protective factors examined in this thesis are in line with those generally considered to be important for understanding individual differences in people's response to stress, including personality characteristics such as self-control and social support from positive parent-child relationships (Masten & Garmezy, 1985; Rutter, 1987, 2013). In this thesis, self-control was found to have a broad influence on transition success, explaining variance in both domains (chapters three and four). Overall, the findings presented in this thesis indicate that self-control plays an important role during the transition to secondary school: it acts as a predictor of transition success, its declines over the transition are linked to children's outcomes, and it also shows evidence of linking biological changes (such as puberty) to children's functioning at secondary school in a wide range of domains. Four types of psychosocial tasks have been suggested to characterise the main challenges posed to children as they try to adapt to secondary school, these relate to: peer-related difficulties; conflicts with authority; academic pressures; and exposure to substance abuse (Elias et al., 1992). Higher levels of self-control have been linked to competencies or positive adjustment in all of these domains (de Ridder et al., 2012; Moffitt et al., 2011; Tangney et al., 2004) which supports the current findings linking higher self-control to successful transitions and better psychological adjustment.

Furthermore, personality characteristics such as self-control are believed to operate as mediating mechanisms linking social support to children's functioning at secondary school. For example, Rutter (1987) has suggested that secure and harmonious parent-child relationships foster children's feelings of self-esteem and self-efficacy which in turn protect them against risk environments. A very similar finding

emerges from this thesis, where parental warmth is associated with higher self-control and in turn with more successful functioning at secondary school. Therefore, as suggested by the developmental psychopathology approach, influences on children's adaptation to secondary school occur across ecological levels and adjustment at the end of the first year of secondary school is the product of both individual and contextual influences (Bronfenbrenner, 1979; Cicchetti, 1984; Sameroff, 2009).

Social support is widely considered to be important during stressful transitions (Masten & Garmezy, 1985; Rutter, 1987). The approach taken in this thesis was to examine social support via characteristics of the parent-child relationship and friendship stability, where warm parenting and stable friendships were expected to confer adjustment benefits and parental mental health difficulties and parental hostility were expected to impair children's adjustment. The findings presented in this thesis corroborate a view where the presence of good quality relationships aid children's transition, for example through boosting children's competencies such as self-control. However, more specificity is possible regarding the methods by which parents, and possibly friends, could be mediating risk during the secondary school transition (Rutter, 1987). For instance, parents may have prepared (or "inoculated") their children for the secondary school transition through previous brief exposures to stressful circumstances that allowed the child to cope successfully (Rutter, 2013). Additionally, parents may influence how their child experiences the school transition by being actively involved in the process, for example, by carefully selecting a secondary school, helping with school work, helping children to be organised, and intervening when their child encounters difficulties (Falbo, Lein, & Amador, 2001; Symonds & Galton, 2014). Positive social relationships confer adjustment benefits for children moving to secondary school,

however, more information on the mechanisms through which this support operates may provide useful avenues for intervening with children who lack social support.

Children encounter multiple changes as they move to secondary school, and it appears that an ‘arena of comfort’ such as supportive parents or a stable friend helps children to deal with the changes brought about by the transition. Factors that reduce the quality of support received from parents or friends, such as parental depression or lower-quality friendships, appear to increase vulnerability to poor outcomes at secondary school. Therefore children who have low levels of social support may need additional help during the transition. Alongside the transition to secondary school, the onset of puberty is one of the defining events of early adolescence. Previous research has suggested links between school transition and the pubertal transition such that their coincidence places children at risk of mental health difficulties and reduced self-esteem (Petersen, Sarigiani, & Kennedy, 1991; Simmons & Blyth, 1987). This thesis extends understanding of the association between these two transitions by presenting findings suggesting self-control may be a mediating mechanism through which puberty influences children’s transition.

Further investigation is required to understand the cause of the decline in self-control over the transition to secondary school found in this thesis. It is likely that such a decline in self-control will be at least partly due to normative developmental changes associated with adolescence and puberty. For instance, executive functions – a group of neuropsychological skills thought to underlie individuals’ self-control – show steady improvement throughout childhood but appear to plateau during early adolescence (Blakemore & Choudhury, 2006; Crone, Ridderinkhof, Worm, Somsen, & van der Molen, 2004; Somsen, 2007) and may even reduce slightly at the onset of puberty (Blakemore & Choudhury, 2006; McGivern, Andersen, Byrd, Mutter, & Reilly, 2002).

This slowing in the development of executive functions occurs alongside extensive synaptic reorganisation in the frontal lobes at the onset of puberty. This may explain the findings in the current thesis of an association between pubertal status and children's self-control (Blakemore & Choudhury, 2006). Future research may be able to tease apart the unique contributions of pubertal development and school transition to the development of children's self-control by utilising a research design that compares a cohort of transitioning children with a cohort of non-transitioning children of equivalent age. It is important to note, however, that it would be very difficult to carry out such research in UK state schools given the nearly universal transition at 11 years old.

Maternal depressive symptoms have a well-established relationship with offspring psychopathology such as depressive symptoms and conduct problems and this has been found to operate through both genetic and environmental mechanisms (Harold et al., 2011; Rice et al., 2005; Silberg et al., 2010; Tully et al., 2008). Comparatively less is known about the links between maternal depressive symptoms and children's educational attainment but on the basis of prior research examining different child outcomes both genetic and environmental mechanisms are likely to be important. The analyses presented in this thesis provided evidence of a link between maternal depressive symptoms and children's educational attainment and support for this effect acting partially through effects on parenting and children's self-control. However, these indirect effects only explained a small amount of the overall association and therefore suggest other mechanisms are operating. Some evidence points to parents with elevated depressive symptoms being less likely to provide cognitively stimulating environments for their children (Murray et al., 2010), for instance, depressed parents may talk and read to their children less often (Bigatti et al., 2001). Children may also have lower educational attainment due to genetic liabilities they share with their parents, for

instance, they may share a genetic propensity for lower cognitive ability, a key predictor of school performance (Sternberg et al., 2001) and also a risk factor for depression in girls (Collishaw, Maughan, & Pickles, 2004; Glaser et al., 2011; Riglin et al., 2015). As described above, children of depressed parents are more likely to show elevated levels of emotional and behavioural difficulties and these difficulties are also associated with lower academic attainment (Riglin et al., 2014). The association between maternal depressive symptoms and children's attainment was not fully explained by socioeconomic risk, but there remain a number of other stressors that may be present in families with a depressed parent which may negatively influence children, such as increased inter-parental conflict (Davies et al., 2002; Grych & Fincham, 1990). Future studies should explore these potential mechanisms through genetically sensitive designs, and by including measures of parental cognitive ability as well as the additional hypothesised mediators described here.

In addition to identifying at-risk children it is important to consider how schools organise and manage transitioning pupils (Eccles & Midgley, 1989). In this study schools varied in their approach to dealing with friendships and this explained variation in the number of children maintaining friendships over the transition period. This implies that schools may have the ability to influence the amount of social support their pupils receive and they should therefore make decisions about how to manage existing friendships carefully. Moving to secondary school results in a number of changes, some of these changes are inevitable like the school buildings and teachers who work there, however, there are aspects of children's social worlds that can be kept more stable such as friendships and parental care and these are likely to have beneficial effects on some characteristics of children's adjustment.

7.3. Limitations

This thesis contributes to a greater understanding of the secondary school transition and some of the processes underlying positive and negative adaptation to secondary school. There are nevertheless a number of limitations to this work which are discussed here.

This thesis relied heavily on questionnaire data. Reliance on a single method of data collection increases the likelihood that associations are inflated due to method effects (Podsakoff et al., 2003). Questionnaire data may also represent more subjective assessments on behalf of the respondents when compared to experimental measures, clinical interviews, and observer ratings. For example, the questionnaire measure of maternal depressive symptoms used here (HADS; Zigmond & Snaith, 1983) may represent a cruder assessment of mothers' depressive symptoms than clinical interviews. In reality, conducting individual assessments was beyond the cost and time constraints of the current study and the HADS is an adequate measure for the current purposes as it has been shown to be a reliable and valid screening tool for use in community samples (see chapter two). In this thesis a number of practical steps were taken to reduce the effects of common method bias. Multiple informants were included (children, parents, teachers) and where possible a number of key constructs were measured using alternative methods and raters, for example academic attainment and school attendance were assessed from official school records, and children's behaviour at school was assessed using a peer-nomination procedure. Care was taken throughout to ensure that appropriate raters of each construct were used, in particular, effort was made to test associations between measures based on different methods or informants (Rutter et al., 2001).

The measures of parenting used in this thesis have some limitations. First, as discussed above, they are questionnaire based and would likely have benefited from being complimented by observational ratings if they were to be credible assessments of actual behaviour rather than the attitudes, perceptions and feelings about parenting which are measured by questionnaire methods. Nonetheless, all methods of measuring parenting carry their own limitations (Lytton, 1971) and perceptions of parenting, particularly children's own perceptions, are likely to have meaningful implications for children and their feelings of emotional security (Davies et al., 2002). Responses to these questionnaire measures correlate moderately with observer ratings therefore providing some support for their validity (Ge et al., 1996). Additionally, findings presented in this thesis converged across parents' self-reports and child-reports of parenting (e.g., parental warmth was associated with self-control in both chapters four and five) providing support for their robustness (Rutter et al., 2001).

As described more generally above, the use of a self-report measure of self-control means responses may reflect perceptions of self-control rather than actual behaviour. These measures may also experience some bias because other factors such as low mood have been found to influence self-evaluations of competences (e.g., Cole, Martin, Peeke, Seroczynski, & Fier, 1999). However, such biases are also possible with reports from other informants. In defence of using self-reports, good levels of convergent validity have been found for self-report measures (Duckworth & Kern, 2011) and there was substantial agreement between child and parent reports of self-control used in the current sample ($r = .6$). Using child-reported data had a number of advantages in the current study, including: (1) the response rate was much higher for children, reducing missingness in the dataset; (2) levels of self-control may vary across domains (e.g., home versus school) so using either parents or teachers as a single rater

may obscure children's self-control in other domains (Tsukayama, Duckworth, & Kim, 2013). Both parent and child reports of self-control were correlated with children's transition success, providing some support for the validity of these findings (Rutter et al., 2001).

An important limitation of the current dataset was the low response rate at wave one (approx. 35%). Analyses reported throughout this thesis showed that wave one respondents represented a slightly better adjusted subsample (e.g., higher attaining) so it would have been inappropriate to base analyses on these cases alone, i.e., using listwise deletion (Allison, 2001; Enders & Bandalos, 2001; Graham, 2009; Schafer & Graham, 2002). Fortunately, the study design collected data at waves two and three from in-school assessments which minimised non-response at these later waves. These later data were used alongside school records data to identify the nature of non-response at wave one and address this slight bias via missing data techniques (Graham, 2009). Full information maximum likelihood (FIML) is generally considered to be appropriate with moderate to large amounts of missing data, but a note of caution is suggested regarding the high level of missingness experienced at wave one of STARS (approx. 65%) (Allison, 2001; Enders & Bandalos, 2001; Graham, 2009; Schafer & Graham, 2002). In line with other research using datasets with large amounts of missingness, results were compared across approaches (e.g., Zammit et al., 2008). The results presented in this thesis were generally the same when compared between listwise deletion and FIML approaches supporting the conclusion that missing data had little influence on the results.

There are limitations to the extent that causality can be assumed based on the associations found throughout this thesis. No experimental manipulation was applied so there remains the possibility that the associations reported here were due to unmeasured

factors (e.g., genetic factors). Quasi-experimental studies or studies using a natural experiment design provide some advantage over purely observational studies, in particular, they increase confidence that observed effects are due to the phenomena being studied rather than unmeasured or unknown factors (Rutter, 2007; Rutter et al., 2001). The secondary school transition has some features of a natural experiment increasing the confidence with which transition related changes can be linked to children's outcomes. The longitudinal prospective design used here provided some benefits in terms of meeting a number of conditions required to assume causality, these include: controlling for likely confounders, temporal ordering of variables, and controlling for baseline levels of the outcome variables (Coolican, 2014; Mill., 1843). Nevertheless, these design and analysis features offer only limited benefits as they rely on the correct set of confounders being selected and variables being ordered correctly. Additionally, it was not always possible to control for baseline levels of the outcome, for instance, school attendance data was not available for wave one. Intervention studies which manipulate levels of the risk and protective factors investigated here would go some way towards increasing the causal validity of these associations.

The dataset used in this thesis comes from a community sample of schoolchildren. This has advantages such as improving generalisability to the wider population but it also meant there were low numbers of at-risk groups in the sample and this precluded the analysis of high-risk groups specifically. For example, few children were classified as having a statement of special needs and few of the responding mothers met the screening criteria for depression. Future research would need to oversample at-risk groups if questions relating to these specific groups are to be addressed.

The findings presented throughout this thesis all relate to data collected across the transition to secondary school, however, there was no opportunity to assess whether the same findings would be found for children who were not transitioning to secondary school. For example, in chapter five maternal depressive symptoms measured pre-transition predicted children's academic attainment post-transition, but it is possible that similar effects would be found in this age group regardless of whether the transition occurred. Nonetheless, given the apprehension and substantial changes children experience when they move to secondary school, there remains good reason to believe that the transition is likely to be a time when factors such as social support and self-control are particularly important for children's development (Jindal-Snape & Miller, 2008; Rutter, 1987). Furthermore, previous research which has compared transitioning children with a non-transitioning comparison group has found a negative impact of school transitions during early adolescence (e.g., Simmons & Blyth, 1987).

Many of the standardised effect sizes reported throughout this thesis are relatively modest when considered against traditional frameworks for interpreting practical significance (e.g., Cohen, 1992; Ferguson, 2009). This does not necessarily mean these effects are weak in a practical sense. Predictors of academic performance are often quite modest (e.g., Duckworth & Seligman, 2005; Riglin et al., 2014) and it is also important to note that many of the effects reported here were found in longitudinal autoregressive models (i.e., controlling for earlier measures of the outcome variable). For instance, friendship stability predicted later academic attainment even though attainment was highly stable over the transition ($r = .8$). Such effects should not be dismissed as insignificant, rather they should be acknowledged for their robustness considering the highly conservative analytic approach taken.

Finally, after identifying a broad selection of associations between hypothesised risk and protective factors and the two domains of transition success in chapter three, only a subset of these were analysed in the subsequent empirical chapters. As this thesis focused on exploring a subset of variables and their interrelations in detail, there remain a number of associations presented in chapter three which warrant further examination in future studies.

7.4. Future work

A key aim of this thesis was to develop a method for measuring children's transition success (chapter three). One of the main motivations for developing this measure was to enable research into the impact of the secondary school transition on children's development and later adjustment, for example, on their academic attainment at the end of secondary school and on their mental health. Previous research has linked transition difficulties to poorer outcomes in these areas but relied on retrospective recall of transition difficulties (West et al., 2010) rather than using a prospective design as used here. It has also been suggested that the successful navigation of hazards at transition points may have "steeling" effects that enable individuals to deal with later challenges (Rutter, 1987). Therefore assessing the relationship between children's transition success and longer term outcomes using a prospective research design is an important area of future work in order to provide robust evidence of an association between what occurs over the secondary school transition and children's subsequent development.

Another aim of this thesis was to examine how social-contextual factors influenced children's development over the transition to secondary school. In this respect, both parents and peers were studied in some detail, but attention was not given

to children's relationships with teachers and school characteristics were only briefly examined in exploratory analyses in chapter six. Researchers have suggested the poor fit between the child's needs and the demands and rules of the secondary school context is an important aspect of what makes transitions difficult (Eccles & Midgley, 1989; Eccles, Wigfield, et al., 1993). Therefore, it would be expected that the positive effects of good social support found in this thesis would be larger where children are transitioning into secondary schools that are less accommodating or 'developmentally-appropriate' (e.g., social support may act as a resilience factor). It was not possible to examine such questions here as the current study took the approach of recruiting a large number of pupils (i.e., whole year groups) from a relatively small number of schools. In order to carry out such analyses, future studies would need to collect data from a larger number of schools as this would facilitate the investigation of how school characteristics influence transition success and also provide opportunities for examining links across school, family, peer, and individual-level factors relating to children's transition success. It is speculated that self-control may continue to provide a useful unifying construct in such work as classroom characteristics, such as teaching styles that encourage children's use of planning, have also been linked to improvements in children's self-control (Blair & Diamond, 2008).

7.5. Implications for schools and parents

Successfully transitioning to secondary school partly consists of children doing well in traditional aspects of school success such as good academic attainment, behaviour, and attendance, but also consists of more subjective indicators such as enjoyment of school and feelings of being socially included at school. Because success in objective and subjective domains are only weakly correlated, children who are

excelling in one domain could quite possibly be struggling in the other. Therefore, in order to fully address any difficulties pupils may be having post-transition, attempts at measuring successful transition should incorporate both objective and subjective measures of functioning. This applies to evaluating programmes that aim to support children's transition and also to assessments of individual pupils' adjustment.

Children's self-control appears to reduce over the secondary transition and this is likely to negatively impact on children's functioning at secondary school. This may partly reflect the additional demands placed on pupils by the transition but is also likely to reflect the normative reduction in self-control which is generally associated with the onset of puberty. Whilst these declines in self-control may be somewhat normative, there does appear to be more promising outcomes for children who have affectionate, loving, and interested parents. This highlights that parents have an important role in bolstering children's self-control and transition outcomes during this period. Furthermore, schools and other support services may need to provide extra support where children's parents are experiencing difficulties (such as elevated depressive symptoms) that may reduce their capacity for warmly supporting their child. Several findings presented in this thesis indicate that children benefit from social support during this period. Another source of social support that schools may be able to draw on is children's pre-existing friendships. One way some secondary schools have done this is to allow children to request which friends they will be placed with in their new secondary form groups. This approach appears to increase friendship stability, and crucially, children who have stable positive relationships across the transition show better academic attainment and conduct at secondary school.

7.6. Conclusion

Successful transitions to secondary school are indicated by good academic and behavioural adjustment, and positive perceptions of school bonding. Transition success is associated with numerous socio-demographic, family, and child characteristics. While there is evidence of unique associations, the relationships linking risk and protective factors to transition success are complex and interrelated, and often involve chains of indirect effect. For instance, children's self-control declines over the transition and is one such factor which plays a role in mediating the effects of puberty and parent-child relationships on transition success. Overall, social support during this period of change, both from parents and friends, aids children's successful transition and adjustment.

APPENDIX 1: Supplementary tables for chapter 3

Supplementary Table 1. *Observed correlations between all transition success indicator variables and variances of continuous variables for (i) primary dataset (STARS) and (ii) replication dataset.*

(i)	Item	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
1.	Total attendance	0.03																		
2.	Unauthorised absences (R)	.41	0.03																	
3.	Maths	.22	.17	1.00																
4.	Science	.23	.15	.72	1.00															
5.	English	.20	.16	.64	.63	1.00														
6.	Disrupts (R)	.11	.13	.28	.29	.33	0.03													
7.	Cooperates	.17	.17	.36	.36	.35	.56	0.04												
8.	SL1	.11	.07	.04	.08	.03	.12	.17	-											
9.	SL2	.07	.06	.04	.06	.05	.10	.09	.70	-										
10.	SL3	.12	.05	.01	.04	.01	.11	.17	.55	.48	-									
11.	SL4	.04	.01	.01	.01	.02	.10	.08	.54	.70	.39	-								
12.	SL5	.09	.04	.07	.10	.06	.11	.13	.70	.66	.53	.58	-							
13.	L1	.01	-.02	.07	.08	.05	.04	.15	.30	.23	.14	.14	.21	-						
14.	L2	.01	.05	.02	.06	.07	.01	.12	.30	.25	.19	.14	.23	.54	-					
15.	L3	.04	.04	-.03	.02	-.03	.10	.17	.30	.34	.19	.25	.27	.51	.74	-				
16.	L4	.02	-.04	.15	.16	.16	.07	.16	.18	.14	.09	.15	.20	.43	.38	.37	-			
17.	L5	.04	.04	.05	.08	.03	.07	.14	.32	.33	.24	.21	.23	.53	.66	.75	.27	-		
18.	L6	.04	.05	.06	.09	.05	.11	.16	.33	.34	.23	.23	.26	.55	.71	.88	.36	.80	-	
19.	L7	-.02	-.03	.09	.13	.13	.14	.24	.29	.24	.19	.19	.21	.64	.54	.54	.48	.51	.55	-

Supplementary Table 1 continued. *Observed correlations between all transition success indicator variables and variances of continuous variables for (i) primary dataset (STARS) and (ii) replication dataset.*

(ii) Item	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Total attendance	0.03											
2. Unauthorised absences (R)	.74	0.03										
3. Maths	.32	.28	6.73									
4. Science	.26	.24	.43	4.41								
5. English	.22	.15	.61	.49	5.39							
6. Disrupts (R)	.23	.18	.24	.23	.30	0.04						
7. Cooperates	.22	.24	.32	.20	.31	.65	0.05					
8. SL1	.14	.18	.01	.11	.11	.24	.19	-				
9. SL2	.13	.09	-.06	-.01	.04	.20	.15	.61	-			
10. SL3	.12	.13	-.02	.14	.17	.23	.17	.70	.61	-		
11. SL4	.08	.01	.06	-.07	.11	.12	.19	.48	.71	.37	-	
12. SL5	.14	.14	-.06	.14	.13	.20	.15	.66	.71	.70	.53	-

Notes. Correlations were calculated using the WLSMV estimator in Mplus. Coefficients displayed are Pearson's

(continuous by continuous variables), Polyserial (continuous by ordinal variables) or Polychoric (ordinal by ordinal variables) correlations. Variances of continuous variables are given on the diagonal, Mplus does not calculate variances for ordinal variables. R = score has been reversed.

Supplementary Table 2. *Correlation residuals for (i) measurement model, (ii) 2-factor model, (iii) 1-factor model from primary dataset (STARS).*

(i) Item	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. Total attendance																		
2. Unauthorised absences (R)	.00																	
3. Maths	.00	.00																
4. Science	.00	.00	.03															
5. English	.00	.00	.00	-.02														
6. Disrupts (R)	.00	.00	.00	.00	.01													
7. Cooperates	.00	.00	.00	.00	.00	.00												
8. SL1	.00	.00	-.01	.03	-.01	.00	.01											
9. SL2	.00	.00	-.01	.01	.00	.00	-.01	-.03										
10. SL3	.01	.00	-.03	.01	-.03	.01	.01	.03	-.05									
11. SL4	.00	-.01	-.03	-.03	-.02	.00	-.01	-.06	.08	-.05								
12. SL5	.00	-.01	.03	.05	.02	.00	.00	.02	-.03	.04	.00							
13. L1	.00	-.01	.00	.01	-.01	-.01	.00	.07	-.01	-.03	-.07	-.02						
14. L2	.00	.01	-.05	-.01	.00	-.02	-.01	.04	-.02	-.01	-.08	-.02	-.02					
15. L3	.00	.00	-.11	-.06	-.10	-.01	.00	.00	.03	-.03	-.01	-.01	-.12	.04				
16. L4	.00	-.01	.11	.12	.12	.00	.01	.01	-.04	-.03	.00	.03	.07	-.02	-.09			
17. L5	.00	.01	-.02	.01	-.04	-.01	.00	.05	.05	.05	-.02	-.03	-.04	.02	.02	-.15		
18. L6	.00	.01	-.03	.01	-.03	.00	.00	.02	.02	.00	-.04	-.03	-.11	-.02	.04	-.12	.04	
19. L7	-.01	-.01	.03	.06	.07	.01	.02	.04	-.01	.01	-.02	-.02	.12	-.03	-.12	.10	-.09	-.13

Supplementary Table 2 continued. *Correlation residuals for (i) measurement model, (ii) 2-factor model, (iii) 1-factor model from primary dataset (STARS).*

(ii) Item	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. Total attendance																		
2. Unauthorised absences (R)	.00																	
3. Maths	.01	.01																
4. Science	.01	.00	.02															
5. English	.01	.01	.00	-.02														
6. Disrupts (R)	.00	.00	.00	.00	.01													
7. Cooperates	.00	.00	.00	.00	.00	.00												
8. SL1	.01	.01	-.04	.00	-.05	.01	.01											
9. SL2	.00	.00	-.04	-.03	-.03	.00	-.01	-.03										
10. SL3	.01	.00	-.05	-.01	-.05	.01	.02	.03	-.05									
11. SL4	.00	.00	-.06	-.06	-.05	.01	.00	-.06	.08	-.05								
12. SL5	.01	.00	.00	.02	-.01	.01	.01	.02	-.03	.04	.00							
13. L1	-.01	-.01	-.01	.00	-.02	-.01	.01	.07	-.01	-.03	-.07	-.02						
14. L2	-.01	.00	-.06	-.02	-.01	-.01	.00	.04	-.02	.00	-.08	-.02	-.02					
15. L3	.00	.00	-.12	-.07	-.11	.00	.01	.00	.03	-.03	-.01	-.01	-.12	.04				
16. L4	.00	-.01	.10	.11	.12	.00	.02	.01	-.04	-.03	.00	.03	.07	-.02	-.09			
17. L5	.00	.00	-.03	.00	-.05	.00	.01	.05	.05	.05	-.02	-.03	-.04	.02	.02	-.15		
18. L6	.00	.00	-.04	-.01	-.04	.00	.01	.02	.02	.00	-.04	-.03	-.11	-.02	.04	-.12	.04	
19. L7	-.01	-.01	.02	.05	.06	.01	.03	.04	-.01	.02	-.02	-.02	.12	-.03	-.12	.10	-.09	-.13

Supplementary Table 2 continued. *Correlation residuals for (i) measurement model, (ii) 2-factor model, (iii) 1-factor model from primary dataset (STARS).*

(iii) Item	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. Total attendance																		
2. Unauthorised absences (R)	.00																	
3. Maths	.03	.02																
4. Science	.03	.02	.01															
5. English	.02	.02	.02	-.02														
6. Disrupts (R)	.00	.00	.03	.04	.05													
7. Cooperates	.00	.00	.05	.05	.05	.00												
8. SL1	.00	.00	-.09	-.06	-.09	-.01	-.01											
9. SL2	-.01	-.01	-.09	-.08	-.08	-.01	-.03	-.03										
10. SL3	.01	.00	-.09	-.05	-.08	.00	.00	.03	-.05									
11. SL4	-.01	-.01	-.10	-.11	-.09	-.01	-.03	-.06	.08	-.05								
12. SL5	.00	-.01	-.05	-.03	-.05	-.01	-.02	.02	-.03	.04	.00							
13. L1	-.01	-.02	-.04	-.03	-.04	-.02	-.01	.12	.04	.00	-.02	.03						
14. L2	-.02	.00	-.09	-.06	-.04	-.02	-.02	.10	.04	.04	-.03	.04	-.01					
15. L3	-.01	-.01	-.16	-.12	-.15	-.01	-.02	.07	.09	.01	.04	.05	-.12	.04				
16. L4	-.01	-.02	.08	.08	.10	.00	.00	.04	.00	-.01	.03	.07	.07	-.02	-.09			
17. L5	-.01	-.01	-.07	-.04	-.08	-.01	-.02	.11	.11	.09	.03	.02	-.04	.03	.02	-.15		
18. L6	-.01	-.01	-.08	-.05	-.08	-.01	-.02	.08	.08	.05	.02	.03	-.11	-.02	.04	-.13	.05	
19. L7	-.02	-.02	-.01	.02	.03	.00	.01	.09	.04	.05	.03	.03	.12	-.03	-.12	.10	-.09	-.14

Notes. Residuals larger than .1 are shown in bold.

APPENDIX 2: Supplementary table for chapter 5.

Table. Standardised regression coefficients for path models in chapter five controlling for the effects of socioeconomic deprivation, for whole sample and by gender.

Hypothesis/Model Path	Whole sample		Boys only		Girls only	
	β	p	β	p	β	p
Hypothesis 1. Longitudinal association between maternal depressive symptoms and children's academic attainment.						
MD → AA	-.09	.017	-.06	.188	-.14	.018
SED ↔ MD	.16	.001	.08	.228	.24	<.001
SED → AA	-.22	<.001	-.27	<.001	-.20	.003
Hypothesis 2. Self-control as a mediator of the association between maternal depressive symptoms and children's academic attainment.						
MD → AA	-.08	.046	-.05	.301	-.13	.033
MD → SC	-.11	.019	-.12	.064	-.07	.268
SC → AA	.16	<.001	.16	<.001	.13	.001
SED ↔ MD	.17	.001	-.08	.236	.25	<.001
SED → SC	-.06	.236	-.02	.724	-.10	.159
SED → AA	-.22	<.001	-.25	<.001	-.19	.004
Hypothesis 3. Maternal parenting and self-control as mediators of the association between maternal depressive symptoms and children's academic attainment.						
MD → AA	-.08	.046	-.06	.270	-.12	.071
MD → MH	.06	.165	.01	.869	.10	.139
MD → MW	-.10	.030	-.08	.294	-.13	.059
MH ↔ MW	-.39	<.001	-.32	<.001	-.46	<.001
MH → SC	-.36	<.001	-.38	<.001	-.30	<.001
MW → SC	.11	<.001	.10	.003	.15	.001
SC → AA	.16	<.001	.15	<.001	.14	<.001
SED ↔ MD	.17	.001	.08	.199	.24	<.001
SED → MH	.01	.811	-.02	.698	.07	.275
SED → MW	-.07	.083	-.05	.411	-.09	.169
SED → SC	-.06	.184	-.05	.376	-.07	.303
SED → AA	-.21	<.001	-.25	<.001	-.19	.016
Hypothesis 4. Paternal parenting and self-control as mediators of the association between maternal depressive symptoms and children's academic attainment.						
MD → AA	-.09	.028	-.06	.186	-.13	.053
MD → PH	.14	.005	.19	.004	.05	.446
MD → PW	-.09	.065	-.12	.077	-.04	.497
PH ↔ PW	-.43	<.001	-.37	<.001	-.48	<.001
PH → SC	-.31	<.001	-.29	<.001	-.29	<.001
PW → SC	.16	<.001	.24	<.001	.08	.090
SC → AA	.16	<.001	.15	<.001	.14	<.001
SED ↔ MD	-.20	<.001	.08	.244	.23	.001
SED → PH	.02	.774	-.05	.479	.11	.194
SED → PW	-.06	.275	.07	.200	-.20	.010
SED → SC	-.06	.172	-.06	.296	-.07	.297
SED → AA	-.20	<.001	-.25	<.001	-.16	.056

Notes. MD=maternal depressive symptoms; SC=child's self-control; AA=child's academic attainment; MH=maternal hostility; MW=maternal warmth; PH=paternal hostility; PW=paternal warmth; SED=socioeconomic deprivation; →=regression path; ↔=correlation.

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