

Temperament and personality correlates of preschoolers' behavioral adjustment

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TEMPERAMENT AND PERSONALITY CORRELATES OF PRESCHOOLERS' BEHAVIORAL ADJUSTMENT

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ABSTRACT

The main goal of this thesis is to contribute to the child development literature about how temperamental predispositions (operationalized as effortful control and surgency) and the personality dimension of agreeableness affect behavioral adjustment (operationalized as adaptive skills and externalizing problems) using a sample of 200 preschoolers (110 boys and 90 girls) from Malaysia. The purpose of the present study is twofold. First, it is to evaluate the convergent and discriminant validity of parent-, teacher-, and observer ratings of two of Behavioral Assessment System for Children-2's composite scales—Adaptive Skills and Externalizing Problems, using established validation procedures (i.e., multitrait-multimethod approach and confirmatory factor analysis). Second, the present study sought to determine if agreeableness was a mediating variable in the relations between temperament predispositions and behavioral adjustment. The findings suggest that parent ratings, in comparison with teacher- and observer ratings, have a better combination of convergent and discriminant validity. Teacher ratings and observer ratings, on the other hand, demonstrated mid-level validity. Consequentially, only parent ratings on adaptive skills and externalizing problems were used for all subsequent analyses. Structural equation modeling was used to examine the direct and indirect relations among study constructs. As expected, effortful control was positively associated with agreeableness and adaptive skills but negatively associated with surgency and externalizing problems. Consistent with the predictions, surgency was positively associated with externalizing problems but negatively associated with agreeableness. In addition to these direct associations between effortful control and surgency and adaptive skills and externalizing problems, agreeableness was a significant partial mediator in the

relations between effortful control and surgency, and externalizing problems.

Agreeableness also emerged as a significant partial mediator in the relation between effortful control and adaptive skills, but not for the relation between surgency and adaptive skills. This thesis contributes to the body of work on early childhood development in at least three ways. First, the present study examined associations between constructs of interest using a preschool sample from Malaysia, thus offering useful information and extending the generalizability and credibility of Rothbart's temperament model. Second, it lends support to recent theoretical and empirical work on culture and early childhood development. Third, the present study's findings have implications for prevention and intervention efforts that target agreeableness.

Collectively, present findings provide a better understanding for the task of delineating the pathways through which preschoolers' individual differences contribute to positive adaptation (aspects of adaptive skills) and the emergence of psychopathology (aspects of externalizing problems). Grounded in the literature on personality psychology, specifically theory and research on early childhood development, the present study also suggests that the pathway from what could be considered as more enduring temperament predispositions to preschoolers' behavioral adjustment is an indirect one—that is, temperament predispositions can affect behavioral adjustment through the personality dimension of agreeableness which could be modified through intervention efforts.

CHAPTER ONE

INTRODUCTION

1.1 Overview

If children grew up according to early indications, we should have nothing but geniuses.—John Wolfgang von Goethe

I have seen children successfully surmount the effects of an evil inheritance. That is due to purity being an inherent attribute of the soul.—Mahatma Gandhi

A key task for preschoolers (age range from 4 to 6 years) is learning how to manage and adjust to various social interactions with peers in the preschool setting (Blair, Denham, Kochanoff, & Whipple, 2004). Preschoolers' adjustment is an outcome resulting from complex systems with conditions that interact with a range of individual characteristics (Huang, 2010). Notably, one's effective coping strategies and adequate regulation of emotions of self and others are essential for his or her behavioral adjustment. Behavioral adjustment refers to a wide repertoire of skills needed for smooth social-behavioral functioning such as development and maintenance of social relationships (Bates, 1989; Blair et al., 2004; Eisenberg et al., 2002). Moreover, Denham et al. (2002) take the position that behavioral adjustment and regulation during preschool relates to varied outcomes in both individuals' contemporaneous and later social development. For example, a longitudinal study showed that positive social functioning was predicted by high levels of regulation, from 4 to 10 years old (Murphy, Eisenberg, Fabes, Shepard, & Guthrie, 1999). Taken together, it is crucial that researchers promote social competence in an attempt to prevent educational and psychological maladjustment among preschoolers.

As previously mentioned, behavioral adjustment refers to a wide array of social-behavioral functioning skills that comprise both positive and negative dimensions. This includes critical positive social and adaptive skills, as well as negative behaviors encompassing externalizing and internalizing problems (Bates, 1989). Negative behavior in preschoolers can be distinguished into internalizing problems, which reflect the preschooler's internal distress (e.g., anxiety, depression, and somatisation) and externalizing problems, which reflect the preschooler's conflict with others and other acting-out behaviors (e.g., aggression and hyperactivity). When investigating internalizing and externalizing behavior problems in preschoolers, one crucial issue that must be addressed is that of measurement. It is acknowledged that young preschoolers do not have the requisite self-reflective skills to rate themselves on behavioral assessments (McAdams & Olson, 2010). In the present study, we did not include internalizing problems for this main reason. According to Achenbach and Edelbrock (1978), a central characteristic of the internalizing problems is the non-disruptive nature of the child's behavior or sometimes referred to as "overcontrolled" behavior—he or she tends to monitor his or her own actions to excess, and as a result, his or her problems are not marked by disruptive acting-out behavior and may easily go unnoticed (Reynolds & Kamphaus, 1992). As such, information pertaining to internalizing problems may be best identified through self-report when children are older (Watkins, 2007). Our present study consists of a sample of 200 preschoolers (aged 4 to 6) and we chose to focus only on behaviors that can be easily and behaviorally observable by significant others.

For many children, the first socialization experience outside of the home is the preschool—an important platform for learning social skills and social acceptance (Eisenberg et al., 2002; Mobley & Pullis, 1991; Spanjers, Burns, & Wagner, 2008).

Mounting evidence suggests that preschoolers' behavioral adjustment could be observed within a preschool context (Eisenberg, Fabes, Murphy, Maszk, et al., 1995). In a daily preschool curriculum, preschoolers have to learn many skills such as regulating their initial reaction of distress, for example, when a peer approaches and plays with their toys without permission, sharing toys and game space, playing in cooperation with peers, and making friends (Hill-Soderlund & Braungart-Rieker, 2008). During naturalistic free play sessions, a host of aggression subtypes were observed to be displayed (i.e., physical, verbal, and relational) and received by preschoolers resulting from peer interactions (Ostrov & Keating, 2004). Indeed, recent investigations have begun to advance the notion that preschoolers' success in socialization experiences is rooted in their ability to regulate attentional processes (aspects of temperament based predispositions). If, however, preschoolers fail to develop attentional experiences adequately, they may be at risk of both internalizing and externalizing problems (Kivisto, 2011). Both cross-sectional and longitudinal research findings suggest that difficulties with attentional regulation predate the development of conduct disorder and mood disorder (e.g., Oldehinkel, Hartman, De Winter, Veenstra, & Ormel, 2004). It is important, therefore, to deeply consider the merits of a theoretical framework of the developmental process from temperament to personality psychology, and not just of temperament dispositions or of personality in isolation.

Temperament is defined as a "biological or bio-behavioral sets of traits" rooted in socialization contexts (Nigg, 2006, p. 395). On the other hand, personality psychology addresses views of human nature and individual differences—partly about what makes everyone alike and partly about what makes people vary from each other (Carver & Connor-Smith, 2010). Temperament and personality have been regarded as

distinct domains (Rothbart & Bates, 2006; Nigg, 2006). According to Nigg (2006), temperament refers to a more constitutionally-based behavioral style (e.g., intensity, tempo, and rate of activity) and personality refers to a more complex domain of psychosocially-shaped behavioral and cognitive preferences. Differences in constructs notwithstanding, temperament and personality are of vital importance in determining preschoolers' behavioral adjustment. They direct the way a preschooler's thinks and acts. In light of this, the interplay between temperament predispositions and personality is also reviewed with respect to its effect on behavioral adjustment.

Rothbart's seminal work on the refinement of basic dimensions of temperament has been prominent in influencing research on individual differences and its effects on early childhood (e.g., Posner & Rothbart, 2000; Rothbart, 2007; Rothbart, Ellis, Rueda, & Posner, 2003). Indeed, different broad dimensions of temperament may have much to offer to our understanding of psychopathology (Rettew & McKee, 2005). Putnam, Ellis, and Rothbart (2001) have developed a series of questionnaires pertaining to child temperament. These include the Infant Behavior Questionnaire-Revised (IBQ-R), the Early Childhood Behavior Questionnaire (ECBQ), and the Children's Behavior Questionnaire (CBQ). Using the aforementioned questionnaires, Putnam et al. (2001) examined consistencies and differences vis-à-vis temperament across life span in early childhood. Factor analytic work by Putnam et al. (2001) found three broad factors namely effortful control, surgency, and negative affectivity. In our study, we focus on two aspects of temperament that may be particularly important in the prediction of adaptive skills and externalizing problems: effortful control and surgency. The third broad factor, negative affectivity, refers to one's sadness, fear, anger, discomfort, and soothability and is omitted from the present study because temperamental fearfulness or behavioral inhibition, which contains elements

of negative affectivity, tends to be associated more with internalizing problems than externalizing problems (Rettew & McKee, 2005; Zentner & Bates, 2008), and the key focus of this thesis is to examine externalizing problems. In Putnam et al.'s (2001) study, a separate affiliativeness factor (comprising affiliation, perceptual sensitivity, and low intensity pleasure) was also obtained. Although there has been a recent increase on the topic of affiliative behaviors, the field is still in its infancy. Like negative affectivity, affiliation does not have strong links with externalizing problems which is a key focus of this thesis (De Pauw & Mervielde, 2010). Thus, we did not include affiliation in the present study.

In his neuro-psychological model of brain functioning, Gray's (1987) proposes two prominent concepts; a behavioral inhibition system (BIS) and a behavioral activation system (BAS). A detailed discussion pertaining to these two behavioral systems is presented in Chapter 2. Different preschoolers may respond to similar environment tasks in predictably divergent ways, suggesting that BIS and BAS activations play an important role in preschoolers' successful and maladaptive behavioral outcomes (Oldehinkel et al., 2004). It has been presumed that effortful control and surgency can be described in terms of inhibition and activation of behavior, respectively. Indeed, a large body of empirical work on child psychopathology continues to lend further support to these theoretical models (e.g., Gray, 1987; Rothbart, Ahadi, & Evans, 2000).

Extant research findings appear to demonstrate that effortful control and surgency affect his or her behavioral adjustment across age groups (6 to 7 years; Ahadi, Rothbart, & Ye, 1993) in both normative (e.g., Cumberland-Li, Eisenberg, Reiser, 2004; Hughes & Shewchuk, 2012) and clinical populations (e.g., Adamek, Nichols, Tetenbaum, Bregman, Ponzio, & Carr, 2011; Martel, Gremillion, & Roberts, 2012).

Preschoolers' social skills are indicative of both constructive coping and attentional regulation (aspects of effortful control), which are crucial to preschoolers' succeeding at this period's key social developmental tasks (Denham et al., 2002). On the other hand, poor self-regulation and high emotional reactivity (aspects of surgency) contribute to the development and expression of negative adjustment (Martel, 2009). In other words, negative behavioral adjustment could reflect a negative or poor self-regulation (aspects of effortful control) which hinders the development of skills in preschoolers (Kerr, Lunkenheimer, & Olson, 2007). The application of Rothbart's temperament model suggests that one's temperamental tendencies (in particular, effortful control and surgency) could play a vital role in predicting his or her social adjustment during early childhood (Coplan & Armer, 2007; Spinrad et al., 2004).

Researchers need to better understand the different temperament factors that predict behavioral adjustment in young children. In addition, personality factors are also needed to distinguish between different behavioral outcomes (Oldehinkel et al., 2004; Spinrad et al., 2006). Existing personality measures in the literature can be evaluated in terms of global and specific personality constructs. Global personality constructs are more inclusive, general, and abstract; in contrast, specific personality constructs tend to be more concrete and have specific behavioral connotations (Ones & Viswesvaran, 1996). With respect to the measurement model in structural equation modeling, global constructs emerge from a combination of the specific components and global constructs are defined as the variance shared by the specific components (Ones & Viswesvaran, 1996). For example, each of the Big Five dimensions of personality is a global personality trait. Being agreeable is a global personality trait, whereas being compliant is a specific trait (Ones & Viswesvaran, 1996).

Ample evidence suggests that global personality traits are preferred over specific traits because they have a wider scope of coverage and have more exploratory power (Carver & Connor-Smith, 2010; Ones & Viswesvaran, 1996). Measurement experts argue that the use of a global construct of agreeableness for a broad assortment of criteria varying in specificity is preferred over the use of the two specific constructs of agreeableness such as compliance and altruism, in which case no substantial improvements in prediction were found (Ones & Viswesvaran, 1996; Soto & John, 2009). Indeed, there is growing evidence for this assertion that agreeableness could add incremental utility to the prediction of behavioral functioning (Graziano, Jensen-Campbell, & Hair, 1996; Jensen-Campbell & Graziano, 2001). Therefore, it is essential to examine the contribution of a broad personality dimension such as agreeableness in explaining behavioral adjustment (in particular, adaptive skills and externalizing problems), as well as to examine its mediating role between temperament predispositions and behavioral adjustment, a point taken up for discussion subsequently (please see Chapter 2 for an extensive review).

A review of temperament and personality literature indicates that relations between temperamental predispositions (in particular, effortful control and surgency), personality dimension of agreeableness, and behavioral adjustment (in particular, adaptive skills and externalizing problems) have been studied primarily in the United States (e.g., Eisenberg, Pidada, & Liew, 2001). Compared to Western individualistic cultures, Southeast Asian culture has been characterized as a relatively collectivistic culture (Oyserman, Coon, & Kemmelmeier, 2002) in which the individual's conformity to societal and in-group rules are highly valued (Huang, 2010). Thus, the ability to inhibit one's dominant responses or behavioral tendencies (aspects of effortful control) to behave in a socially appropriate manner is paramount. Malaysia is

a pluralistic society of immigrants from China, India, and Indonesia. The current third to fifth generation immigrants are characterized by closely bonded ethnic groups, divided geographically and socially by culture, language, religion, trade, and social class (Chan, 2011). To this end, it appears that one's efforts to maintain his or her positive relationships for peaceful coexistence and to keep close cooperation among different ethnic groups in Malaysia is therefore of great importance. Moreover, previous studies have examined these constructs of interest recruiting either school-aged children or adolescents (Helmsen, Koglin, & Petermann, 2012). Therefore, it is of great interest to the present study to examine the relations between temperamental predispositions (in particular, effortful control and surgency), personality factors (such as agreeableness) and behavioral adjustment (in particular, adaptive skills and externalizing problems) using a sample of preschoolers from Malaysia.

In summary, the main goal of this thesis is to contribute to the empirical literature about how temperamental predispositions (in particular, effortful control and surgency) and the personality dimension of agreeableness affect preschoolers' behavioral adjustment (in particular, adaptive skills and externalizing problems). To date, most of the research focusing on these constructs of interest has primarily examined the direct links between these constructs rather than the underlying processes. For example, although relations between regulatory abilities (based on temperament predispositions) and behavioral adjustment have been reported, the mechanisms supporting these are not well-understood. Thus, research is still needed to examine the mediational linkages among temperamental predispositions, personality factors, and preschoolers' behavioral adjustment. Within the framework of the five-factor dimension of personality, the most consistent associations have been found for agreeableness. For example, a child's level of agreeableness affects his or her social

interactions through a variety of behavioral styles and patterns (Bettencourt, Talley, Benjamin, & Valentine, 2006; Miller, Lynam, & Leukefeld, 2003). From a personality developmental perspective, it is plausible that agreeableness could be a potential mediator of the relation between temperamental predispositions and behavioral adjustment. Specifically, the present study examined four underlying mechanisms (all via agreeableness): (a) effortful control and adaptive skills, (b) effortful control and externalizing problems, (c) surgency and adaptive skills, and (d) surgency and externalizing problems. To facilitate visualization of these hypothesized relationships, it would be helpful to refer to Figure 1 (page 16) and Figure 2 (page 17).

1.2 Definition of Terms

It is important to clarify definitions of study variables before proceeding to discuss the rationale for research questions and hypotheses. As part of this discussion, all study variables are defined both conceptually and operationally in terms of how they are measured. The full definitions and the instruments and procedures used to assess these dimensions are described in more detail in Chapter 2 and Chapter 4, respectively.

Behavioral adjustment is a broad construct that encompasses a wide range of functioning that includes positive and negative dimensions of child behavior (Bates, 1989). The Behavior Assessment System for Children, Second Edition (BASC-2; Reynolds & Kamphaus, 2004) was used to measure behavioral adjustment. For the purposes of this study, only two composite scales namely Adaptive Skills and Externalizing Problems were used. Additionally, a momentary time sampling procedure was implemented to assess preschoolers' adaptive skills and externalizing problems across three settings.

Effortful control is defined as the efficiency of executive attention and this includes the ability to inhibit a prevailing response and/or to trigger a subdominant response, to plan, and to notice errors (Rothbart & Bates, 2006). On the other hand, *surgency*, also known as extraversion to some researchers, signals the sensitivity to hints of rewards or termination of punishment (Eisenberg, Haugen, et al., 2010; Putnam & Rothbart, 2006). These two temperamentally based dispositions were measured by Child Behavior Questionnaire (CBQ; Putnam & Rothbart, 2006). Due to the focus of our study, only the following subscales were used: Effortful Control and Surgency.

Agreeableness expresses one's positive orientation toward social interactions and interpersonal relationships (Graziano & Eisenberg, 1997). In the present study, preschoolers' agreeableness was measured by the Big Five Inventory (BFI; John & Srivastava, 1999). In structural equation modeling, the "two indicator rule" needs to be adhered to. The rule implies that each latent variable should have at least two indicators for model identification (Kline, 2010). In this regard, the present study needs at least two indicators for agreeableness latent construct. For both practical and statistical considerations, we collected parent-and teacher ratings of agreeableness.

1.3 Research Questions

The primary goal of the current study was to systematically examine relations among preschoolers' temperament predispositions (i.e., effortful control and surgency), agreeableness, and behavioral adjustment (i.e., adaptive skills and externalizing problems). Prior to examining the research questions and hypotheses, the present study examined the comparative strengths of three informants (i.e. parent-, teacher-,

and observer ratings) of the two broad domains of behavioral adjustment—adaptive skills and externalizing problems.

The research questions are as follows.

Research Question for Psychometric Examination of the BASC-2 Composite Scale

What is the convergent and discriminate validity of the BASC-2 composite scales—Adaptive Skills and Externalizing Problems?

Research Question 1

What is the relation between effortful control and surgency?

Research Question 2a

How does effortful control relate to adaptive skills and externalizing problems?

Research Question 2b

How does surgency relate to adaptive skills and externalizing problems?

Research Question 3

How are effortful control and surgency related to agreeableness?

Research Question 4

How does agreeableness relate to adaptive skills and externalizing problems?

Research Question 5a

Does agreeableness mediate the relation between effortful control and behavioral adjustment?

Research Question 5b

Does agreeableness mediate the relation between surgency and behavioral adjustment?

Both diagrams show the pattern of linkages that was specified and predicted among the investigated variables. In Figure 1, line 1 represents the relation between effortful control and surgency. The direct effects of effortful control and surgency on adaptive skills are presented in two bold lines—2a1 and 2b1, respectively.

The present study focused on the relation between temperament predispositions, agreeableness, and adaptive skills. Three bold lines represent the direct effects: line 3a indicates that effortful control will predict agreeableness, line 3b indicates that surgency will predict agreeableness, and line 4 indicates that agreeableness will predict adaptive skills.

In addition to these hypothesized direct effects of effortful control and surgency on skills, this study predicts that agreeableness will mediate the relation between effortful control and surgency on adaptive skills. The indirect effects of effortful control and surgency on adaptive skills are represented using dashed lines. Line 5a1 indicates that effortful control will predict adaptive skills through agreeableness and line 5b1 indicates that surgency will predict adaptive skills through agreeableness.

In Figure 2, line 1 represents the relation between effortful control and surgency. The direct effects of effortful control and surgency on externalizing problems are presented in two bold lines—2a2 and 2b2, respectively.

The present study also focused on the relation between temperament predispositions, agreeableness, and externalizing problems. Three bold lines represent the direct effects: line 3a indicates that effortful control will predict agreeableness, line

3b indicates that surgency will predict agreeableness, and line 4 indicates that agreeableness will predict externalizing problems.

In addition to these hypothesized direct effects of effortful control and surgency on externalizing problems, this study predicts that agreeableness will mediate the relation between effortful control and surgency on externalizing problems. The indirect effects of effortful control and surgency on externalizing problems are represented using dashed lines. Line 5a2 indicates that effortful control will predict externalizing problems through agreeableness, line 5b2 indicates that surgency will predict externalizing problems through agreeableness.

1.4 Significance of the Study

While there are clearly strengths in the use multiple informants for preschoolers' behavioral adjustment, when resources are limited, researchers are often urged to employ empirical evidence to make the best-informed decisions (Spangler & Gazelle, 2009). Published materials on how to select potential informants in the research field are limited. Thus, this study provides an empirical examination of the comparative strengths of three informants of the two broad domains of behavioral adjustment—adaptive skills and externalizing problems. The present study's results could serve as possible practical guidelines to researchers when choosing potential informants pertaining to preschoolers' behavioral adjustment.

There is a growing need for psychological research conducted in Southeast Asia. Research topics investigating theoretically complex domains of behavioral adjustment such as adaptive skills and externalizing problems have indeed been receiving greater attention. This study may, therefore, represent an initial effort at addressing this need to investigate deeper into differential correlates of behavioral

adjustment and to assess its applicability in the Southeast Asian context. It also appears that previous studies have examined these constructs of interest in either school-aged children or adolescents (Helmsen et al., 2012). Therefore, the present study examined relations between temperamental predispositions (in particular, effortful control and surgency), personality factors (such as agreeableness) and behavioral adjustment (in particular, adaptive skills and externalizing problems) using a sample of preschoolers from Malaysia.

1.5 Summary

Chapter 1 describes the background and rationale for this thesis and addresses significant gaps in previous research concerning temperamental predispositions, personality factors, and behavioral adjustment. All constructs of interest are briefly reviewed. Research questions along with significance of the present study are also discussed. The rest of this thesis is organized as follows. In the next chapter we provide a relevant literature review, building a case for the research questions and hypotheses to be examined in the study. In Chapter 3, we describe an examination of convergent and discriminant validity for two of BASC-2's composite scales selected for use in this thesis—Adaptive Skills and Externalizing Problems. The primary goal was to examine agreement among parent-, teacher-, and observer reports of adaptive skills and externalizing problems using established approaches such as MTMM and confirmatory factor analysis. Chapter 4 outlines the methodology and analytic techniques used in the study. In Chapter 5 we present descriptive statistics, intercorrelations among study variables, and results associated with the corresponding research hypotheses. In particular, this chapter organizes all the findings by research questions. The last part of the thesis, Chapter 6, summarizes and discusses the

findings of the thesis, highlights potential limitations of this methodology, and outlines some important implications and interesting extensions for future research.

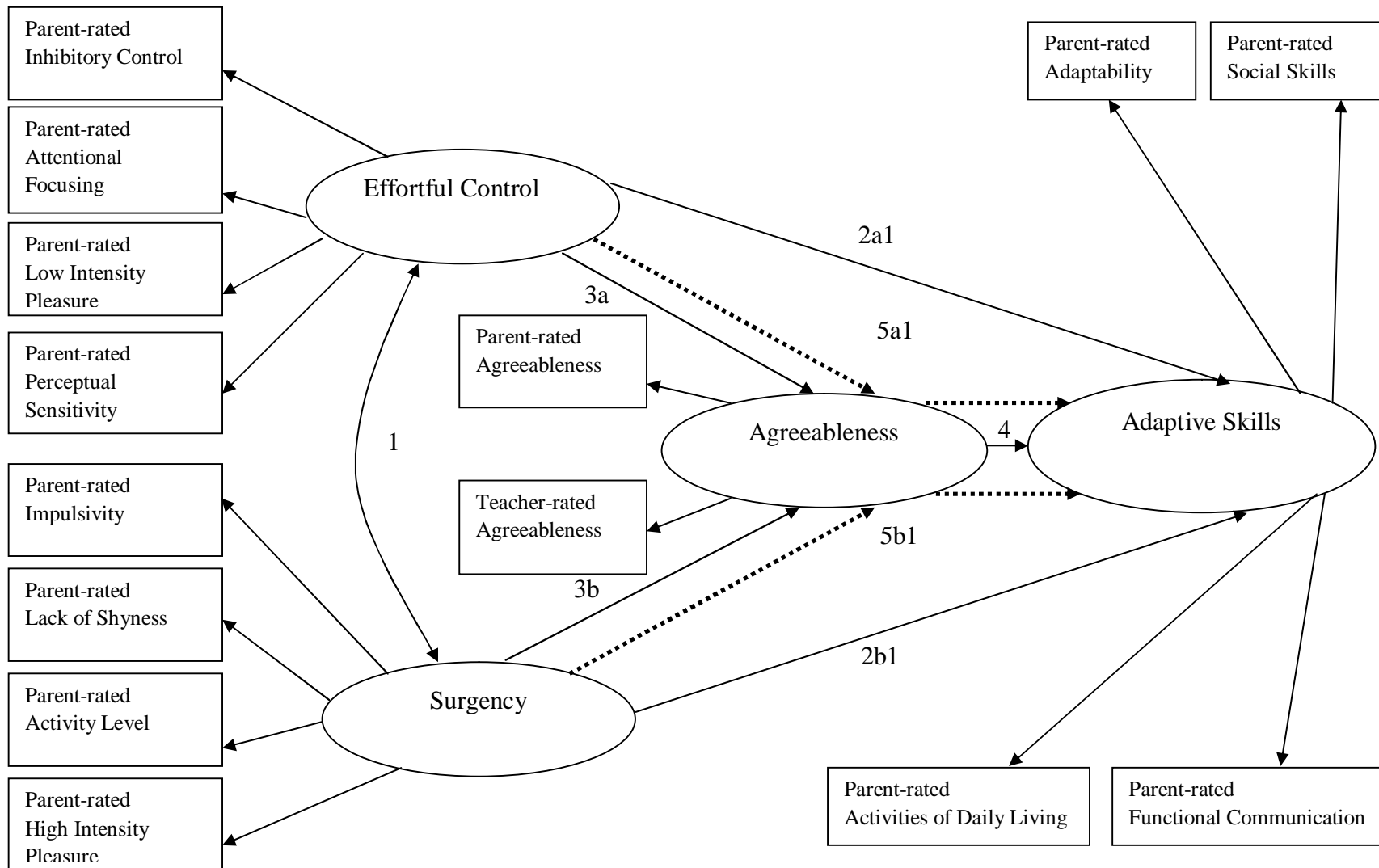


Figure 1. Hypothesized model linking effortful control and surgency to agreeableness and adaptive skills.

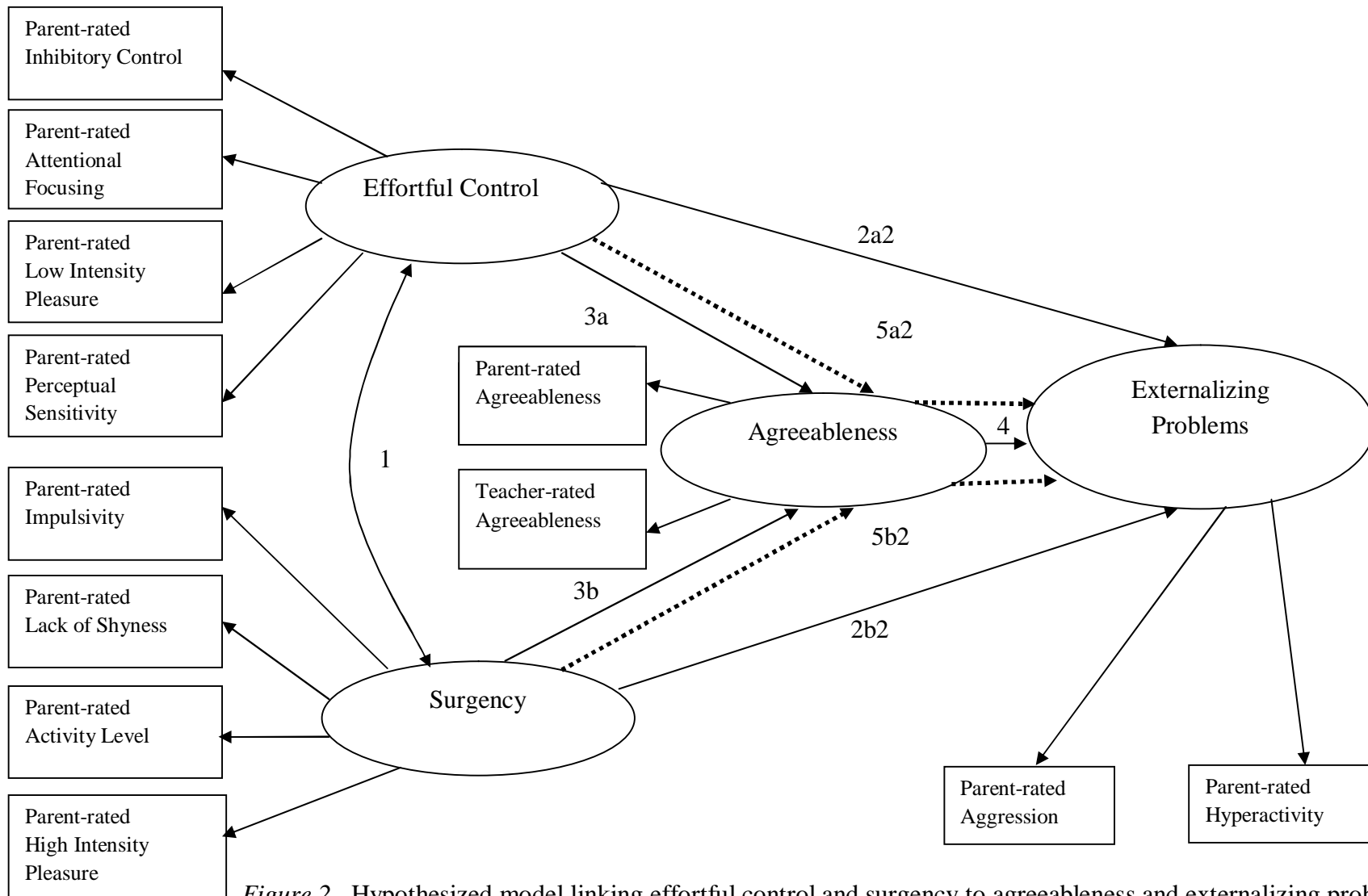


Figure 2. Hypothesized model linking effortful control and surgency to agreeableness and externalizing problems.

CHAPTER TWO

LITERATURE REVIEW

A review of the relevant literature suggests that different temperamental tendencies and personality factors have been associated with positive and negative behavioral adjustment in preschoolers. To posit that agreeableness mediate the relations between temperament traits and behavioral adjustment, it is necessary to first systematically demonstrate the relations between each pair of constructs. These relations are presented and discussed more in depth in the following sections. Section 2.1 reviews the relations between effortful control and surgency and provides the background for *Hypothesis 1*. Section 2.2 summarizes the relations between effortful control, surgency, and behavioral adjustment, which provides the background for *Hypotheses 2a1* and *2a2* (in particular, Section 2.2.1), and *Hypotheses 2b1* and *2b2* (in particular, Section 3.2.2). Section 2.3, which provides the background for *Hypotheses 3a* and *3b*, is an attempt to elaborate on the relation between effortful control, surgency, and agreeableness. Section 2.4 provides the literature review about the relation between agreeableness and behavioral adjustment, which is the background for *Hypothesis 4*. Section 2.5 explains the logic of agreeableness as a mediator between temperament and behavioral adjustment and provides the background for *Hypotheses 5a1*, *5a2*, *5b1*, and *5b2*. Following these sections, a summary is presented in Section 2.6.

2.1 Effortful Control and Surgency

The study of temperament and by extension, personality, is currently a topic of interest and activity within individual differences research. Current theories of child temperament and emotion regulation focus on the dual role of regulation and reactivity

(Eisenberg, Losoya, Fabes, et al., 2001; Posner & Rothbart, 2000; Rothbart & Ahadi, 1994). Self-regulation is defined as a child's cognitive and emotional ability to react to a stimulus and the capacity to modulate and suppress his or her immediate stimulus, allowing him or her to anticipate possible consequences during social interactions (Dennis & Hajcak, 2009; Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009; Rothbart, 2004b). Reactivity is defined as a child's motor arousability, emotionality, and orientation to sensory input (Litty, 2007; Rothbart, 2004a; Rothbart, Ahadi, Hershey, & Fisher, 2001). As one might expect, the dual role of regulation and reactivity could play a significant role in predicting one's behavioral adjustment during his or her early childhood window.

In Gray's (1987) *neuro-psychological model* of brain functioning, he described effortful control and surgency in terms of inhibition and activation of behavior, respectively. Behavioral Inhibition System (BIS) shows the inhibition of behavior in novel situations and in the existence of cues signalling imminent punishment. On the other hand, Behavioral Activation System (BAS) generates instinctive and aggressive behavior and is sensitive to reward. A stronger BIS than BAS will increase the likelihood of the presentation of inhibited behavior. Likewise, a stronger BAS than BIS will result in behaviors sensitive to reward being initiated. Gray's view of the BIS and the BAS sheds light on the fundamental dimensions of child temperament. Both "relative overactivation" of the BIS and BAS could predict different areas of psychopathological problems (Oldehinkel et al., 2004, p. 422). To paraphrase Oldehinkel et al. (2004), a child's externalizing behaviors, for example, could be explained by (a) an underactive BIS, which may influence the BAS to engage negative behavior that would usually be restrained by the BIS, (b) an overactive BAS, which may overwhelm the BIS, or (c) both.

Separately, Rothbart and colleagues developed the *temperament model* (see Rothbart et al., 2000, for a review), which is a multidimensional representation of constitutionally based individual differences in self-regulation (aspects of effortful control) and reactivity (aspects of surgency). Broadly speaking, there are two control/regulation-related temperamentally based dispositions that are particular of interest to behavioral adjustment: effortful control and surgency. Effortful control reflects to one's attentional flexibility needed to react to negative feelings in others and to relate these feelings to responsibility for his or her actions (Rothbart & Bates, 2006). A number of indicators related to self-regulation such as voluntary attention, inhibitory control, and self-soothing have been conceptualized as major dimensions of effortful control, which is associated with the development of executive attention skills (Gartstein, Slobodskaya, Putnam, & Kinsht, 2009). Effortful control seems to have neural roots—a network involving areas of the prefrontal cortex, anterior cingulate, and basal ganglia is viewed to be most closely related to the functions of executive attention (Rothbart et al., 2003).

Surgency, on the other hand, reflects to one's high activity level arising from his or her constant exploration in the environment with disregard for social rules and regulations (Berdan, Keane, & Calkins, 2008). A few indicators related to reactivity such as impulsivity, lack of shyness, activity level, and high intensity pleasure have been conceptualized as major dimensions of surgency, which is associated with the arousal of sensation and excitement seeking (Putnam & Rothbart, 2006). To some extent, surgency could be considered analogues of Gray's "relative activation" of the BIS and BAS system (Oldehinkel et al., 2004, p. 422). Likewise, surgency seems to have neural roots—a network involving areas of the substantia nigra and ventral tegmental area are associated with surgency (Pickering & Gray, 1999).

Cumulative evidence suggests that behavioral adjustment involves at least two temperamental paths, one deriving from low fear response and one from either high incentive approach or high anger reactivity (Nigg, 2006). These temperamental paths encompass some of the basic dimensions of effortful control and surgency. Therefore, in the present study, we focused on two aspects of temperament that may be particularly important in preschoolers' behavioral adjustment: effortful control and surgency. In Rothbart's theory of temperament (Ahadi et al., 1993; Putnam & Rothbart, 2006; Rothbart et al., 2001), effortful control and surgency represent one's regulation of arousal and response to new information (specifically, one's tendency to withdraw versus one's tendency to approach, respectively). These two mechanisms are crucial for successful completion of the demanding tasks (Rothbart et al., 2001). As previously mentioned, reactivity (surgency) refers to the arousability of the motor, affective, and sensory response system. Self-regulation (effortful control) refers to processes such as attentional focusing and inhibitory control, which can serve to modulate (facilitate or inhibit) reactivity, suggesting that effortful control and surgency could be negatively correlated. More importantly, these two aspects of temperament could be included in a broad framework which allows us to consider both the initial state of individual differences and the early development of attentional and emotional systems basic to preschoolers' subsequent behavioral adjustment such as adaptive skills and externalizing problems (Rothbart, 2004a, 2004b; Rothbart et al., 2001).

There is rich literature examining the relation between effortful control and surgency. Cumberland-Li et al. (2004) found that effortful control was negatively correlated to surgency in a sample of 82 Western preschoolers. Similar results were reported elsewhere. Ahadi et al. (1993) found that effortful control was negatively correlated with surgency in a school sample (age range from 6 to 7 years) in China. In

a more recent study, Hughes and Shewchuk (2012) documented a similar pattern of relationship in a sample of 639 preschoolers from low-income minorities. Consistent findings emerged in a neuro-typical children sample. For example, Adamek et al. (2011) found that effortful control was negatively associated with surgency in a sample of 111 children with Autism Spectrum Disorder (ASD). Likewise, Martel et al. (2012) documented a similar pattern of relationship between effortful control and surgency in sample of 109 preschoolers with Disruptive Behaviors Disorders (DBD), particularly those with Oppositional-Defiant Disorder (ODD) and Attention-Deficit Hyperactivity Disorder (ADHD). Research findings across multiple studies appear consistent. Self-regulation could facilitate or inhibit reactivity, suggesting that effortful control and surgency would likely be negatively correlated. Based on this, the following hypothesis was suggested:

Hypothesis 1: Effortful control is expected to be negatively related to surgency.

2.2 Effortful Control, Surgency, and Behavioral Adjustment

2.2.1 Effortful Control and Behavioral Adjustment

Effortful control has been linked to important developmental outcomes, both positive and negative, including adaptive skills and externalizing problems (Eisenberg, Fabes, Guthrie, & Reiser, 2000; Muris & Ollendick, 2005; Rothbart, 2007). Effortful control has been found to be positively correlated with children's social functioning (Zhou, Eisenberg, Wang, & Reiser, 2004), coping efficacy (Zhou et al., 2008), school readiness (Nathanson, Rimm-Kaufman, & Brock, 2009), and adaptive skills (Dennis, Brotman, Huang, & Gouley, 2007), suggesting that a higher level of effortful control

enables children to inhibit impulses and to regulate socially inappropriate behavior in response to environmental demands (Karreman, van Tuijl, van Aken, & Deković, 2009). Similar results were reported elsewhere. Zhou et al. (2004), for example, examined relations among parenting styles, children's effortful control, and children's social functioning of first and second graders (7 to 10 years old; $N = 425$) in Beijing, China, and revealed that high effortful control uniquely predicted Chinese children's high social functioning. In a longitudinal study, Eisenberg, Liew, and Pidada (2004) examined relations of individual differences vis-à-vis temperamental regulation and emotionality in 6th grade Indonesian children's quality of socio-emotional functioning ($N = 112$) and found that high temperamental regulation was related to children's positive socioemotional functioning (e.g., social skills, adjustment, prosocial tendencies and peer liking, and sympathy). A review of the literature suggests that the relation between effortful control and positive behavior adjustment has not been well studied in a typically developing preschool sample (Espy, Sheffield, Wiebe, Clark, & Moehr, 2011), though this relationship has been studied in other age groups. Therefore, this makes the present study a timely one to conduct.

Effortful control has been found to be negatively correlated with externalizing problems (Spinrad et al., 2004; Zhou, Lengua, & Wang, 2009) and poor coping strategies for handling impulses and stresses in the environment (Karreman et al., 2009). In a separate study, Eisenberg et al. (2001) examined the relations of individual differences with respect to regulation and negative emotionality in third-grade Indonesian children's externalizing problem behavior ($N = 127$), and found that low dispositional regulation was related to children's high problem behavior. In a different cross-cultural study, Zhou et al. (2009) compared the relations of school-age children's effortful control and their externalizing problems and found that in both the Chinese

($N = 382$) and U.S. ($N = 322$) cultures, low effortful control was associated with high externalizing problems, although the relations were stronger in the Chinese sample than in the U.S. sample. Indeed, the findings reviewed here shed light that dysregulation will likely create a disruption and interfere with children's behavioral functioning (Myers & Morris, 2009). High levels of effortful control may increase adaptive skills and decrease externalizing problems. Based on the research reviewed so far, the following hypotheses were developed:

Hypothesis 2a1: Effortful control is expected to be positively related to adaptive skills.

Hypothesis 2a2: Effortful control is expected to be negatively related to externalizing problems.

2.2.2 Surgency and Behavioral Adjustment

Specific temperamental sub-traits are considered to predispose one's variations in motivational and attentional adaptations (Grist & McCord, 2010). In support of this premise, Bruce, Davis, and Gunnar (2002) found that children who are high in surgency, and low in shyness, display higher levels of activity level and impulsivity in response to novel social situations, such as entry into a new peer crowd. To facilitate integration of the multitude of constructs used to label surgency, some theorists have traced more similar sub-trait components emerging from factor analytic studies (De Pauw, Mervielde, & Van Leeuwen, 2009). Therefore, it can be seen that the temperament dimension of surgency reflects the enjoyment of intense play, high activity level, impulsivity, and lack of shyness. Thus, surgency is a higher order latent construct encompassing several different components (see Putnam & Rothbart, 2006,

for a review). While isolated components of surgency have been examined from time to time, surgency as a whole construct has not often been adequately studied.

One component of surgency, high impulsivity, has been found to be positively related to low behavioral control. High impulsivity in social situations may create conflict and stress. For example, the relations of impulsivity to externalizing problem behaviors were examined in a sample of 185 children aged 6 through 9 years (Eisenberg et al., 2005). Results found that impulsivity predicted stability in problem behavior status over 2 years. Likewise, high levels of impulsivity were associated with externalizing problems in a longitudinal study by Eisenberg et al. (2009). Another study that examined this issue with a clinical sample was completed by Eisenberg, Haugen, et al. (2010), who surveyed 467 children, some of whom were children of alcoholics (COA), and examined the relation between impulsivity and externalizing problems. They found that the relation between impulsivity and externalizing problems was significantly correlated in this clinical sample. The literature reviewed yielded consistent findings across both nonreferred, school-going, and clinical samples.

Another component of surgency that has been studied is the lack of shyness. Considerable evidence shows that lack of shyness was associated with a wide range of social functioning skills including poorer school adjustment, negative emotionality, and lower self-regulation (Coplan, Arbeau, & Armer, 2008; Eisenberg, Fabes, & Murphy, 1995; Eisenberg et al., 2004). Lack of shyness is associated with an exhibitory and approach regulation style (Eisenberg et al., 1995). In other words, a higher level of excitement in approaching new social situations could reflect one's lower level of shyness (henceforth referred to lack of shyness) or his or her relative strength of the BAS toward novel stimuli and reward cues (Eisenberg et al., 1995).

The overactivation of the BAS may be manifested in children's extreme high sociability, which in turn, is associated with a wide array of behavioral problems (Xu, Farver, Yu, & Zhang, 2009). Thus, it is reasonable to hypothesize such a link—preschoolers who are high in surgency, and thus low in shyness, may display low adaptive skills and more externalizing behaviors resulting from their tendency to act before thinking and to act in pursuit of personal gains.

Likewise, the temperamental characteristic of high intensity pleasure, which is one component of surgency has been related to the development of externalizing problems (Oldehinkel et al., 2004). Moreover, high activity level, which is another component of surgency, was associated with Attention-Deficit Hyperactivity Disorder (ADHD) in an elementary school sample (Bussing et al., 2003). A combination of impulsivity, lack of shyness, high intensity pleasure, and high activity level may inhibit the efforts of preschoolers to fulfil preschoolers' school and family responsibilities, thereby decreasing their positive social interactions with others. Surgency as a whole considered in this study may hinder preschoolers' adaptive skills. In contrast, surgency may facilitate preschoolers' externalizing problems. Thus, based on the relevant literature review, the following hypotheses were suggested:

Hypothesis 2b1: Surgency is expected to be negatively related to adaptive skills.

Hypothesis 2b2: Surgency is expected to be positively related to externalizing problems.

2.3 Effortful Control, Surgency, and Agreeableness

Extant research findings appear to support the associations between temperament and personality (e.g., Cumberland-Li et al., 2004). Preschoolers' who can regulate their attention and behavior have a tendency to be agreeable and a capacity toward adaptation in social interactions (Cumberland-Li et al., 2004). On the other hand, highly surgent preschoolers who are described as socially potent and who have less of a capacity for positive adaptation during conflict interactions—they have a tendency to be less agreeable (Eisenberg et al., 2007; Shiner, Masten, & Roberts, 2003). Within the framework of the five-factor model of personality, the most consistent associations between personality dimensions and behavioral outcomes have been found for agreeableness (e.g., Jensen-Campbell & Graziano, 2001). For example, in a meta-analysis based on data from 63 studies, Bettencourt et al. (2006) found that agreeableness significantly predicted different patterns of aggressive behavior under different social situations.

Given that agreeableness is associated with one's motives to maintain positive interpersonal relations (Jensen-Campbell & Graziano, 2001), this construct could facilitate temperamentally based dispositions (effortful control and surgency) in the prediction of behavioral adjustment. Therefore, two broad areas of research will be reviewed: (a) the relations of effortful control and surgency to agreeableness, and (b) the relation of agreeableness to behavioral adjustment. This line of inquiry is important, because it may enhance our understanding of the mechanisms involved—how temperamental predisposition exerts its influence by facilitating or inhibiting the ability to maintain positive relationships with others (agreeableness), which in turn, could predict a broad array of behavioral outcomes.

It is also important to note that examinations of specificity and generality concerning Big Five factors in collectivist and individualist cultures are central in cross-cultural studies (Benet-Martinez & John, 1998). The application of cross-cultural research could explain whether one's culturally specific dimension is associated with his or her unique cultural background (John, Naumann, & Soto, 2008). Each culture could shape a unique personality structure, compared with Anglo American culture, Spanish are less individualistic and more collectivist (Benet-Martinez & John, 1998). In such a collectivist culture, mutualism-and antagonism-related traits such as interdependence and achievement of goals, expression of positive emotions, and avoidance of interpersonal conflict are highly valued (Triandis, 2001). Taken together, this broad trait shapes a culture-level concept and is called *simpatia*, a need for positive interpersonal behaviors that encourage smooth and harmonious relationships (Benet-Martinez & John, 1998), which is truly unique to Spanish. Likewise, Malaysia, a collectivist society, is created as a result of peoples from diverse cultures, with diverse ethnicities, languages, and religions (Chan, 2011). It is reasonable to posit that one's efforts to maintain his or her positive relationships (i.e., core aspects of agreeableness) for familial and societal obligations and to meet the behavioral expectations of significant others in Malaysia are deemed important.

To this end, agreeableness may be a resilience factor to maintain positive relationships with others (Graziano et al., 1996; Jensen-Campbell & Graziano, 2001; Meier, Robinson, & Wilkowski, 2006; Onishi, Gjerde, & Block, 2001; Robinson & Wilkowski, 2006). For example, Torin, Graziano, Vanman, and Tassinary (2000) investigated the emotional processes beneath the five-factor dimension and found that agreeableness was a significant predictor of emotional experience and efforts to control emotion. Indeed, extant research findings appear to demonstrate that a child's

level of agreeableness affects his or her social interactions through a variety of behavioral styles and patterns (e.g., Gleason, Jensen-Campbell, & Richardson, 2004; Miller, Lynam, & Jones, 2008; Sneed, 2002), across different age groups (e.g., Saulsman & Page, 2004) in both normative (e.g., Shiner et al., 2003) and clinical populations (e.g., Huey & Weisz, 1997; Miller, Parrott, & Giancola, 2009; Ode & Robinson, 2009). For example, Gleason et al. (2004) found that agreeableness was negatively associated with aggressive behavior in a sample of 74 students, after controlling for effects of other personality dimensions and sex of participant.

In addition, agreeableness is a personality construct that researchers have argued to be part of a broader temperamental dimension of effortful control, which plays a crucial role in regulating children's concentration and behavior in response to social demands (Abe, 2005). Specifically, agreeableness encompasses the inhibition of one's negative emotions in social interactions; therefore, the early ability to regulate emotions affects one's ability to voluntarily regulate behaviors pertaining to situational demands over the course of development in later life (Abe, 2005). Hence, researchers posit that there is a continuum linking early temperamental dispositions (in particular, effortful control and surgency) to personality dimensions such as agreeableness (e.g., Cumberland-Li et al., 2004). For example, Jensen-Campbell et al. (2002) examined the relation between personality and self-regulation in a sample of college students ($N = 113$) and found effortful control is a common developmental substrate of agreeableness. In a separate but related study, Cumberland-Li et al. (2004) examined components of surgency to children's agreeableness and found that impulsivity for example, was negatively associated with agreeableness. As previously mentioned, impulsivity is one key component of surgency. Even though studies have not shown direct links between surgency as a higher order construct and agreeableness, it is

logical and plausible to hypothesize such a link, based on previous research (Abe, 2005; Cumberland-Li et al., 2004; Jensen-Campbell et al., 2002).

Hypothesis 3a: Effortful control is expected to be positively related to agreeableness.

Hypothesis 3b: Surgency is expected to be negatively related to agreeableness.

2.4 Agreeableness and Behavioral Adjustment

Agreeableness has been found to be related to both positive and negative adjustment. Specifically, agreeableness has been found to be related to positive behavioral adjustment such as adaptive skills (Graziano & Tobin, 2002), positive relationships with peers and teachers (Sneed, 2002), conflict management (Jensen-Campbell, Gleason, Adams, & Malcom, 2003) and empathy (Sneed, 2002).

Agreeableness has been found to be inversely related to negative behavioral adjustment such as conduct problems (Miller et al., 2003) and aggressive behaviors (Bettencourt et al., 2006). With respect to specific studies, Sneed (2002) examined the relations between agreeableness and children's social relationships in a sample of elementary students, and found agreeableness was positively correlated to social skills, empathy, and trust. A 25-year prospective study revealed that high-agreeable children had better school grades and fewer behavior problems than their low-agreeable counterparts (Laursen, Pulkkinen, & Adams, 2002). Consistent with previous findings, Miller et al. (2003) found that agreeableness was negatively related to stability, variety, and onset of conduct problems, aggression, and antisocial personality disorder symptoms. In a recent meta-analytic study that examined the relations between the personality facets and aggressive behavior, Bettencourt et al. (2006) found that low

agreeableness individuals were more likely to report destructive conflict resolution tactics (i.e., physical action, threats, and undermining others' self-esteem) compared with those high in agreeableness. Taken together, preschoolers who have higher levels of agreeableness show greater positive adjustment in social situations. Preschoolers who have lower levels of agreeableness tend to show greater externalizing problems (Cumberland-Li et al., 2004). Based on research reviewed thus far, the following hypothesis was developed:

Hypothesis 4: Agreeableness is expected to be positively related to adaptive skills and negatively related to externalizing problems.

2.5 Agreeableness as a Mediator between Temperament Predispositions and Behavioral Adjustment

Developmental literature has shown isolated links between temperamentally based dispositions (in particular, effortful control and surgency) and behavioral adjustment. There is some evidence that temperament predict numerous aspects of behavioral adjustment (such as adaptive skills and externalizing problems). Despite empirical evidence for a direct link between temperament traits and behavioral adjustment in some studies (e.g., Dennis et al., 2007; Eisenberg, Haugen, et al., 2010; Zhou et al., 2009), it is plausible that some preschoolers who managed to address risk factors associated with their temperament are well adjusted. Although the mechanisms are still unclear, these children are seemingly able to use social-personality resources (aspects of agreeableness) to redirect their temperamental predispositions and to engage in more appropriate behaviors (Berdan et al., 2008). A better understanding to delineate the different pathways through which preschoolers'

temperament predispositions influence positive and negative behavioral outcomes is deemed important. Following the logic outlined previously, agreeableness could be a potential mediator of the relation between temperamental predispositions (in particular, effortful control) and behavioral adjustment (such as adaptive skills and externalizing problems).

Hypothesis 5a1: Agreeableness is expected to mediate the link between effortful control and adaptive skills.

Hypothesis 5a2: Agreeableness is expected to mediate the link between effortful control and externalizing problems.

Based on previous findings and theoretical rationale, effortful control is expected to exert its influence on behavioral adjustment of preschoolers through the personality variable of agreeableness (e.g., Eisenberg et al., 2001; Ode & Robinson, 2007; Robinson & Wikowski, 2006). Likewise, surgency is expected to influence behavioral adjustment of preschoolers through the proposed mediator, agreeableness (e.g., Cumberland-Li et al., 2004). To date, there is limited information available on the links between effortful control and surgency to behavioral adjustment and the possibility that agreeableness may mediate the effects of temperamental traits on behavioral adjustment. We would like to test such a relationship. To make progress in this area of inquiry, these proposed mediational models are further examined in relation to the underlying mechanisms.

Hypothesis 5b1: Agreeableness is expected to mediate the link between surgency and adaptive skills.

Hypothesis 5b2: Agreeableness is expected to mediate the link between surgency and externalizing problems.

2.6 Summary

This chapter surveys the existing literature and highlights both direct and indirect effects of study variables. From a personality development perspective, we proposed two hypothesized models through which temperamental predispositions may affect preschoolers' behavioral adjustment via the mediating role of agreeableness. The first reflects the mediating role of agreeableness between effortful control (and separately, surgency) and adaptive skills. Specifically, *Hypothesis 5a1* proposes that agreeableness mediates the relation between effortful control and adaptive skills. On the other hand, *Hypothesis 5b1* proposes that the relation between surgency and adaptive skills is mediated by agreeableness. The second reflects the mediating role of agreeableness between effortful control (and separately, surgency) and externalizing problems. Specifically, *Hypothesis 5a2* posits that agreeableness mediate the relation between effortful control and externalizing problems. On the other hand, *Hypothesis 5b2* posits that the relation between surgency and externalizing problems is mediated by agreeableness. The construction of these models is based on existing theories and empirical findings gathered from the literature.

CHAPTER THREE

AN EXAMINATION OF THE CONVERGENT AND DISCRIMINANT VALIDITY OF THE BASC-2 COMPOSITE SCALES

Section 3.1 presents a detailed background for this chapter. Methodology including measures, observation procedure, and analytic techniques are presented under Section 3.2. In Section 3.3, we provide evidence of convergent and discriminant validity for two of BASC-2's composite scales selected for use in this study—Adaptive Skills and Externalizing Problems. Results obtained from multitrait and multimethod approach and confirmatory factor analysis are highlighted in Section 3.3.1 and Section 3.3.2, respectively. At the end of this chapter, a summary is presented in Section 3.4.

3.1 Background

There is growing interest in the use of valid and reliable tools as a means of identifying various forms of behavioral adjustment (Renk, 2005; Thomas, Shapiro, DuPaul, Lutz, & Kern, 2011). Indeed, a great number of direct (e.g., Child Observation Record, School Observation Measure, and Student Observation System) and indirect measures (e.g., Child Behavior Checklist, Eyberg Child Behavior Inventory, and Strengths and Difficulties Questionnaire) have been developed and used to evaluate preschoolers' behavioral adjustment. Direct measures assess behavior at the real time of its occurrence and typically employ observations; in contrast, indirect measures assess behavior at a time or place apart from its actual occurrence, and usually employ self-and informant reports obtained via checklists or rating scales (see Thomas et al., 2011 for a review).

Contemporary assessment of preschoolers' behavioral adjustment relies on one or three possible informants: parents, teachers, and observers (Spilt, Koomen, Stoel, Thijs, & van der Leij, 2011). As aptly mentioned by Spangler and Gazelle (2009), each type of informant has strengths and shortcomings: (a) strengths of parent ratings include broad knowledge of the preschooler's history, whereas shortcomings include limited access to preschool and biases pertaining to the role of parent, (b) strengths of teacher ratings include access to preschool setting and familiarity with a relatively large amount of age mates as a standard benchmark for various behavioral characteristics whereas shortcomings include bias resulting from the role of teacher and time-limited knowledge of preschoolers, and (c) strengths of observers include ratings based on objective criteria, access to preschool, and information about rate of occurrence, whereas shortcomings include the limited time in which observers' ratings are obtained. It appears that an effective assessment of a preschooler's behavior should include a multi-informant approach using both direct and indirect measures. Perhaps, one of the most important issues in the developmental study of psychopathology is selecting who should provide ratings on children's behavioral adjustment (Renk & Phares, 2004; Stanger & Lewis, 1993). There is support for the use of multiple informants of preschoolers' behavioral adjustment, but when resources are limited, researchers are usually urged to employ empirical evidence to make the best-informed decisions (Spangler & Gazelle, 2009). To date, published materials on how to select potential informants in the research field are scant.

The Behavior Assessment System for Children, Second Edition (BASC-2; Reynolds & Kamphaus, 2004) is a multimethod, multidimensional scale to assess preschoolers' social-behavioral functioning and has been widely used in both clinical (e.g., Bender, Auciello, Morison, MacAllister, & Zaroff, 2008; Matson, LoVullo,

Rivet, & Boisjoli, 2009) and non-clinical research (e.g., Braun et al., 2009; Rinaldi & Howe, 2012). Indeed, the BASC-2 is designed to facilitate the diagnosis and educational classification of various emotional and behavioral disorders of preschoolers (Reynolds & Kamphaus, 2004) as delineated in *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM V; American Psychiatric Association, 2000). In general, the BASC-2 focuses on positive and negative dimensions of child behavior and is commonly used in both clinical and school-going samples. A review of recent studies that have used the short version of the BASC-2, that is the BASC-2 Behavioral and Emotional Screening System (BASC-2 BESS; Kamphaus & Reynold, 2007), suggested that items for BASC-2 BESS Parent Form originated from a pool of over 400 items that were used to develop the BASC-2 Parent Rating Scale (Dowdy, Chin, Twyford, & Dever, 2010; Feeney-Kettler, Kratochwill, Kaiser, Hemmeter, & Kettler, 2010). Published studies have used exploratory factor analyses and confirmatory factor analyses to obtain a four-factor latent construct (i.e., adaptive skills, externalizing problems, internalizing problems, and inattention).

Despite its potential contributions, research studies exploring the psychometric information of BASC-2 are limited. In one study, Bender et al. (2008) examined the relationship between two rating scales, the BASC-2 and Child Behavior Checklist (CBCL) in children with epilepsy using only parent ratings. To determine if the sensitivities of each scale were statistically different, Pearson correlation coefficients as well as nonparametric correlations (Spearman rank correlation coefficient) were also calculated. Results revealed significant agreement between mean scores on composite scales of the BASC-2 and CBCL, with the highest correlations were obtained for a few aspects of externalizing behaviors (e.g., attention problems, aggression, and rule-breaking behavior), suggesting that both BASC-2 and CBCL

could assess the similar psychopathology behaviors in this specific population (Bender et al., 2008). In a separate and more recent study, Mahan and Matson (2011) evaluated the differential validity of the Autism Spectrum Disorder-Problem Behavior for Children (ASD-PBC) and the BASC-2 in a sample of children with Autism Spectrum Disorder (ASD). The similarities and differences between these instruments were investigated through correlational and content analyses. In general, the results provide preliminary convergent validity for the ASD-PBC and BASC-2. The ASD-PBC externalizing scale established convergent validity with the BASC-2 hyperactivity and aggression subscales, and the ASD-PBC internalizing scale established convergent validity with the BASC-2 atypicality subscale (Mahan & Matson, 2011).

The gap in research appears to be that the BASC-2's composite scales that we have selected to use in this study—Adaptive Skills and Externalizing Problems—need a thorough, comprehensive psychometric examination. We did not include internalizing problems because young preschoolers do not have the requisite self-reflective skills to rate themselves and such problems do not lend themselves to be rated easily by parents, teachers or observers (McAdams & Olson, 2010). Thus, we chose to focus on Adaptive Skills Composite scale (comprising adaptability, social skills, activities of daily living, and functional communication subscales) and Externalizing Problems Composite scale (comprising hyperactivity and aggression subscales)—these behaviors can be easily observable by significant others.

A separate but related research gap is that given the vital role of informants in the reporting of behavioral adjustment, it is vital to examine how well informants agree in their ratings of the same type of constructs (i.e., convergent validity) relative to their ratings of different types of constructs and how well informants discriminate

adaptive skills from externalizing problems in their ratings (i.e., discriminant validity). A widely used approach to evaluate convergent and discriminant validity is the multitrait-multimethod matrix (MTMM; Campbell & Fiske, 1959). This approach provides a conventional inspection of the variance that is due to traits, variance that is due to methods, and unique or error variance (Kenny & Kashy, 1992). In the present study, the MTMM approach is further enhanced by the use of confirmatory factor analysis (in particular, correlated uniqueness model) that allows less ambiguous conclusions pertaining to trait and method variances (Hill & Hughes, 2007). Taken together, these approaches provide a systematic examination of which forms and informants of behavioral adjustment could be best supported by empirical evidence for this particular sample and this particular study. Therefore, our goal here was to examine the convergent and discriminant validity for two BASC-2's composite scales namely Adaptive Skills and Externalizing Problems.

3.2 Method

3.2.1 Participants

The sampling frame consisted of a complete list of all preschools in Penang, Malaysia. We chose multistage cluster sampling because it provided a feasible sampling solution, given the available list of educational centers. Kalton (1983) reported that if clusters are selected randomly, then the elements within the clusters (i.e., preschoolers) are similarly selected in a random method. Clusters consist of geographical areas. Penang comprises five geographical zones and is located on the northwest coast of Peninsular Malaysia.

The sample selection involved two stages. Stage 1 was to identify the participating geographical zones. To determine the number of participating geographical zones needed in this study, we picked an arbitrary point with the use of a random number table. Based on this procedure, we had to select one geographical zone. To complete the selection of which one out of five geographical zones to be sampled, we then assigned all geographical zones in Penang with a number (the range was 1 to 5). With the use of a random number table, we simply read off a random digit. As such, we selected the Central Zone.

Likewise, Stage 2 was to identify the participating preschools. To determine the number of participating preschools required in this study, we picked an arbitrary point with the use of a random number table. Based on this procedure, we had to select four participating preschools. To complete the selection of which four out of 55 preschools in the Central Zone, we then assigned all preschools within Central Zone with a number (the range was 1 to 55). With the use of a random number table, we simply read off random digits ignoring those that were out of range or recurred, until we obtained four random digits. As such, we selected four specific participating preschools. However, to ensure confidentiality, we did not report the names of these selected preschools here in this thesis.

A priori power analysis determined that 183 child participants were required to detect a medium effect size ($f = .30$) with a power of .90 ($\alpha = .05$, $1 - \beta = .90$) in Goodness-of-fit tests (Erdfelder, Faul, & Buchner, 1996). No previous studies reported using a higher or lower effect size measure, therefore, a medium effect size was chosen.

To achieve the priori-determined sample size of 183 preschoolers, we contacted the principals of the four randomly selected preschools. We plan to

intentionally slightly over-sample to obtain a sample of 200 potential child participants in anticipation of attrition. In general, there are two preschool classes for each preschool in Malaysia. Penang has one of the smallest average preschool class sizes ($n = 25$). To achieve a sample of 200 potential child participants, we randomly selected 50 preschoolers from each preschool. Written consent for this study was obtained following standard procedures. All parents whose children had been selected for the study were contacted by letter and telephone beforehand. After informed consent had been obtained, we then gave parents a questionnaire and asked them to complete and return it after one week. No parents refused to participate. Likewise, all teachers who were affiliated with the selected participating preschools were contacted by letter and telephone beforehand. After informed consent had been sought, we then gave teachers a questionnaire and asked them to complete and return it after one week.

The participants for the present study included 200 preschoolers (110 boys and 90 girls), 197 parents (22 fathers and 175 mothers), and 19 teachers (two males and 17 females). The mean age for child participants was 4.88 years ($SD = 0.99$), whereas the mean age for parent participants was 36.6 years ($SD = 1.21$), and the mean age for teacher participants was 26.3 years ($SD = 2.13$). As far as ethnic background is concerned, 88.8% of the child-and parent participants were Chinese, 6% were Malay, 5.5% were Indian, and 0.5% endorsed Others (ethnic groups not listed). The ethnic composition of the teacher participants consisted of 65.32% Chinese, 2.18% Malay, and 32.5% Indian. On average, one teacher participant provided behavioral ratings for 10 child participants.

3.2.2 Consent

The study has been approved by the Research Ethics Board of the Division of Psychology at Nanyang Technological University, Singapore. Prior to data collection, ethical clearance and approval for data collection was obtained from the Ministry of Education in Malaysia and from the four selected preschools. Parental consent and teacher consent were obtained prior to preschoolers' participation in the study. Participation was strictly voluntary and parent and teacher responses were kept confidential. However, we used a numerical code to synchronize the parent-, teacher -, and observer ratings. Parents and teachers were also informed that they could refuse or discontinue participation at any time, without penalty. Self-report questionnaires were distributed. All questionnaires were administered in English.

3.2.3 Questionnaire Assessment

3.2.3.1 Behavior Assessment System for Children, Second Edition (BASC-2)

Two rating scales of the BASC-2 were employed in this study: Parent Rating Scales (PRS) and Teacher Rating Scales (TRS). These rating scales were used to assess adaptive and problem behavior in preschoolers on a number of dimensions of behavior. Specifically, both PRS and TRS have three parallel forms—preschool, child, and adolescent. Due to the focus of our study, only the following six subscales of preschool form were employed: Adaptability (PRS: 8 items; TRS: 7 items), Social Skills (PRS: 9 items; TRS: 6 items), Functional Communication (PRS: 11 items; TRS: 9 items), (Activities of Daily Living (PRS: 9 items), Aggression (PRS: 11 items; TRS: 11 items), and Hyperactivity (PRS: 11 items; TRS: 9 items). The preschool form of the

TRS does not contain an Activities of Daily Living subscale. Parents and teachers rated these items on a 4-point Likert scale ranging from 0 (*never*) to 3 (*always*).

The Adaptability subscale (e.g., “adjusts well to changes in routine”) measures the ability to adjust readily to changes in the surroundings. A high score on the Adaptability subscale represents adequate ability to adapt to changes in schedule and to new teachers, to alter from one task to another, and to share toys or belongings with other children.

The Social Skills subscale (e.g., “compliments others”) measures the skills needed for cooperating effectively with peers and adults in school. A high score on the Social Skills subscale reflects good interpersonal characteristics of social adaptation.

The Functional Communication subscale (e.g., “is able to describe feelings accurately”) measures the ability to articulate ideas and communicate in a way others can easily comprehend. A high score on the Functional Communication subscale indicates a good ability to converse one’s affect and emotions with respect to environmental changes.

The Activities of Daily Living subscale (e.g., “acts in a safe manner”) measures the skills associated with performing basic, daily tasks in a suitable and secure manner. A high score on the Activities of Daily Living subscale indicates a child may be placed in a less restrictive situation if interventions for different behavioral and emotional disorders are targeted.

The Aggression subscale (e.g., “annoys others on purpose”) measures the tendency to act in a hostile approach (either verbal or physical) that is threatening others. A high score on the Aggression subscale indicates a high tendency to do physical or emotional destruction to others.

The Hyperactivity subscale (e.g., “acts out of control”) measures the tendency to be excessively energetic, hurry through work or activities, and take actions without judgment. A high score on the Hyperactivity subscale reflects a high prevalence of impatience and distractibility.

In addition to the above subscales, both PRS and TRS include two composite scales: Adaptive Skills and Externalizing Problems. The PRS Adaptive Skills Composite was computed by summing the Adaptability, Social Skills, Functional Communication, and Activities of Daily Living subscales, whereas the TRS Adaptive Skills Composite was computed by summing Adaptability, Social Skills, and Functional Communication subscales. Higher scores on Adaptive Skills Composite reflect more appropriate and adaptive behaviors. Both PRS and TRS Externalizing Problems Composites are comprised of Aggression and Hyperactivity subscales with higher scores on Externalizing Problems Composite reflecting more disruptive behaviors.

Internal reliability measured with Cronbach’s alphas for the PRS Composite and subscale scores for this present study were as follows: Adaptive Skills Composite ($\alpha = .83$), Externalizing Problems Composite ($\alpha = .84$), Adaptability ($\alpha = .79$), Social Skills ($\alpha = .77$), Functional Communication ($\alpha = .78$), Activities of Daily Living ($\alpha = .74$), Aggression ($\alpha = .73$), and Hyperactivity ($\alpha = .73$). Cronbach’s alphas for the TRS Composite and subscale scores for this present study were as follows: Adaptive Skills Composite ($\alpha = .90$), Externalizing Problems Composite ($\alpha = .96$), Adaptability ($\alpha = .74$), Social Skills ($\alpha = .84$), Functional Communication ($\alpha = .72$), Aggression ($\alpha = .93$), and Hyperactivity ($\alpha = .92$).

3.2.4 Observation Procedure

3.2.4.1 Training Research Assistants to Provide Reliable Ratings

Prior to the formal data collection, extensive training was given to various research assistants. These research assistants attended 2 hours of training, followed by 3 hours of mock observation. The research procedure, momentary time sampling, was clearly explained to the research assistants and all the observational coding categories were explicitly demonstrated via paired role plays. Such training is necessary so that research assistants can code using momentary time sampling in a consistent and reliable manner. Also, this is an opportunity for all research assistants to clarify behaviors that could be deemed ambiguous with respect to which category they belonged to, and research has shown that such training improves rating accuracy and consistency (Ebner-Priemer & Trull, 2009).

Using convenience sampling, only 5 child participants (aged 4 to 6 years old) from one preschool in Penang were recruited for this exercise in training the research assistants. This small sample of 5 participants does not overlap with the sample for the present study. This small sample of 5 participants is solely for the purposes of training. For this exercise, after training, we obtained Cohen's Kappa coefficient for inter-rater reliability. The average Cohen's Kappa coefficient across all observed behaviors was .82 (κ s ranged from .70 to 1.0).

3.2.4.2 Coding Scheme

In general, our observations were conducted in an unobtrusive manner; research assistants observed preschoolers from the sidelines of the playground or classroom. Research assistants were extensively trained in the reliable use of the

coding scheme before actual fieldwork began. This could facilitate them to work with multiple observations in a group setting. After consultation with teachers, research assistants obtained brief information (e.g., physical appearance and clothing) pertaining to the child participant they were about to observe. This would help them to focus on the individual child participant especially in a group setting. To ensure reliability, we avoided multiple *concurrent* observations. In this regard, we observed one child participant at any one time, and after a 3-minute delay, we started a new observation routine with a new child participant. The target child participant was observed for 15 minutes per session. In each 15-minute observation, there were 30 direct observations. There were three observations conducted per child, in relatively unstructured settings. These settings were recess, physical exercise, and music/art/craft class (either one). Each observation session took 15 minutes. In each 15-minute observation block, there were 30 mini-observation segments in which coding was needed. Research assistants observed preschoolers' behavior for approximately 3 seconds (e.g., when the stopwatch reads 0:30 – 0:33) at the end of each 30-second interval. This would be repeated 30 times. Research assistants placed a check mark in the time column next to each category of behavior that occurred during the 3-second interval in which the behavior was recorded. Two research assistants jointly coded 50% of all sessions for inter-rater reliability—this is to ensure the consistency and precision of the two ratings. As a result, one hundred child participants had inter-rater ratings. Disagreements, if any, were resolved through discussion.

Table 1 presents a categorized list of specific behaviors that was used in the present study. Four categories of Adaptive Skills come first, followed by five categories of Externalizing Problems. There were a total of nine categories used.

These observational variables and coding scheme were based on existing measures such as the BASC-2 used in the behavioral adjustment literature. Observers used these operational definitions and descriptions to code the observational data across the three settings. Collecting observational data via this method is well established and research has shown that with training, such data obtained is both reliable and valid (Lett & Kamphaus, 1997).

A total score for each category was collapsed across the three settings to calculate the percentage of interval scores. Then, the percentage of observed interval scores for the On Task, Positive Interaction with Others, Helping Behavior, and Cooperative Play codes were collapsed to form the broad category of Adaptive Skills. Likewise, the percentage of observed interval scores for the Negative Interaction with Others, Disruptive Behavior, Aggression, Aggressive play, and Tantrums codes were collapsed to form the broad category of Externalizing Problems. Inter-rater agreement was calculated on 50% of the direct observations. Across the three settings, the average Cohen's Kappa coefficient for Adaptive Skills and Externalizing Problems was .86 (κ s ranged from .85 to 1.0) and .83 (κ s ranged from .85 to 1.0), respectively.

Table 1

Coding Scheme

Categories	Behaviors
Adaptive Skills	
On Task—The child being	(a) talking to teacher in class/group

(table continues)

Table 1 (*continued*)

Categories	Behaviors
	(b) working with teacher on-on-one
	(c) looking/listening to teacher/following directions
	(d) looking/standing or sitting by teacher or teacher's desk appropriately
	(e) raising his/her hand
	(f) working with other students one-to-one/group
	(g) doing seat work
	(h) looking at materials appropriately
	(i) playing in centers or outside
	(j) at computer or blackboard
	(k) cleaning up or lining up
	(l) eating snack
	(m) singing appropriately

(table continues)

Table 1 (*continued*)

Categories	Behaviors
	(n) waiting at seat or carpet for task to begin
Positive Interaction with Others—	
The child being	(a) complimented
	(b) praised by teacher
	(c) provided with a high five
	(d) hugged or given a pat on the back
Helping Behavior—The child is	(a) bringing another student materials
	(b) holding another student's materials
	(c) supporting another student
	(d) providing a pat on the back, hug, or high five to another student
	(e) asking some one to play
Cooperative Play—The child is	(a) playing or talking with other student
	(b) sharing objects

(*table continues*)

Table 1 (*continued*)

Categories	Behaviors
	(c) touching other student appropriately
Cooperative Play—The child is	(a) playing or talking with other student
	(b) sharing objects
	(c) touching other student appropriately
Externalizing Problems	
Negative Interaction with Others—	
The child is	(a) being given a negative redirection
	(e.g., “stop” and “don’t do that”)
	(b) being given a time out
	(c) being removed from the classroom
	(d) is arguing/talking back to teacher
	(e) being scolded by teacher
Disruptive Behavior— The child is	(a) fiddling with objects
	(b) tapping with body part/pencil/object
	(c) spinning an object

(*table continues*)

Table 1 (*continued*)

Categories	Behaviors
	(d) walking around classroom
	inappropriately
	(e) playing at blackboard inappropriately
	(f) using work materials inappropriately
	(g) sitting/standing beside/or on desk
	(h) complaining of not feeling well
	(i) copying answers
	(j) passing notes
	(k) talking/humming/singing to self
	inappropriately
	(l) talking out
	(m) jumping out of seat
	(n) running around classroom
	(o) touching others inappropriately
	(p) clinging to teacher

(*table continues*)

Table 1 (*continued*)

Categories	Behaviors
	(q) making disruptive noises
	(r) laughing inappropriately
Aggression—Four subtypes of aggression are coded	
Verbal Aggression Towards Peer	(a) tattling
	(b) teasing
	(c) saying mean statements toward peer
	(d) arguing/yelling/screaming with student
Verbal Aggression Towards an Object	(a) saying mean statement toward object
	(b) arguing/yelling/screaming at an object
Physical Aggression Towards Peer	(a) kicking or hitting others
	(b) throwing objects at others
	(c) pushing others

(*table continues*)

Table 1 (*continued*)

Categories	Behaviors
Physical Aggression Towards an	
Object	(a) kicking or hitting others
	(b) throwing objects
	(c) destroying property
	(d) stealing
Aggressive Play—The child	(a) plays fighting with toys
Tantrums—The child is	(a) whining
	(b) crying
	(c) kicking teacher
	(d) screaming at teacher
	(e) yelling at teacher

3.2.5. Data Analytic Plan

3.2.5.1 MTMM Matrix

Using the conventional MTMM matrix, convergent and discriminant validity could be evaluated by correlating the multiple constructs obtained by multiple informants (Campbell & Fiske, 1959). To summarize Kenny and Kashy (1992),

convergent validity is evidenced by the **monotrait-heteromethod** (same constructs but different informants) correlations, which is often called the *validity diagonal*. To establish discriminant validity, both the *heterotrait-heteromethod* (different constructs and different informants) correlations and the heterotrait-monomethod (different constructs but same informant) correlations must not be higher than the **monotrait-heteromethod** (same constructs but different informants) correlations. Common variance due to method could be detected if the heterotrait-monomethod (different constructs but same informants) correlations are higher than the *heterotrait-heteromethod* (different constructs and different informants) correlations.

3.2.5.2 Structural Equation Modeling

Psychometric literature has documented clear guidelines to establish convergent and discriminant validity (Kline, 2010; Lance, Noble, & Scullen, 2002). For example, convergent and discriminant validity could be evaluated using structural equation modeling, which models different informants' contributions to different constructs (Spangler & Gazelle, 2009). Convergent validity is measured by evaluating the magnitude of each informant's loading on each construct, with stronger loadings indicating stronger convergent validity. An examination of the correlations among latent constructs provides an indication of discriminant validity, with high correlations reflecting poor discriminant validity. To establish method variance, error terms from each informant are allowed to correlate across constructs, with high correlations among error terms indicating high shared method variance. In the present study, the MTMM approach is further enhanced by the use of confirmatory factor analysis (in particular, correlated uniqueness model) that allows more unambiguous conclusions pertaining to trait and method variances (Hill & Hughes, 2007).

3.3 Results

3.3.1 MTMM Matrix

Table 2 shows the descriptive statistics and MTMM matrix. Correlations were performed among the parent, teacher, and observers to examine convergent and discriminant validity of adaptive skills and externalizing problems. **Monotrait-heteromethod** correlations were in the low to moderate (r s ranged from .01 to .25; mean $r = .12$) range. Heterotrait-monomethod correlations (r s ranged from .13 to .48; mean $r = .26$) varied across constructs but were, on average, somewhat higher than **monotrait-heteromethod** correlations (r s ranged from .01 to .25; mean $r = .12$). *Heterotrait-heteromethod* correlations (r s ranged from .01 to .20; mean $r = .10$) were lower than both the **monotrait-heteromethod** (r s ranged from .01 to .25; mean $r = .12$) and the heterotrait-monomethod correlations (r s ranged from .13 to .48; mean $r = .26$).

The findings of low to moderate **monotrait-heteromethod** and low *heterotrait-heteromethod* correlations support the convergent validity of the BASC-2 composite scales. The MTMM matrix shows the highest convergence occurring between teachers and parents and between parents and observers and the lowest convergence between teachers and observers.

Findings did not provide evidence for discriminant validity because heterotrait-monomethod correlations (r s ranged from .13 to .48; mean $r = .26$) were relatively higher than **monotrait-heteromethod** correlations (r s ranged from .01 to .25; mean $r = .12$). Heterotrait-monomethod correlations (r s ranged from .13 to .48; mean $r = .26$) were higher than *heterotrait-heteromethod* correlations (r s ranged from .01 to .20; mean $r = .10$), therefore establishing method variance.

Table 2

Descriptive Statistics and Multitrait-Multimethod Matrix

Variable	<i>M</i>	<i>SD</i>	Parent		Teacher		Observer	
			1	2	3	4	5	6
Parent								
1. AS	86.11	11.20	(.83)					
2. EP	41.55	6.95	<u>.13</u>	(.84)				
Teacher								
3. AS	51.06	11.22	.18	<i>−.01</i>	(.90)			
4. EP	35.43	13.74	.02	.25	<u>.48</u>	(.83)		
Observer								
5. AS	61.09	18.25	.09	.07	.01	<i>−.20</i>	−	
6. EP	2.81	4.43	.10	.10	.06	.07	<u>−.17</u>	−

Note. Coefficients or Cronbach's alphas appear on the main diagonal in parentheses. However, no internal consistency is available for observer ratings. Correlations in **bold** indicate convergent validity coefficients (**monotrait-heteromethod**); underlined correlations indicate discriminant validity coefficients (heterotrait-monomethod); and *italicized* correlations indicate common method effects (*heterotrait-heteromethod*). AS = Adaptive Skills; EP = Externalizing Problems.

3.3.2 Correlated Uniqueness Model

Although the MTMM approach provides one of the best available tests of validity (Cole, 1987), confirmatory factor analysis (CFA) is the preferred method for evaluating method and trait variance. In the present study, Analysis of Moment Structure (AMOS; Arbuckle, 2009) was used and robust maximum likelihood estimation was requested for confirmatory factor analysis (in particular, correlated uniqueness model). Multiple goodness-of-fit indexes were used to evaluate the adequacy of the models: chi-square statistic (χ^2), ratio of chi-square to degrees of freedom (χ^2/df), root mean square error of approximation (RMSEA), and comparative fit index (CFI). Cut-off values of .08 and .90, respectively, for RMSEA and CFI indicate acceptable model fit (Byrne, 1994). It is acknowledged that the chi-square statistic (χ^2) is sensitive to sample size, some researchers have recommended reporting the ratio of chi-square to degrees of freedom (χ^2/df) and suggested that ratios less than 3 is indicative of good fit (Garver & Mentzer, 1999).

Using SEM, a CU model was conducted to examine convergent and discriminant validity (see Figure 3). The big circles represent latent constructs: adaptive skills and externalizing problems, whereas the boxes depict the assessed variables for each construct by informants: parents, teachers, and observers. There are two types of arrows: single-headed arrows and curved arrows. The single-headed arrows from the big circles to the boxes represent factor loadings (λ) of the respective latent constructs assessed by informants (e.g., parents, teachers, and observers) whereas the curved arrows between the big circles represent the correlation (ϕ) between the latent constructs (e.g., adaptive skills and externalizing problems). The small circles represent error terms (δ) associated with each assessed variable. These

error terms were allowed to correlate within informants across constructs to establish shared method variance.

The CU model had an adequate fit to the data, $\chi^2(6, N = 200) = 14.67, p < .05$, $\chi^2/df = 2.44$, RMSEA = .08, CFI = .89. To establish convergent validity, we compared factor loadings (λ s) across different informants. For parent ratings, λ s ranged from .34 to .80, with a mean of .57. For teacher ratings, λ s ranged from .30 to .45, with a mean of .38. For observer ratings λ s ranged from .13 to .28, with a mean of .21. Results suggest that parent ratings (mean $\lambda = .57$) contain less trait variance than either teacher (mean $\lambda = .38$) or observer (mean $\lambda = .21$) ratings. The correlation between adaptive skills and externalizing problems was negligible ($\phi = .01$), therefore establishing discriminant validity. Method variance could be obtained by examining the strength of the unique covariances (δ), and results suggest that method variance is strongest for teacher ratings ($\delta = .56$), followed by parent ($\delta = .26$) and observer ratings ($\delta = .19$).

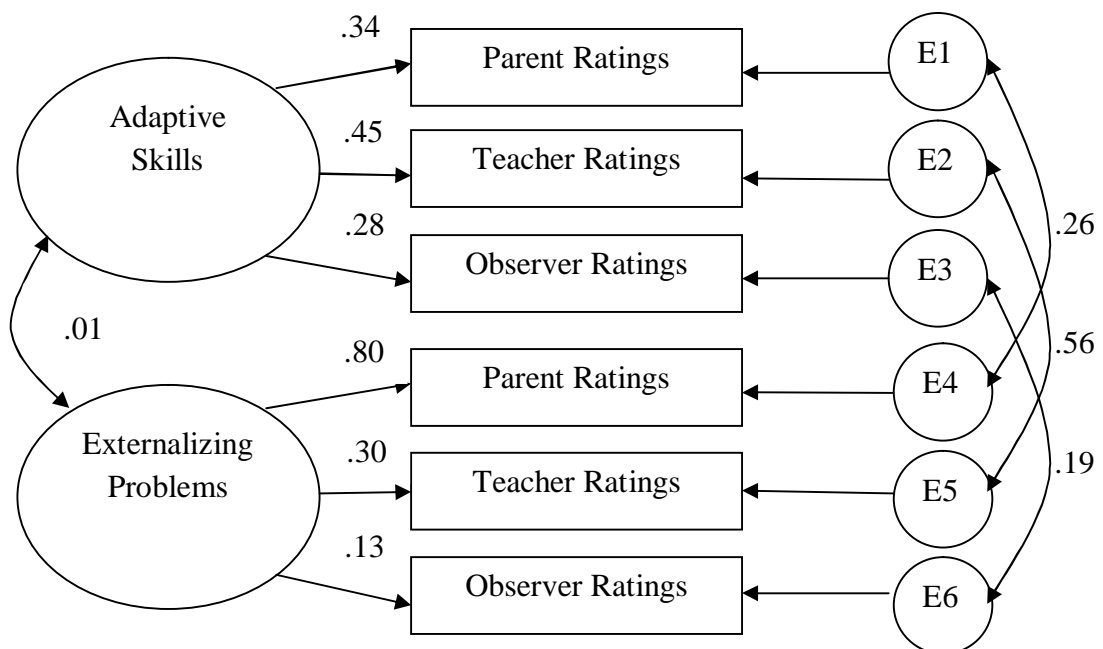


Figure 3. Standardized correlated uniqueness model of adaptive skills and externalizing problems as assessed by three informants.

3.4 Summary

This chapter was divided into three main segments concentrating first on sample selection and ethical clearance for data collection, then on the study measures and observation procedure, and lastly on the validation procedure. Our main interest was to examine the convergent and discriminant validity of two of BASC-2's composite scales—Adaptive Skills and Externalizing Problems, using a MTMM approach and confirmatory factor analysis (in particular, correlated uniqueness model). Fundamental strengths of MMTM CFA, as noted by Hill and Hughes (2007), lie in its theory-driven nature and its capability of providing a less ambiguous conclusion pertaining to trait and method variances. Together, these approaches provide a systematic examination of which forms and informants (e.g., parent, teacher, and observer) pertaining to behavioral adjustment (in particular, adaptive skills and externalizing problems) could be best supported by empirical evidence. Despite a growing recognition of multiple informant approach, there is evidence suggests that collecting information from multiple informants adds little variance to the identification process of emotional and behavioral problems in children (Dowdy et al., 2011; Jones, Dodge, Foster, Nix, & the Conduct Problems Prevention Research Group, 2002). To some extent, these findings provide evidence to support the utility of using a sole informant for psychological assessment among children. Specifically, results suggest that for this sample and this study, parent ratings, in comparison with teacher- and observer ratings, have a better combination of convergent and discriminant validity, whereas teacher ratings and observer ratings demonstrated mid-level validity. In light of this, only parent ratings on adaptive skills and externalizing problems were used for all subsequent analyses in the present study. The findings also suggest that the BASC-2 PRS (Adaptive Skills and Externalizing Problems Composite scales, in

particular) could be used as an initial tool to evaluate preschoolers' behavioral adjustment when researchers have limited resources.

CHAPTER FOUR

METHOD

This chapter starts with an overview by introducing sample characteristics and research procedures for data collection in Section 4.1 and Section 4.2, respectively. Relevant study measures are presented in Section 4.3. Analytic techniques used in the present study will be described in Section 4.4. To conclude Chapter 4, a summary is presented at the end of this chapter.

4.1 Participants

The participants for the present study included 200 preschoolers (110 boys and 90 girls), 197 parents (22 fathers and 175 mothers), and 19 teachers (two males and 17 females). The mean age for child participants was 4.88 years ($SD = 0.99$), whereas the mean age for parent participants was 36.6 years ($SD = 1.21$), and the mean age for teacher participants was 26.3 years ($SD = 2.13$). As far as ethnic background is concerned, 88.8% of the child-and parent participants were Chinese, 6% were Malay, 5.5% were Indian, and 0.5% endorsed Others (ethnic groups not listed). The ethnic composition of the teacher participants consisted of 65.32% Chinese, 2.18% Malay, and 32.5% Indian. With respect to parents' educational level, 89.3% of the parent participants had obtained at least pre-university/polytechnic or university education qualifications and 10.7% of the parent participants had obtained secondary school educational qualifications. Educational level information for teacher participants was as follows: 23.4% were pre-university or polytechnic diploma holders and 76.6 % were university degree holders. We did not have information on parents' income or occupation, thus parents' educational level was used as a proxy for SES. This

suggests that the present sample included preschoolers from a largely middle class background.

4.2 Consent

The study was approved by the Research Ethics Board of the Division of Psychology at Nanyang Technological University, Singapore. Prior to data collection, additional approval for data collection was obtained from the Ministry of Education in Malaysia and from the four selected schools. Written consent for this study was obtained following standard procedures. All parents whose children had been selected for the study were contacted by letter and telephone beforehand. After informed consent had been obtained, we then gave parents a questionnaire and asked them to complete and return it after one week. No parents refused to participate. Likewise, all teachers who affiliated with the selected participating schools were contacted by letter and telephone beforehand. After informed consent had been sought, we then gave teachers a questionnaire and asked them to complete and return it after one week.

In general, participation was strictly voluntary and parent-and teacher responses were kept confidential. We used a numerical code to synchronize the parent-and teacher ratings. Parents and teachers were also informed that they could refuse or discontinue participation at any time, without penalty. Parents were given a token gift certificate of RM 10 for their help in assessing their children. Likewise, teachers were offered a token gift certificate of RM 15 for their participation. Self-report questionnaires were distributed. All questionnaires were administered in English and no translation was required.

4.3 Measures

A questionnaire comprising the BFI, CBQ, and BASC-2-PRS was completed by parents. A questionnaire comprising the BFI was completed by teachers. Below are the measures that were used in this present study.

4.3.1 Big Five Inventory (BFI)

The BFI is a 44 item questionnaire that measures the Big Five personality domains (John & Srivastava, 1999). The BFI contains 8 items measuring Neuroticism, 8 items measuring Extraversion, 10 items measuring Openness, 9 items measuring Agreeableness, and 9 items measuring Conscientiousness. Due to the focus of our study, only the Agreeableness subscale was used (e.g., “is helpful and unselfish with others”). Parents and teachers completed these 9 items on a 5-point Likert scale ranging from 1 (*disagree strongly*) to 5 (*agree strongly*). A high score indicates a high level of agreeableness. The Cronbach’s alphas (α s) for Agreeableness were .65 and .61 for parent-and teacher ratings, respectively.

4.3.2 Child Behavior Questionnaire (CBQ)

The 36-item CBQ is a measure designed to assess temperament of children between the ages of three to eight (Putnam & Rothbart, 2006). The CBQ provides scores for 3 higher-order dimensions. These higher-order dimensions are Effortful Control, Surgency, and Negative Affectivity. Each higher-order dimension consists of 12 items. The higher-order dimensions of particular interest in this study were Effortful Control (comprising Inhibitory Control, Attentional Focusing, Low Intensity Pleasure, and Perceptual Sensitivity subscales) and Surgency (comprising Impulsivity, Lack of Shyness, Activity Level, and High Intensity Pleasure subscales). All

subscales contain 3 items. Parents rated these items on a 7-point Likert scale ranging from 1 (*extremely untrue of my/this child*) to 7 (*extremely true of my/this child*). A high score on effortful control indicates one's capacity to concentrate attention as well as to shift attention, whereas a high score on surgency indicates one's high sensitivity to clues of rewards or termination of punishment.

The following provides a description of each subscale and what they measure conceptually and operationally. Example items for each subscale are also provided.

The Inhibitory Control subscale (e.g., "is good at following instructions") measures preschoolers' capacity to plan and to restrain improper responses under instruction or in uncertain circumstances.

The Attentional Focusing subscale (e.g., "when drawing or coloring in a book, shows strong concentration") measures preschoolers' tendency to preserve attentional focus in task-related settings.

The Low Intensity Pleasure subscale (e.g., "likes being sung to") measures preschoolers' degree of pleasure or gratification related to situations concerning low stimulus intensity and rate of activity.

The Perceptual Sensitivity subscale (e.g., "notices it when parents are wearing new clothing") measures preschoolers' degree of recognition of slight, low intensity stimuli from the external environment.

The Impulsivity subscale (e.g., "often rushed into new situations") measures preschoolers' pace of response initiation.

The Shyness subscale (e.g., "seems to be at ease with almost any person"; shyness scores were reversed) measures preschoolers' low or inhibited approach in conditions relating novelty or ambiguity.

The Activity Level subscale (e.g., “seems always in a big hurry to get from one place to another”) measures preschoolers’ level of gross motor activity including speed and degree of locomotion.

The High Intensity Pleasure subscale (e.g., “likes going down high slides or other adventurous activities) measures preschoolers’ degree of enjoyment or satisfaction related to novel situations concerning high stimulus intensity and response rate.

In addition to the above subscales, the CBQ includes higher-order dimensions: Effortful Control and Surgency. Effortful Control was computed by summing Inhibitory Control, Attentional Focusing, Low Intensity Pleasure, and Perceptual Sensitivity subscales, whereas Surgency was computed by summing Impulsivity, Lack of Shyness, Activity Level, and High Intensity Pleasure subscales. Adequate Cronbach’s alpha reliability estimates were obtained for Effortful Control ($\alpha = .76$) and Surgency ($\alpha = .78$).

4.3.3 Behavioral Assessment System for Children, Second Edition (BASC-2)

An examination of convergent and discriminant validity for two of BASC-2’s composite scales—Adaptive Skills and Externalizing Problems suggested that comparatively, parent ratings have a better combination of convergent and discriminant validity as compared to teacher and observer ratings. In light of this, only parent ratings on adaptive skills and externalizing were used for all subsequent analyses in this study. Please see Chapter 3 for an extensive review.

4.4 Data Analytic Plan

Table 3 summarizes the research purposes and hypotheses along with their associated statistical analyses or programs. Prior to inferential analyses, data were checked for violation of normality assumption by examining skewness and kurtosis values. In addition, multivariate outliers were examined using a $p < .001$ criterion for Mahalanobis's distance (D^2).

A series of statistical analyses were conducted to examine both the direct and indirect relations between preschoolers' temperament predispositions, agreeableness, and behavioral adjustment. Structural equation modeling (SEM) is arguably a powerful, multivariate analysis method used to examine associations among the latent variables and indicators. In the present study, our latent variables include effortful control, surgency, agreeableness, adaptive skills, and externalizing problems. In structural models, latent variables are theoretical constructs specified by multiple conceptually-related indicators (Gall, Gall, & Borg, 2003). For the effortful control latent construct, inhibitory control, attentional focusing, low intensity pleasure, and perceptual sensitivity were indicators. Likewise, for the surgency latent construct, the indicators were impulsivity, lack of shyness, activity level, and high intensity pleasure. For the agreeableness latent construct, both parent-and teacher ratings of agreeableness were indicators. For the adaptive skills latent construct, the indicators were adaptability, social skills, functional communication, and activities of daily living. And finally, for the externalizing problems latent construct, aggression and hyperactivity were indicators. To facilitate visualization of these measurement models, it would be helpful to refer to Figures 1 and 2, on pages 16 and 17, respectively.

Prior to testing the structural equation models, the assumption of normality was assessed first. Next, confirmatory factor analyses were conducted to test the full

measurement models. In particular, confirmatory factor analyses of the full measurement models were tested through freeing the parameters among study constructs and allowing them to correlate. If the fit of the confirmatory factor analysis of the measurement models was found to be acceptable, then the structural model of the study would be tested. If not, the measurement models would be re-examined for possible improvement that can be justified on theoretical grounds, using modification indices.

To evaluate model fit, several fit indices were considered including chi-square test statistics (χ^2), the root mean square error of approximation (RMSEA), and the comparative fit index (CFI). It is acknowledged that the chi-square statistic (χ^2) is sensitive to sample size (Hooper, Coughlan, Mullen, 2008; Kenny, Kaniskan, & McCoach, 2011), and some researchers have recommended reporting the ratio of chi-square to degrees of freedom (χ^2/df) and suggested that ratios of less than 3 is indicative of good fit (Garver & Mentzer, 1999). Another fit index reported in the current study was RMSEA. In particular, RMSEA provides an indication of the discrepancy between the population covariance matrix and the model fitted to the sample (Brown & Cudeck, 1993). With respect to RMSEA, a value of .08 or less is considered indicative of reasonable fit (Kline, 2010). The final index selected to be used in this study for testing and reporting of model fits was CFI. Specifically, the CFI provides an indication of the discrepancy between the estimated model and the independence model (Raykov, 2005). The latter is a strict model in which all latent variables are considered uncorrelated. An examination of CFI would suggest the extent to which the estimated model is better than the independence model. The value of CFI ranges from 0 to 1.0 and a fit index of .90 or more can be considered indicative of good fit (Hu & Bentler, 1999).

In the present study, SEM was used to examine two hypothesized models through which temperament predispositions (in particular, effortful control and surgency) may exert their influence on preschoolers' behavioral adjustment (in particular, adaptive skills and externalizing problems) with agreeableness as a mediator. Robust maximum likelihood estimation was requested using the AMOS 18.0 software (Arbuckle, 2009). It is worth mentioning that partial mediation can be observed if X (e.g., effortful control) has a significant direct effect on the outcome Y (e.g., adaptive skills) in addition to its indirect effect through the mediator M (i.e., agreeableness). Following Baron and Kenny's (1986) and MacKinnon's (1994) procedures, we performed inspections concerning the presence of a significant partial mediator. One remaining issue in mediation studies to be discussed is that of building confidence intervals (CIs). Tofighi and MacKinnon (2011) offered a solution by developing a statistical program called RMediation. To paraphrase Tofighi and MacKinnon (2011), RMediation generates CIs using: (a) the distribution-of product approach, (b) the Monte Carlo simulations, and (c) the asymptotic normal distribution. A variety of statistical parameters pertaining to the mediated effect including CIs, percentiles, quantiles, and kernel density plots for the product of two normally distributed random constructs could be requested via RMediation. Kernel density plots, among others, can aid researchers to visualize the ambiguity pertaining to the estimated effect between the constructs of interest. Notably, such plots use the kernel density method along with a standard normal distribution to estimate the probability density function of the product of two normally distributed constructs (Tofighi & MacKinnon, 2011). If the lower and upper boundaries of the 95% CI surrounding an odds ratio does not contain zero, we can conclude that the mediated effect is significant at an alpha level of .05 (MacKinnon, Fairchild, & Fritz, 2007; Ranby,

MacKinnon, Faichild, Elliot, Kuehl, & Goldberg, 2011). In contrast, if the lower and upper boundaries of the 95% CI does include zero, we can conclude that there is no significant mediated effect (MacKinnon et al., 2007; Ranby et al., 2011).

Table 3

Research Questions, Hypotheses, and Associated Analyses or Statistical Programs

Research Question	Hypothesis	Associated Analyses or Statistical Programs
To check the assumptions of normality and to check for multivariate outliers.	–	Kurtosis and Skewness, and Mahalonobis's distance (D^2)
To examine the intercorrelations among study variables.	–	Pearson product-moment correlations (r)
To examine whether effortful control is related to surgency.	<i>Hypothesis 1</i>	SEM
To examine whether effortful control is related to adaptive skills and externalizing problems.	<i>Hypotheses 2a1 and 2a2</i>	SEM

(table continues)

Table 3 (*continued*)

Research Question	Hypothesis	Associated Analyses or Statistical Programs
To examine whether surgency is related to adaptive skills and externalizing problems.	<i>Hypotheses 2b1 and 2b2</i>	SEM
To examine whether effortful control and surgency are related to agreeableness?	<i>Hypotheses 3a and 3b</i>	SEM
To examine whether agreeableness is related to adaptive skills and externalizing problems?	<i>Hypothesis 4</i>	SEM
To examine whether the relation between effortful control and behavioral adjustment is mediated by agreeableness?	<i>Hypotheses 5a1 and 5a2</i>	SEM and RMediation

(*table continues*)

Table 3 (*continued*)

Research Question	Hypothesis	Associated Analyses or Statistical Programs
To examine whether the relation between surgency and behavioral adjustment is mediated by agreeableness?	<i>Hypotheses 5b1 and 5b2</i>	SEM and RMediation

Note. SEM = Structural Equation Modeling.

4.5 Summary

The purpose of this chapter was to describe how the present study was carried out and how the research data was gathered. Also highlighted were study measures and analytic techniques to be used in this study. Specifically, for the inferential part of this study, multiple fit indices used to evaluate model fit were introduced and described. Additionally, their relevant cut-off values were also delineated. Last but not least, the statistical significance of mediated effects, if any, was examined with the use of the RMediation package.

CHAPTER FIVE

RESULTS

This chapter is divided in two parts. The first part consists of the descriptive statistics and intercorrelations of study variables—specifically, we present descriptive statistics in Section 5.1.1 and intercorrelations of study variables in Section 5.1.2. The second part consists of the inferential analyses—the findings from structural equation modeling are presented in Section 5.2. In particular, Section 5.2.1 offers the findings for *Hypothesis 1*. Section 5.2.2 presents empirical evidence for the relations between effortful control, surgency, and behavioral adjustment—*Hypotheses 2a1* and *2a2* (in particular, Section 5.2.2.1), and *Hypotheses 2b1* and *2b2* (in particular, Section 5.2.2.2). In Section 5.2.3, we present the empirical findings for *Hypotheses 3a* and *3b*. Inferential findings for *Hypothesis 4* are presented in Section 5.2.4. Following these sections, we present mediational findings for *Hypotheses 5a1*, *5a2*, *5b1*, and *5b2* in Section 5.2.5. At the end of Chapter 5, a summary is presented in Section 5.3.

5.1 Descriptive Statistics and Intercorrelations of Study Measures

5.1.1 Descriptive Statistics

Table 4 presents means, standard deviations, skewness, and kurtosis of study variables. Following procedures in Tabachnick and Fidell (2001), the skewness and kurtosis for all variables were examined. No variables exceeded the cut-off scores of 3 and 10 for skewness and kurtosis values, respectively (Kline, 2010). In other words, skewness and kurtosis values were within acceptable limits for the present sample. In

addition, with the use of a $p < .001$ criterion for Mahalanobis's distance (D^2), no multivariate outliers among the cases were detected.

Table 4

Means, Standard Deviations, Skewness, and Kurtosis for Study Variables

Variable	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
Effortful Control	59.24	7.97	-.14 (.17)	.62 (.34)
Inhibitory Control	13.75	2.63	.12 (.17)	.28 (.34)
Attentional Focusing	14.16	3.52	-.17 (.17)	-.60 (.34)
Low Intensity Pleasure	15.11	2.84	-.32 (.17)	.09 (.34)
Perceptual Sensitivity	16.15	2.74	-.36 (.17)	-.21 (.34)
Surgency	47.61	9.77	.11 (.17)	.31 (.34)
Impulsivity	12.01	2.73	.19 (.17)	-.02 (.34)
Lack of Shyness	11.51	3.39	.20 (.17)	-.08 (.34)
Activity Level	13.00	2.99	-.19 (.17)	.05 (.34)
High Intensity Pleasure	11.15	4.15	.01 (.17)	-.56 (.34)
Parent-rated Agreeableness	30.87	4.35	.80 (.17)	.64 (.34)
Teacher-rated Agreeableness	30.61	4.49	.39 (.17)	.12 (.34)
Adaptive Skills	86.15	11.11	.10 (.17)	-.56 (.34)
Adaptability	20.15	3.93	.29 (.17)	-.44 (.34)
Social Skills	21.66	3.95	.09 (.17)	-.21 (.34)
Functional Communication	25.97	5.27	.15 (.17)	-.68 (.34)
Activities of Daily Living	18.38	3.43	.38 (.17)	.08 (.34)

(table continues)

Table 4 (*continued*)

Variable	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
Externalizing Problems	41.84	6.88	.44 (.17)	1.11 (.34)
Aggression	20.10	3.75	.53 (.17)	.55 (.34)
Hyperactivity	21.74	3.81	.44 (.17)	1.66 (.34)

Note. The numbers in parentheses are standard errors.

5.1.2 Intercorrelations of Study Measures

Correlations among the constructs of interest were examined. The intercorrelations of study measures have been organized in the following: Sections 5.1.2.1, 5.1.2.2, 5.1.2.3, 5.1.2.4, and 5.1.2.5 present the correlational relations among indicators of effortful control, surgency, agreeableness, adaptive skills, and externalizing problems, respectively. Lastly, the intercorrelations among study variables such as temperament predispositions, agreeableness, and behavioral adjustment are presented in Section 5.1.2.6.

5.1.2.1 Correlational Relations among Indicators of Effortful Control

Table 5 presents the correlational relations among indicators of effortful control. Inhibitory control was positively correlated to attentional focusing ($r = .25$, Cohen's $d = 0.51$, $p < .001$), low sensitivity pleasure ($r = .20$, Cohen's $d = 0.41$, $p < .01$), and perceptual sensitivity ($r = .38$, Cohen's $d = 0.82$, $p < .001$). Another indicator, attentional focusing showed positive associations with low sensitivity pleasure ($r = .44$, Cohen's $d = 0.98$, $p < .001$) and perceptual sensitivity ($r = .36$, Cohen's $d = 0.77$, $p < .001$), while low sensitivity pleasure showed a positive association with perceptual sensitivity ($r = .35$, Cohen's $d = 0.75$, $p < .001$). Cohen's

d ranged from 0.41 to 0.98, suggesting that these effects are approximately moderate to large.

Table 5

Correlational Relations among Indicators of Effortful Control

Variable	1	2	3	4
1 Inhibitory Control				
2 Attentional Focusing	.25*			
3 Low Intensity Pleasure	.20*	.44*		
4 Perceptual Sensitivity	.38*	.36*	.35*	

* $p < .001$.

5.1.2.2 Correlational Relations among Indicators of Surgency

Table 6 presents the correlational relations among indicators of surgency.

Impulsivity was positively correlated to lack of shyness ($r = .46$, Cohen's $d = 1.04$, $p < .001$), activity level ($r = .54$, Cohen's $d = 1.28$, $p < .001$), and high intensity level ($r = .53$, Cohen's $d = 1.25$, $p < .001$). Another indicator, lack of shyness showed positive associations with activity level ($r = .32$, Cohen's $d = 0.68$, $p < .001$) and high intensity level ($r = .35$, Cohen's $d = 0.75$, $p < .001$), while activity level showed a positive association with high intensity level ($r = .46$, Cohen's $d = 1.04$, $p < .001$). Cohen's d ranged from 0.68 to 1.28, suggesting that these effects are approximately moderate to large.

Table 6

Correlational Relations among Indicators of Surgency

Variable	1	2	3	4
1 Impulsivity				
2 Lack of Shyness	.46*			
3 Activity Level	.54*	.32*		
4 High Intensity Pleasure	.53*	.35*	.46*	

* $p < .001$.

5.1.2.3 Correlational Relations among Indicators of Agreeableness

The relation between parent-rated and teacher-rated agreeableness was positive and modest ($r = .32$, Cohen's $d = 0.68$, $p < .001$).

5.1.2.4 Correlational Relations among Indicators of Adaptive Skills

Table 7 presents the correlational relations among indicators of adaptive skills. Adaptability was significantly correlated to social skills ($r = .62$, Cohen's $d = 1.58$, $p < .001$) and functional communication ($r = .59$, Cohen's $d = 1.46$, $p < .001$) but marginally correlated to activities of daily living ($r = .13$, Cohen's $d = 0.26$, $p = .078$). Another indicator, social skills showed positive associations with functional communication ($r = .62$, Cohen's $d = 1.58$, $p < .001$) and activities of daily living ($r = .22$, Cohen's $d = 0.45$, $p < .001$), while functional communication showed a positive association with activities of daily living ($r = .20$, Cohen's $d = 0.41$, $p < .001$). Cohen's d ranged from 0.26 to 1.58, suggesting quite a wide variability of effect sizes that stretch from approximately small to large.

Table 7

Correlational Relations among Indicators of Adaptive Skills

Variable	1	2	3	4
1 Adaptability				
2 Social Skills	.62*			
3 Functional Communication	.59*	.62*		
4 Activities of Daily Living	.13	.22*	.20*	

* $p < .001$.

5.1.2.5 Correlational Relations among Indicators of Externalizing Problems

The relation between aggression and hyperactivity was positive and large ($r = .65$, Cohen's $d = 1.71$, $p < .001$).

5.1.2.6 Intercorrelations between Temperament Predispositions, Agreeableness and Behavioral Adjustment

Table 8 presents the intercorrelations between temperament predispositions, agreeableness, and behavioral adjustment. The relation between effortful control and surgency was negative and modest ($r = -.18$, Cohen's $d = 0.37$, $p < .05$). Direct effects between temperament and behavioral adjustment were obtained. Effortful control was positively correlated to adaptive skills ($r = .54$, Cohen's $d = 1.28$, $p < .05$) but not for externalizing problems ($r = .11$, Cohen's $d = .22$, ns). Another temperament predispositions, surgency was positively correlated to adaptive skills ($r = .36$, Cohen's $d = 0.77$, $p < .001$) and externalizing problems ($r = .32$, Cohen's $d = 0.68$, $p < .05$). Next, direct effect between temperament predispositions and agreeableness was also found: effortful control showed a significant positive

association with parent-rated agreeableness ($r = .35$, Cohen's $d = 0.75$, $p < .001$) but not for teacher-rated agreeableness. However, both parent-rated agreeableness ($r = -.10$, Cohen's $d = 0.20$, ns) and teacher-rated agreeableness ($r = -.08$, Cohen's $d = 0.16$, ns) were not significantly related to surgency. Direct effects between agreeableness and behavioral adjustment were obtained. Parent-rated agreeableness was positively correlated to adaptive skills ($r = .35$, Cohen's $d = 0.75$, $p < .001$) but negatively correlated to externalizing problems ($r = -.40$, Cohen's $d = 0.87$, $p < .001$). Whereas, teacher-rated agreeableness was significantly and negatively correlated to externalizing problems ($r = -.26$, Cohen's $d = 0.54$, $p < .001$) but not for adaptive skills. Lastly, the relation between adaptive skills and externalizing problems was negative and modest ($r = -.16$, Cohen's $d = 0.32$, $p < .05$). Cohen's d ranged from 0.37 to 0.87, suggesting that these effects are approximately moderate to large.

Table 8

Intercorrelations between Temperament Predispositions, Agreeableness, and Behavioral Adjustment

Variable	1	2	3	4	5	6
1 Effortful Control						
2 Surgency	-.18*					
3 Parent-rated A	.35**	-.10				
4 Teacher-rated A	.08	-.08	.32**			
5 AS	.54**	.36**	.35**	.09		
6 EP	.11	.32**	-.40**	-.26**	-.16*	

Note. A = Agreeableness, AS = Adaptive Skills, EP = Externalizing Problems.

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

5.2 Hypothesis Testing

Our central analyses were designed to examine possible mechanisms through which temperament dispositions influence preschoolers' behavioral adjustment. The analyses follow the hypothesized models elaborated in Chapters 1 and 3. Our focal interest is on two mediational models: the first reflects the mediating role of agreeableness between effortful control and surgency and adaptive skills, and the second reflects the mediating role of agreeableness between effortful control and surgency and externalizing problems. Loadings of each latent variable's indicators are presented in Table 9 (please see page 81). All the factor loadings for the indicators on the latent variables were significant ($p < .05$), indicating that all the latent factors were well represented by their respective indicators.

In the first model, we hypothesized that preschoolers' effortful control and surgency would predict their agreeableness, which in turn would predict preschoolers' adaptive skills. The hypothesized model had a marginally adequate fit to the data, $\chi^2(71, N = 200) = 166.80, p < .001; \chi^2/df = 2.35; RMSEA = .08; CFI = .88$. Examination of modification indices revealed that allowing several error terms to covary could improve model fit. A decrease in misfit could be achieved by freeing a number of error terms (Byrne, Shavelson, & Muthén, 1989; Han, Burns, Weed, Hatchett, & Kurokawa, 2009). Based on theoretical and statistical considerations, error terms associated with subscales that previously loaded on the same common factor from the CBQ were allowed to covary due to following reasons: covariances among subscales associated with the same factor have higher covariances than could be accounted for by the higher-order dimensions (Evans & Rothbart, 2009). In the present study, the higher-order dimensions were Effortful Control and Surgency. Therefore, error terms associated with the following pairs of subscales were allowed to covary: Inhibitory

Control (E1) and Attentional Focusing (E2), and Inhibitory Control (E1) and Low Intensity Pleasure (E3).

After making these modifications, the final model fit the data better, $\chi^2(69, N = 200) = 152.04, p < .001; \chi^2/df = 2.20; RMSEA = .07; CFI = .89$. While not all fit indices indicate good fit, as a whole, based on results from multiple fit indices, this suggested a reasonable fit. We were particularly interested to examine whether agreeableness significantly mediated the relation between effortful control and surgency, and adaptive skills. There are several ways to assess whether the mediated effect is statistically significant. For example, MacKinnon's (1994) method of testing mediation involves computing the product of the path coefficients from two equations and dividing these path coefficients by their respective standard errors. The statistical significance of mediated effects, if any, was further probed with asymmetric 95% confidence intervals for the distribution of two normally distributed variables with the use of RMediation package (Ranby et al., 2011, Tofighi & MacKinnon, 2011). Based on the 95% confidence intervals for testing the mediated effect, agreeableness was found to significantly mediate the relation between effortful control and adaptive skills, but agreeableness was not a significant mediator of the relation between surgency and adaptive skills. The paths for this model with standardized path coefficients are indicated in Figure 4 (page 87).

Also investigated was the mediating role of agreeableness between effortful control and surgency and externalizing problems. In the second model, we hypothesized that preschoolers' effortful control and surgency would influence externalizing problems via agreeableness. The hypothesized model had an adequate fit to the data, $\chi^2(48, N = 200) = 106.34, p < .001; \chi^2/df = 2.22; RMSEA = .08; CFI = .90$. A close examination of modification indices revealed that allowing several

error terms to covary could improve model fit. It is suggested that freeing a number of error terms could result in a decrease in misfit (Byrne et al., 1989; Han et al., 2009). Similarly, based on theoretical and statistical considerations, error terms associated with subscales that previously loaded on the same common factor from the CBQ could be allowed to covary. According to Evans and Rothbart (2009), covariances among subscales associated with the same factor have higher covariances than could be accounted for by the higher-order dimensions to which they were labelled as Effortful Control and Surgency in the current study. Therefore, error terms associated with the following pairs of subscales were allowed to covary: Inhibitory Control (E1) and Attentional Focusing (E2), and Inhibitory Control (E1) and Low Intensity Pleasure (E3).

When this was done, the final model fit the data better, $\chi^2(46, N = 200) = 94.68$, $p < .001$; $\chi^2/df = 2.06$; RMSEA = .07; CFI = .92. We were particularly interested to examine whether agreeableness significantly mediated the relation between effortful control and surgency, and externalizing problems. Based on the 95% confidence intervals for testing the mediated effect, agreeableness was a significant mediator between effortful control and surgency, and externalizing problems. The paths for this model with standardized path coefficients are indicated in Figure 5 (page 88).

This study examines the direct and indirect relations between effortful control, surgency, agreeableness, adaptive skills, and externalizing problems with a sample of 4 to 6 year-old preschoolers. The hypotheses and findings are summarized in Table 10 (pages 89 to 90).

Table 9

Standardized Parameter Estimates of Latent Variables

Indicators	EC	S	A	AS	EP
Inhibitory Control	.70				
Attentional Focusing	.67				
Low Intensity Pleasure	.65				
Perceptual Sensitivity	.54				
Impulsivity		.79			
Lack of Shyness		.53			
Activity Level		.68			
High Intensity Pleasure		.67			
Parent-rated A			.82		
Teacher-rated A			.39		
Adaptability				.77	
Social Skills				.83	
Functional Communication				.74	
Activities of Daily Living				.20	
Aggression					.86
Hyperactivity					.76

Note. EC = Effortful Control, S = Surgency, A = Agreeableness, AS = Adaptive Skills, EP = Externalizing Problems.

5.2.1 Effortful Control and Surgency

The first hypothesis investigated the relation between effortful control and surgency. The standardized path coefficient revealed that effortful control showed a negative association with surgency ($\beta = -.17, p < .05$). *Hypothesis 1* was supported.

5.2.2 Effortful Control, Surgency, and Behavioral Adjustment

5.2.2.1 Effortful Control and Behavioral Adjustment

Hypothesis 2a1 predicted that effortful control is positively related to adaptive skills. The standardized path coefficient in Figure 4 (page 87) indicated that effortful control is positively associated with adaptive skills ($\beta = .47, p < .05$). *Hypothesis 2a1* was supported.

Hypothesis 2a2 proposed that effortful control is negatively related to externalizing problems. The standardized path coefficient in Figure 5 (page 88) showed that effortful control is negatively associated with externalizing problems, and that this relationship was statistically significant ($\beta = -.38, p < .05$). *Hypothesis 2a2* was supported.

5.2.2.2 Surgency and Behavioral Adjustment

Hypothesis 2b1 posited that surgency is negatively related to adaptive skills. The standardized path coefficient from surgency to adaptive skills was statistically significant ($\beta = .39, p < .05$) but not in the expected direction. *Hypothesis 2b1* was not supported.

Hypothesis 2b2 proposed that surgency is positively related to externalizing problems. The standardized path coefficient in Figure 5 (page 88) indicated that surgency is positively associated with externalizing problems ($\beta = .24, p < .05$). *Hypothesis 2b2* was supported.

5.2.3 Effortful Control, Surgency, and Agreeableness

Hypothesis 3a predicted that effortful control is positively related to agreeableness. The standardized path coefficient revealed that effortful control showed a positive association with agreeableness ($\beta = .47, p < .05$). *Hypothesis 3a* was supported.

Hypothesis 3b proposed that surgency is negatively related to agreeableness. The standardized path coefficient revealed that surgency showed a negative association with agreeableness ($\beta = -.24, p < .05$). *Hypothesis 3b* was supported.

5.2.4 Agreeableness and Behavioral Adjustment

The fourth hypothesis anticipated that agreeableness is positively related to adaptive skills and negatively related to externalizing problems. The standardized path coefficients indicated that agreeableness is positively associated with adaptive skills ($\beta = .25, p < .05$; see Figure 4 on page 87) but negatively associated with externalizing problems ($\beta = -.71, p < .05$, see Figure 5 on page 88). *Hypothesis 4* was supported.

5.2.5 Agreeableness as a Mediator between Temperament Predispositions and Behavioral Adjustment

As previously discussed, there are several ways to evaluate whether the mediated effect is statistically significant. For the present study, we used the probing techniques proposed by MacKinnon (1994): an estimate of the mediated effect is obtained by multiplying the corresponding estimates from *a* and *b* paths. The *a* path is the relation of independent variable (in particular, effortful control and surgency) to mediator (i.e., agreeableness). The *b* path is the relation of mediator (i.e.,

agreeableness) to outcome variables (in particular, adaptive skills and externalizing problems). The product of the *a* and *b* paths, *ab*, is also known as indirect effect or mediated effect. Additionally, a 95% asymmetric confidence intervals for each mediated effect was generated in RMediation using respective estimates and standard errors of the paths (Ranby et al., 2011).

Hypothesis 5a1—that agreeableness would mediate the relation between effortful control and adaptive skills—was tested using RMediation. Figure 6 (page 91) presents a kernel density plot of the distribution of two normally distributed variables and the associated CI with error bars. By extension, as graphically shown in Figure 6 (page 91), this means that the mediated effect of agreeableness through effortful control on adaptive skills is significant, $ab = .20$, 95% CI [.01, .49]. Our findings indicate that direct effect of effortful control on adaptive skills was statistically significant. Following Baron and Kenny's (1986) and MacKinnon's (1994) recommendations, this suggests that agreeableness was a significant partial mediator in the relation between effortful control and adaptive skills. *Hypothesis 5a1* was partially supported. Preschoolers' effortful control increased his or her levels of agreeableness, which in turn increased his or her adaptive skills.

Hypothesis 5a2—that agreeableness would mediate the relation between effortful control and externalizing problems—was tested next. Figure 7 (page 92) presents a kernel density plot of the distribution of two normally distributed constructs and the associated CI with error bars. By extension, as graphically shown in Figure 7 (page 92), this means that the mediated effect of agreeableness through effortful control on externalizing problems is significant, $ab = .60$, 95% CI [−1.22, −.15]. Our findings indicate that direct effect of effortful control on externalizing problems was statistically significant. Following Baron and Kenny's (1986) and MacKinnon's (1994)

recommendations, this suggests that agreeableness was a significant partial mediator in the relation between effortful control and externalizing problems. *Hypothesis 5a2* was partially supported. Preschoolers' effortful control increased his or her levels of agreeableness, which in turn decreased his or her externalizing problems.

Hypothesis 5b1—that agreeableness would mediate the relation between surgency and adaptive skills—was examined using RMediation. Figure 8 (page 93) presents a kernel density plot of two normally distributed constructs and the associated CI with error bars. By extension, as graphically shown in Figure 8 (page 93), this means that the mediated effect of agreeableness through surgency on adaptive skills is not significant, $ab = .06$, 95% CI $[-.01, .15]$. *Hypothesis 5b1* was not supported.

Hypothesis 5b2—that agreeableness would mediate the link between surgency and externalizing problems—was tested next. Figure 9 (page 94) presents a kernel density plot of two normally distributed constructs and the associated CI with error bars. By extension, as graphically shown in Figure 9 (page 94), this means that the mediated effect of agreeableness through surgency on externalizing problems is significant, $ab = .18$, 95% CI $[.02, .40]$. Our findings indicate that direct effect of surgency on externalizing problems was statistically significant. Following Baron and Kenny's (1986) and MacKinnon's (1994) recommendations, this suggests that agreeableness was a significant partial mediator in the relation between surgency and externalizing problems. *Hypothesis 5b2* was partially supported. Preschoolers are seemingly able to use social-personality resources (aspects of agreeableness) to redirect their temperamental predispositions (i.e., surgency) and to engage in less externalizing problems.

5.3 Summary

We used structural equation modeling to examine the potential mediating role of agreeableness in the associations between temperament predispositions and behavioral adjustment. Two hypothesized models tested in this chapter were first constructed and introduced in Chapters 1 and 2. These models were proposed based on the existing literature, past studies, and developmental theories. Descriptive analyses of the data were presented and following these analyses, the empirical findings of the structural models were then depicted in Figures 4 and 5 (pages 87 to 88). As expected, effortful control was positively associated with agreeableness and adaptive skills but negatively associated with surgency and externalizing problems. Consistent with the predictions, surgency was positively associated with externalizing problems but negatively associated with agreeableness. In addition to these direct associations between effortful control and surgency and adaptive skills and externalizing problems, agreeableness was a significant partial mediator between effortful control and surgency, and externalizing problems. Agreeableness also emerged as a significant partial mediator between effortful control and adaptive skills, but not for the relation between surgency and adaptive skills.

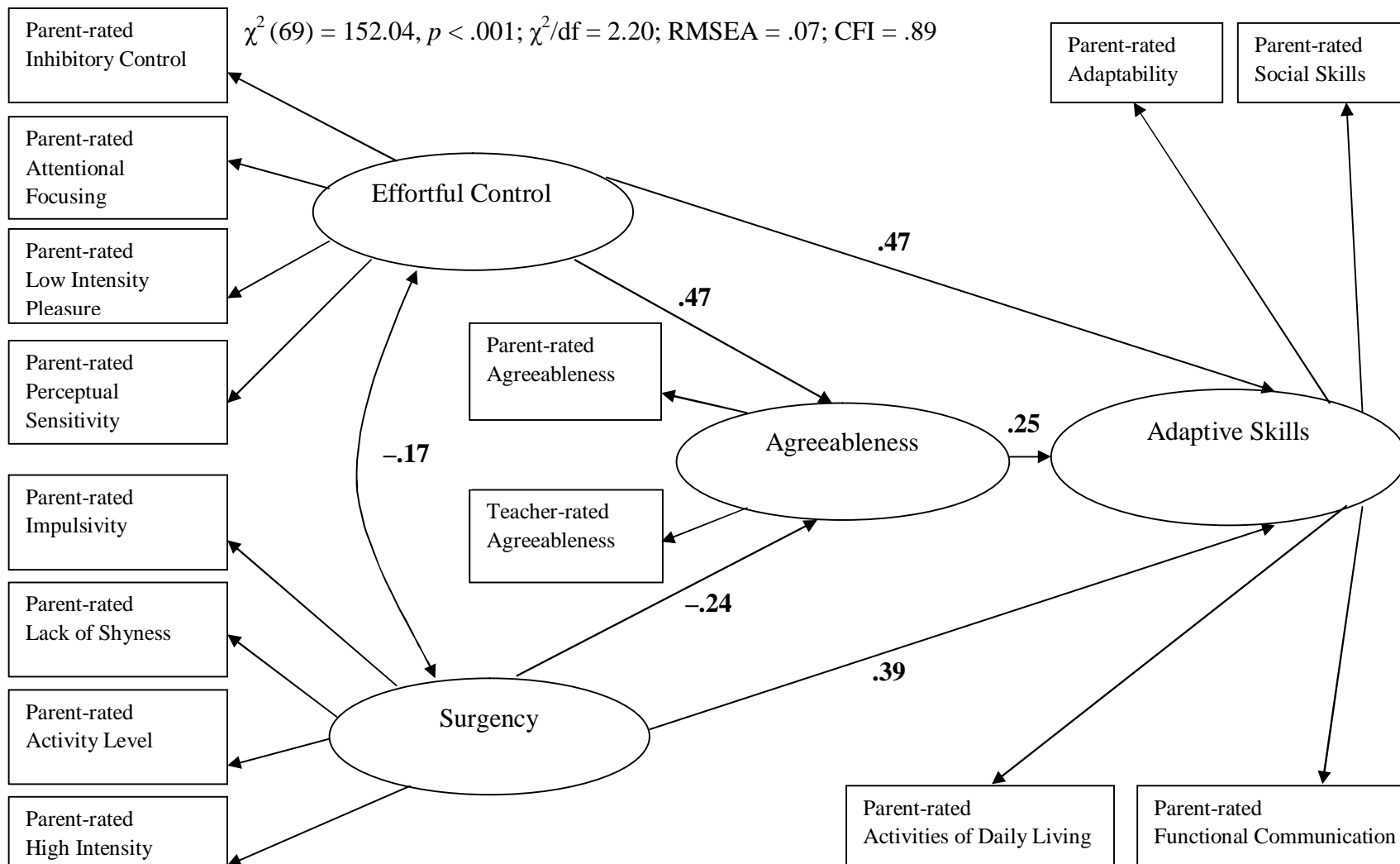


Figure 4. Fit of hypothesized model linking effortful control and surgency to agreeableness and adaptive skills. Note. Path coefficients are presented in standardized units. Coefficients in **bold** differ significantly at $p < .05$.

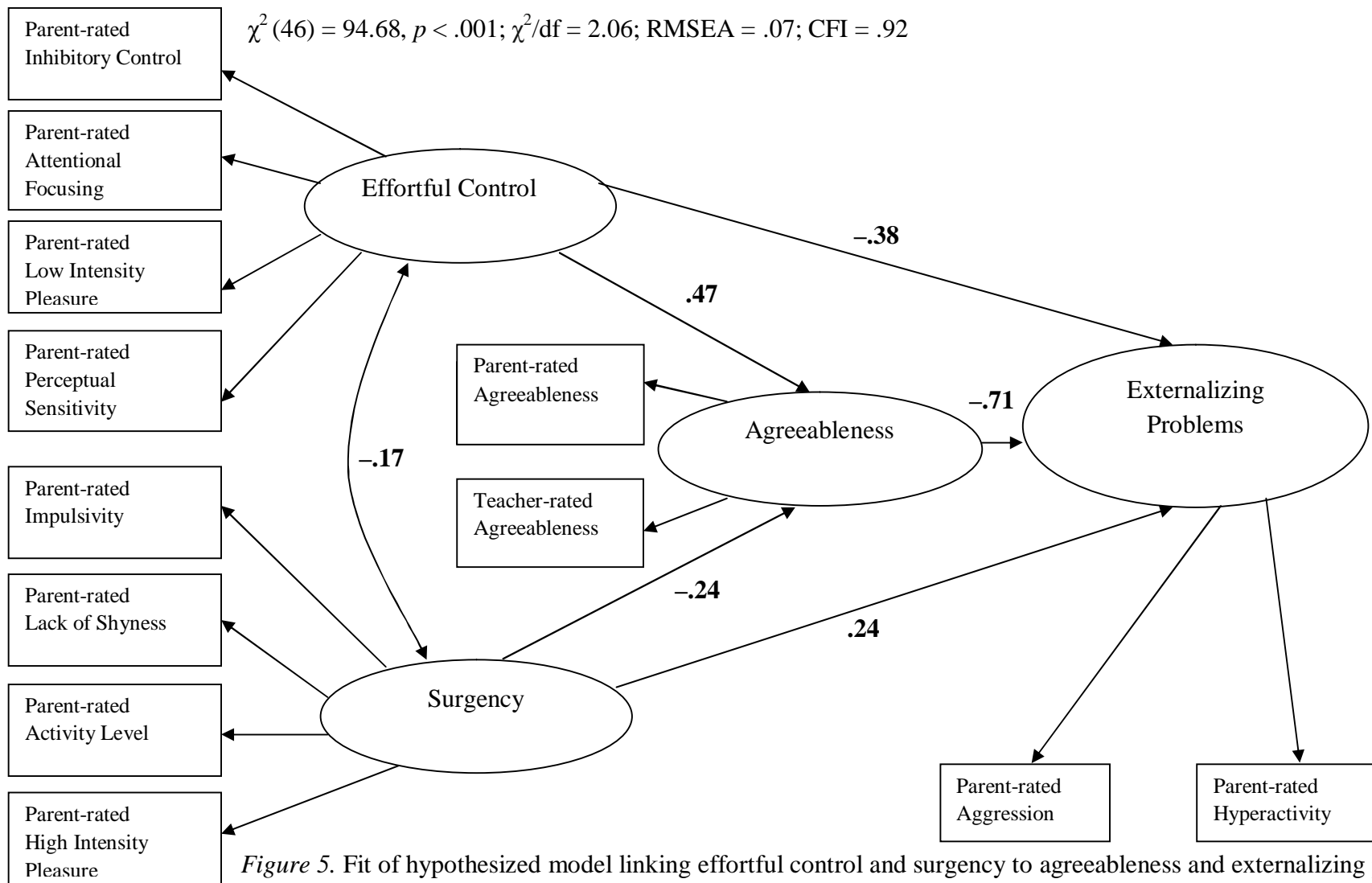


Figure 5. Fit of hypothesized model linking effortful control and surgency to agreeableness and externalizing problems. Note. Path coefficients are presented in standardized units. Coefficients in **bold** differ significantly at $p < .05$.

Table 10

Summary of the Hypotheses and Findings Relating Effortful Control, Surgency, and Agreeableness to Adaptive Skills and Externalizing Problems

Hypothesis	Findings
<i>Hypothesis 1</i> : Effortful control is expected to be negatively related to surgency.	<i>Hypothesis 1</i> was supported.
<i>Hypothesis 2a1</i> : Effortful control is expected to be positively related to adaptive skills.	<i>Hypothesis 2a1</i> was supported.
<i>Hypothesis 2a2</i> : Effortful control is expected to be negatively related to externalizing problems.	<i>Hypothesis 2a2</i> was supported.
<i>Hypothesis 2b1</i> : Surgency is expected to be negatively related to adaptive skills.	<i>Hypothesis 2b1</i> was not supported.
<i>Hypothesis 2b2</i> : Surgency is expected to be positively related to externalizing problems.	<i>Hypothesis 2b2</i> was supported.
<i>Hypothesis 3a</i> : Effortful control is expected to be positively related to agreeableness.	<i>Hypothesis 3a</i> was supported.
<i>Hypothesis 3b</i> : Surgency is expected to be negatively related to agreeableness.	<i>Hypothesis 3b</i> was supported.

(table continues)

Table 10 (*continued*)

Hypothesis	Findings
<i>Hypothesis 4:</i> Agreeableness is expected to be positively related to adaptive skills and negatively related to externalizing problems.	<i>Hypothesis 4</i> was supported.
<i>Hypothesis 5a1:</i> Agreeableness is expected to mediate the link between effortful control and adaptive skills.	<i>Hypothesis 5a1</i> was partially supported.
<i>Hypothesis 5a2:</i> Agreeableness is expected to mediate the link between effortful control and externalizing problems.	<i>Hypothesis 5a2</i> was partially supported.
<i>Hypothesis 5b1:</i> Agreeableness is expected to mediate the link between surgency and adaptive skills.	<i>Hypothesis 5b1</i> was not supported.
<i>Hypothesis 5b2:</i> Agreeableness is expected to mediate the link between surgency and externalizing problems.	<i>Hypothesis 5b2</i> was partially supported.

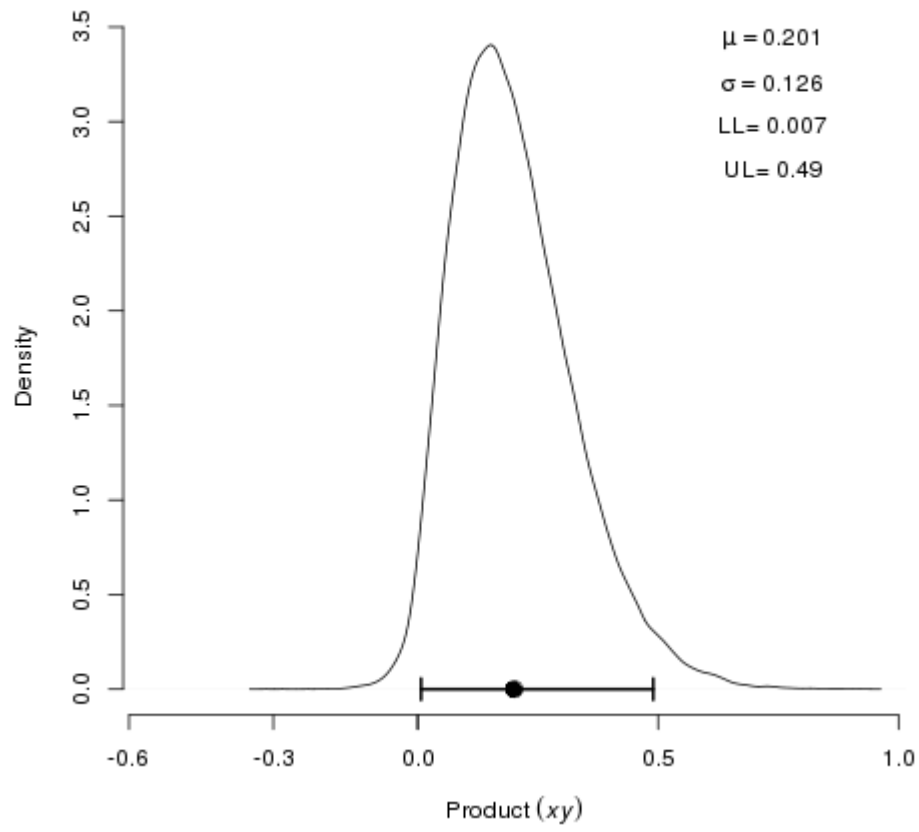


Figure 6. Kernel density plot of the distribution of the product of two normally distributed constructs (i.e., effortful control and adaptive skills) and the 95% CI with error bars for agreeableness as a mediator, with $a = .38$, $b = .52$, $SE(a) = .17$, $SE(b) = .20$. LL = lower limit, UL = upper limit.

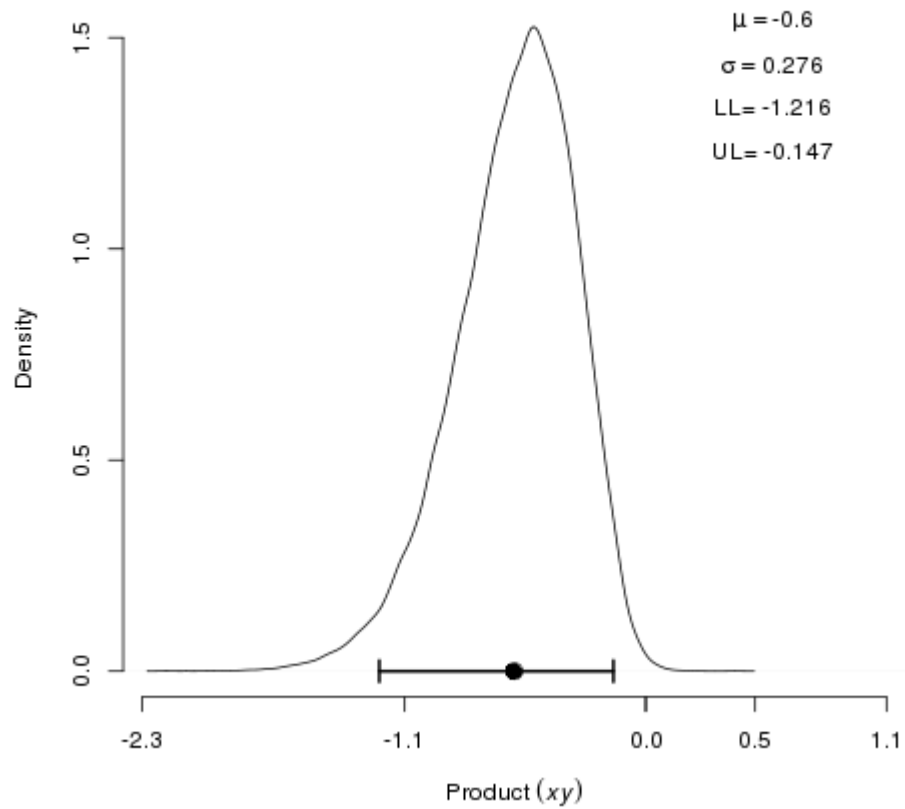


Figure 7. Kernel density plot of the distribution of the product of two normally distributed constructs (i.e., effortful control and externalizing problems) and the 95% CI with error bars for agreeableness as a mediator, with $a = .51$, $b = -1.16$, $SE(a) = .17$, $SE(b) = .35$. LL = lower limit, UL = upper limit.

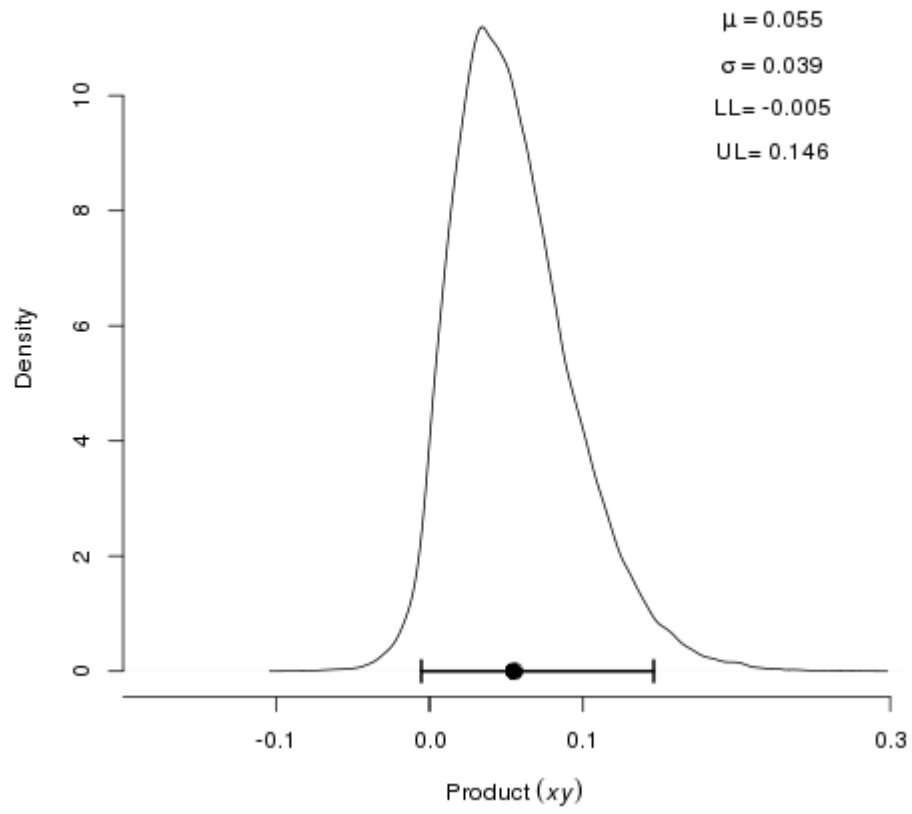


Figure 8. Kernel density plot of the distribution of the product of two normally distributed constructs (i.e., surgency and adaptive skills) and the 95% CI with error bars for agreeableness as a mediator, with $a = .10$, $b = .05$, $SE(a) = .05$, $SE(b) = .20$. LL = lower limit, UL = upper limit.

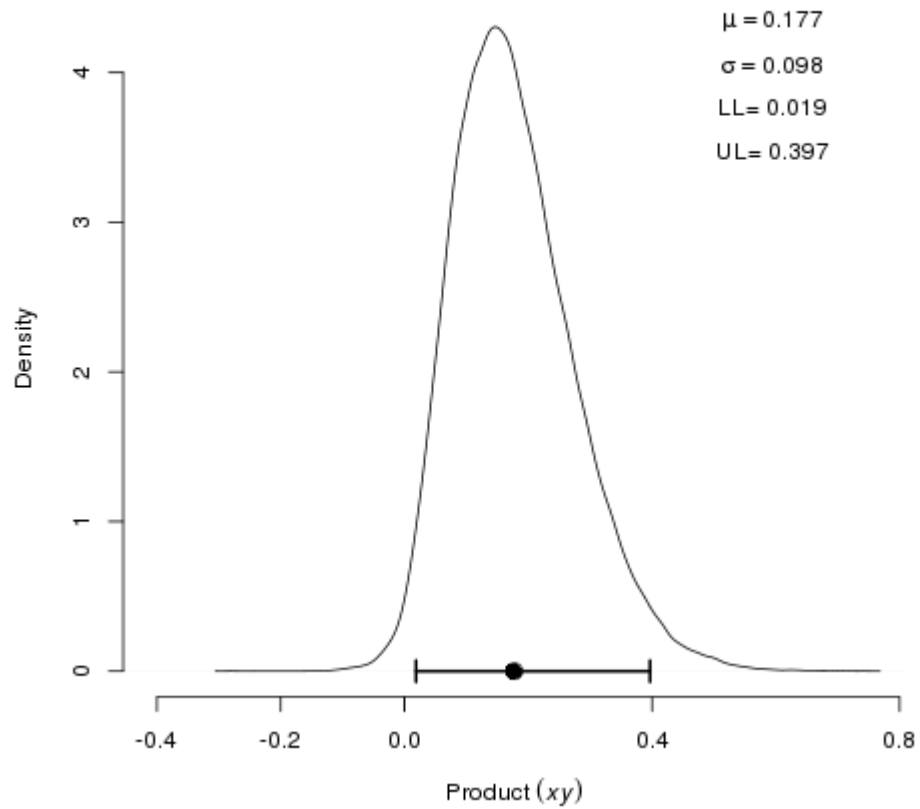


Figure 9. Kernel density plot of the distribution of the product of two normally distributed constructs (i.e., surgency and externalizing problems) and the 95% CI with error bars for agreeableness as a mediator, with $a = -.15$, $b = -1.16$, $SE(a) = .06$, $SE(b) = .35$. LL = lower limit, UL = upper limit.

CHAPTER SIX

DISCUSSION

Section 6.1 summarizes and discusses the findings of the thesis and potential implications—theoretically and practically. Specifically, all research findings associated with the various research questions are discussed from Section 6.1.1 to Section 6.1.5. Practical implications of the present study are presented in Section 6.2. In Section 6.3, we point out some limitations of this thesis, and outline some important and interesting extensions for future research. Lastly, we present a summary at the end of this chapter.

6.1 Summary of Findings

The goal of this study was to examine the direct and indirect effects of temperamental predispositions (operationalized as effortful control and surgency) on behavioral adjustment (operationalized as adaptive skills and externalizing problems) in preschoolers, taking into account the possible mediating roles of agreeableness. Specifically, two central research questions were examined that dealt with (a) the relations between temperament predispositions, personality dimension of agreeableness, and behavioral adjustment and (b) the possibility that agreeableness could serve as a mediator between temperament predispositions and behavioral adjustment.

Prior to answering the research questions, it is equally important to examine the psychometric properties of the two broad domains of preschoolers' behavioral adjustment used specifically in the present study—adaptive skills and externalizing problems. Therefore, we examined the psychometric properties of two of BASC-2's

composite scales—Adaptive Skills and Externalizing Problems. In particular, our aim for this psychometric analysis was to evaluate the validity of parent-, teacher-, and observer ratings of adaptive skills and externalizing problems using established validation procedures (i.e., MTMM approach and confirmatory factor analysis). Thus, the present study provided a systematic and comprehensive examination of the comparative strengths of three informants pertaining to two broad domains of behavioral adjustment. The findings suggest that parent ratings, in comparison with teacher- and observer ratings, have a better combination of convergent and discriminant validity. Teacher ratings and observer ratings, on the other hand, demonstrated mid-level validity. Consequentially, only parent ratings on adaptive skills and externalizing problems were used for all subsequent analyses in the present study. Indeed, parents are widely acknowledged as a valuable source of information on preschoolers' social-behavioral functioning skills (Spangler & Gazelle, 2009). At the preliminary level, it is suggested that BASC-2 PRS (Adaptive Skills and Externalizing Problems Composite scales, in particular) could be used as an initial tool to evaluate preschoolers' behavioral adjustment when researchers have limited resources (details were discussed in Chapter 3).

Although not conclusive, our study extends previous findings by Bender et al. (2008) and Mahan and Matson (2011), allowing greater understanding of the aspects of construct validity of two broad domains of preschoolers' behavioral adjustment who were assessed by parents, teachers, and observers. In the present study, observational ratings were obtained via momentary time sampling (MTS). Collecting observational data via this method is well established and research has shown that with training, such data obtained is both reliable and valid (Lett & Kamphaus, 1997). Indeed, MTS has a long tradition in the field. As a result of real-life assessment and absence of

retrospective biases, multiple studies lend support that MTS could enhance generalizability pertaining to one's behaviors (Ardoin & Martens, 2004; Burt & Donnellan, 2010; Ebner-Priemer & Trull, 2009; Hilbert, Rief, Tuschen-Caffier, de Zwaan, & Czaja, 2009). For example, Burt and Donnellan (2010) added MTS as additional data to test the validity of the Sub-Types of the Antisocial Behavior questionnaire (STAB) and found that STAB scale uniquely predicted the momentary acting-out behaviors. In the present study, the direct observational variables and coding scheme were based on existing measures such as the BASC-2 Student Observation System (BASC-2 SOS) used in the behavioral adjustment literature. Despite its strengths, there may be other behavioral categories which are not included in the coding scheme used in the present study. This might limit study's contributions to psychometric literature. The second limitation that should be noted is that our data were obtained in a nonreferred, preschool-going sample. Caution in interpreting these findings is warranted because validation analyses of BASC-2 in different samples might yield different results. For example, clinic-referred child participants may have other deficits or comorbid conditions that account for the magnitude of the relation between adaptive skills and externalizing problems (Trentacosta & Fine, 2009).

In the following sections, a detailed discussion of the specific findings based on the research questions is presented.

6.1.1 Effortful Control and Surgency

The hypothesis that effortful control would be negatively related to surgency was supported. As postulated previously, our proposition aligns with developmental theory, specifically Rothbart's notion that effortful control and surgency represent one's regulation of arousal and response to new situations, respectively. Put

differently, effortful control reflects one's tendency to withdraw whereas surgency reflects one's tendency to approach. Indeed, these two aspects of temperament could serve as components within a broad framework to explain the early development of attentional and emotional systems in preschoolers. This finding is also in line with previous research by Ahadi et al. (1993) and Cumberland-Li et al. (2004), which document a similar association between effortful control and surgency and suggest that one's attentional focusing and inhibitory control (aspects of effortful control) can serve to modulate his or her response to new situations in pursuit of personal gain (aspects of surgency). So far, effortful control and surgency have been examined in isolation. There is limited research on this topic area using preschool samples. To the best of our knowledge, this is the first study to examine this pattern of relationships using a preschool sample from Southeast Asia.

6.1.2 Effortful Control, Surgency, and Behavioral Adjustment

6.1.2.1 Effortful Control and Behavioral Adjustment

The findings provided support for the hypotheses that effortful control is expected to be positively associated with adaptive skills but negatively associated with externalizing problems. Discussion and potential implications pertaining to *Hypotheses 2a1* and *2a2* will be highlighted more fully below.

Beginning with the proposed relation between effortful control and adaptive skills, as stated in *Hypothesis 2a1*, the result provides evidence that effortful control was positively related to adaptive skills. This result is consistent with our hypothesis and with results from previous studies (e.g., Dennis et al., 2007; Eisenberg et al., 2004; Karreman et al., 2009; Zhou et al., 2004) documenting significantly greater positive

adjustment outcomes for preschoolers with higher levels of effortful control. What is novel in this study is that it expands previous findings by demonstrating this association in a typically developing preschool sample. This finding suggests that a higher level of effortful control could enable preschoolers to inhibit impulses and to regulate socially inappropriate behaviors in preschool settings. This result also supports findings from extant research, which generally report a clear association between effortful control and adaptive skills. For example, Zhou et al. (2004) examined relations between children's effortful control and children's social functioning of first and second graders (7 to 10 years old; $N = 425$) in Beijing, China, and found that high effortful control uniquely predicted Chinese children's high social functioning.

With respect to the proposed relation between effortful control and externalizing problems in *Hypothesis 2a2*, a significant and negative association between effortful control and externalizing problems was found to be supported. Despite the dual role of regulation (aspects of effortful control) and reactivity (aspects of surgency) in the prediction of externalizing problems, it is possible that lower levels of effortful control could intensify the relation between surgency and externalizing problems. In this regard, we performed a series of hierarchical regression analyses to examine the interactive effects of temperament predispositions to preschoolers' externalizing problems. Moderational analyses and the testing of the interaction effect followed the recommendations of Aiken and West (1991) and Cohen, Cohen, West, and Aiken (2003). Results indicate that the relation between surgency and externalizing problems was stronger for preschoolers with lower levels of effortful control, $b = .30$, $t = 4.62$, $p < .001$. Collectively, results found were in line with our hypothesis and previous research (e.g., Eisenberg et al., 2001; Spinrad et al., 2004;

Zhou et al., 2009) documenting significantly poorer adjustment outcomes for preschoolers with lower levels of effortful control. This finding sheds light that preschoolers' poor self-regulatory skills, could likely create a disruption and interfere with their behavioral functioning.

6.1.2.2 Surgency and Behavioral Adjustment

Overall findings provided support for the direct effects between surgency and adaptive skills and externalizing problems. In particular, our findings can be presented as follows: (a) the relation between surgency and adaptive skills—*Hypotheses 2b1* and (b) the relation between surgency and externalizing problems—*Hypotheses 2b2*. Discussion and potential implications pertaining to *Hypotheses 2b1* and *2b2* will be highlighted more fully below.

Hypothesis 2b1 posited a negative association between surgency and adaptive skills. We found that association between surgency and adaptive skills was statistically significant but not in the expected direction. This pattern of findings does not support our assertion that surgent preschoolers appear to be those who act in ways either spontaneous or impulsive, thus resulting in poor social adjustment (Putnam et al., 2001). One possible explanation for this discrepancy in the present finding is that surgency might be negatively related to adaptive skills only in more extreme cases, such as in samples that comprise many preschoolers who are *extreme* in surgency. It is important to acknowledge that surgency is a heterogeneous construct with multiple components. Each component may have a different association (or none) with adaptive skills. A detailed discussion pertaining to the construct of surgency is presented in Section 6.1.5.

The present study provides evidence that surgency was positively related to externalizing problems—*Hypothesis 2b2*. One remaining question is that whether all of the facet scales of surgency are significantly associated with externalizing problems. In this regard, we conducted a series of bivariate analyses to examine relations between facets of surgency with externalizing problems. All facet scores of surgency except lack of shyness ($r = .14$, Cohen's $d = 0.28$, ns) were positively correlated to externalizing problems; however, the magnitude of the correlation between impulsivity ($r = .31$, Cohen's $d = 0.65$, $p < .05$) and externalizing problems was strongest, followed by activity level ($r = .27$, Cohen's $d = 0.56$, $p < .05$) and high intensity pleasure ($r = .26$, Cohen's $d = 0.54$, $p < .05$). Take together, the finding from the present study appears consistent with previous research documenting that high levels of various components of surgency combined, were predictive of externalizing problems. For example, Eisenberg et al. (2005) examined the relations of impulsivity to externalizing problems in a sample of 185 children aged 6 through 9 years. The authors found that impulsivity predicted stability in externalizing problems status over 2 years. This present finding corroborates and extends past research by illustrating empirically, that surgency (comprising impulsivity, lack of shyness, activity level, and high intensity pleasure) added unique variance to the prediction of externalizing problems in a sample of preschoolers.

6.1.3 Effortful Control, Surgency, and Agreeableness

The results demonstrated support for the direct effects between temperamental predispositions and the personality dimension of agreeableness. In particular, our findings can be presented as follows: (a) the relation between effortful control and agreeableness—*Hypotheses 3a* and (b) the relation between surgency and

agreeableness—*Hypotheses 3b*. Discussion and potential implications pertaining to *Hypotheses 3a* and *3b* will be highlighted more fully below.

There was empirical support for *Hypotheses 3a*; the finding from this study showed that effortful control was significantly correlated with agreeableness in the positive direction. This finding lends support to Abe's (2005) views that agreeableness encompasses one's inhibition of negative emotions in social interactions. As such, the early ability to regulate emotions (aspects of effortful control) affects one's ability to voluntarily control behaviors in pursuit of situational demands. Taken as a whole, this result provides additional support to findings from a handful of studies (e.g., Jensen-Campbell et al., 2002) showing that preschoolers' who can regulate their attention and behavior have a tendency to be agreeable.

With respect to the proposed relation between surgency and agreeableness, as stated in *Hypothesis 3b*, the finding from the present investigation provides empirical evidence to a growing body of research demonstrating the negative association between surgency and agreeableness. A review of the literature suggested that isolated components of surgency have been examined from time to time, and that surgency as a whole construct has not been adequately studied. For example, most previous studies examined the surgency-agreeableness link for only a single component of surgency such as impulsivity (e.g. Cumberland-Li, 2004). The finding extends growing evidence for the value of incorporating different components of surgency (e.g., impulsivity, lack of shyness, activity level, and high intensity pleasure) to explain more significant variance in preschoolers' agreeableness.

6.1.4 Agreeableness and Behavioral Adjustment

This study's finding lends credence to the hypothesis that agreeable preschoolers are likely to exhibit high adaptive skills and low externalizing problems—*Hypothesis 4*. Our results are consistent with existing research and theoretical evidence suggesting significant links between agreeableness and behavioral adjustment. It is noteworthy that agreeableness is a resilience factor to maintain one's positive interpersonal relationships (e.g., Meier et al., 2006; Nigg, 2006; Onishi et al., 2001; Robinson & Wilkowski, 2006). So far, the relations between agreeableness and adaptive skills and between agreeableness and externalizing problems have been examined somewhat in isolation and to date, there is still limited research on this topic area focusing on preschool samples. The present findings here extend growing evidence for the value of incorporating two broad domains in a single study to explain even more variance in behavioral adjustment, operationalized as adaptive skills and externalizing problems using a preschool sample. Our findings suggest that preschoolers who have higher levels of agreeableness show greater positive adjustment in daily living such as adaptability, social skills, and functional communication. In contrast, preschoolers who have lower levels of agreeableness show greater externalizing problems including aggression and hyperactivity.

6.1.5 Agreeableness as a Mediator between Temperament Predispositions and Behavioral Adjustment

Two hypothesized models pertaining to the mediating role of agreeableness between temperament predispositions, operationalized as effortful control and surgency, and behavioral adjustment, operationalized as adaptive skills and externalizing problems, were evaluated.

The findings showed that agreeableness partially mediated the relation between effortful control and behavioral adjustment. In particular, the mediating effects can be presented as follows: (a) the significant indirect effect of effortful control on adaptive skills was through its effect on agreeableness—*Hypothesis 5a1* and (b) the significant indirect effect of effortful control on externalizing problems was through its effect on agreeableness—*Hypothesis 5a2*. Each of the mediating association will be discussed more fully below.

Hypothesis 5a1 posited that agreeableness would mediate the relation between effortful control and adaptive skills. Results indicated that agreeableness partially mediated the relation between effortful control and adaptive skills. To the best of our knowledge, this is a novel finding and one that has yet to be identified in the temperament literature. One possible explanation consistent with these findings, posited by Graziano et al. (1996), is that preschoolers who are high in regulatory capabilities have good skills to manage and to focus their attention and they are more likely to maintain positive interpersonal relationships with others. In turn, through their ability to maintain positive interpersonal relationships with others, these preschoolers are more likely to display socially competent behaviors in daily life such as adaptability, social skills, and functional communication.

Hypothesis 5a2 posited that agreeableness would mediate the relation between effortful control and externalizing problems. The present findings extend research demonstrating that agreeableness partially mediated the relation between effortful control and externalizing problems. Developmental theories and previous findings on early childhood development may provide a possible explanation for the present findings. Preschoolers who are not capable of modulating their attention may place themselves at risk for emotional distress and poor interpersonal skills, which in turn,

results in increased risk for developing problem behaviors such as aggression and hyperactivity. Thus, the present findings expand on the work of Cumberland-Li et al. (2004) by highlighting process mechanisms—the mediating role of agreeableness—explaining why preschoolers with low levels of effortful control could have greater externalizing problems.

The results revealed that agreeableness was a significant partial mediator between surgency and externalizing problems but not for adaptive skills. In particular, the mediating effects (or non mediating effects) can be presented as follows: (a) there was a nonsignificant indirect effect of surgency on adaptive skills, and agreeableness did not emerge as a mediator—*Hypothesis 5b1* and (b) the significant indirect effect of effortful control on externalizing problems was through its effect on agreeableness—*Hypothesis 5b2*. The results of each hypothesis will be discussed more fully below.

Hypothesis 5b1 posited that agreeableness would mediate the relation between surgency and adaptive skills. Contrary to expectations, agreeableness did not significantly mediate the link between surgency and adaptive skills. Rather, the results demonstrated that surgency and agreeableness independently predicted adaptive skills. One possibility is that the inconsistent findings may be result of construct issues surrounding surgency. It is important to acknowledge that surgency is a heterogeneous construct with multiple components. An important question to consider is whether each component of surgency (e.g., impulsivity, lack of shyness, activity level, and high intensity pleasure) could have a different association (or none) with adaptive skills. Putnam and Rothbart (2006) first developed the CBQ Short Form (CBQ SF) to measure surgency with a 25-item scale that assessed preschoolers' sensitivity to clues of rewards or termination of punishment and each item was rated on a 7-point scale ranging from 1 (*extremely untrue of your child*) to 7 (*extremely true*)

of your child). Putnam and Rothbart (2006) also constructed the CBQ Very Short Form (CBQ VSF) in reference to the factor pattern characteristic of the CBQ Standard Form. In particular, the CBQ VSF contains 12 items measuring surgency. Regardless of the directionality, these 12 items were loaded the surgency. It is crucial to note that not all components (e.g., impulsivity, lack of shyness, activity level, and high intensity pleasure) exert their influence in the same way and no particular component plays a critical or all encompassing role (Allen & Armour-Thomas, 1993; Putnam & Rothbart, 2006). Therefore, when combined under a higher order construct of surgency, the component effects may cancel each other out. In this regard, we conducted a series of bivariate analyses to examine the relations between facets of surgency with adaptive skills. Findings indicated that only two facet scores of surgency namely impulsivity ($r = .35$, Cohen's $d = 0.75$, $p < .05$) and high intensity pleasure ($r = .17$, Cohen's $d = 0.35$, $p < .05$) were significantly positively correlated to adaptive skills. A similar pattern of relationships was obtained for the other two remaining facet scores namely lack of shyness and activity level. But these relationships did not reach significance. The findings provide evidence that the different components may not all be positively and significantly related to adaptive skills. There is clear evidence documenting that impulsivity is positively related to low behavioral control in social situations. No conclusive results have been found for associations between lack of shyness, another component of surgency, and difficulties in social adjustment. Lack of shyness reflects one's exhibitory and approach regulation styles (Eisenberg et al., 1995). This suggests that a higher level of excitement in approaching new social situations could reflect one's relative strength of the BAS toward novel stimuli and reward cues (Eisenberg et al., 1995). As such, overactivation of the BAS may be manifested in children's *extreme* high sociability, which in turn, is associated with a wide array of behavioral

problems (Xu et al., 2009). Taken together, it is possible that perhaps agreeableness would significantly mediate the relation between surgency and adaptive skills only in samples that contain many preschoolers who are *very extreme* in surgency—additional research is needed to confirm this assertion in samples containing more children with problem behaviors that account for the magnitude of the relation between surgency, agreeableness, and behavioral adjustment.

Hypothesis 5b2 posited that agreeableness would mediate the relation between surgency and externalizing problems. Congruent with expectations, agreeableness acts as a partial mediator between surgency and externalizing problems. Indeed, there is insufficient research regarding potential mechanisms which underlie the relation between surgency and externalizing problems. The present study is, to the best of our knowledge, the first to examine agreeableness as a mediator in the relation between surgency and externalizing problems in a preschool sample. Our findings provided support for the hypothesis that preschoolers with high surgency are at increased risk for externalizing problems. More importantly, we also found that agreeableness may appear to be a protective factor in the development of externalizing problems in preschoolers. Such a protective factor, agreeableness, has been thought to be one whereby it could critically determine whether a preschooler is able to successfully redirect at-risk characteristics to more positive behavioral outcomes (Keogh, 2003). One possible explanation consistent with these findings is that preschoolers are seemingly able to use social resources like social interactions and interpersonal relationships (aspects of agreeableness) to redirect risk factors associated with their temperamental predispositions such as surgency and to display fewer externalizing problems. Taken together, there is great capacity for improving behavioral adjustment if interventions target the personality dimension of agreeableness.

6.2 Implications

This study contributes to the body of work on early childhood development in at least three ways. One way is that the current results provide useful information for theory building. As far as we are aware, most researchers have examined the relations between temperamental predispositions and behavioral adjustment, between temperamental predispositions and agreeableness, and between agreeableness and behavioral adjustment using Western samples but so far previous studies have yet to include an investigation in a sample of Asian preschoolers (Helmsen et al., 2012). Therefore, the main goal of this thesis is to contribute to the developmental literature about how temperamental predisposition (in particular, effortful control and surgency) and the personality dimension of agreeableness affect behavioral adjustment (in particular, adaptive skills and externalizing problems) using a sample of preschoolers from Malaysia. Specifically, our hypothesized models demonstrate that temperament predisposition appears to exert its influence on preschoolers' behavioral adjustment through the presence of agreeableness as a mediator. The present research extends previous studies by using a sample of preschoolers from Malaysia, thus contributing to theory building.

We can conclude that credibility for a theoretical model is gained, if multisite studies with different methodology including procedures, populations, and informants yield similar and consistent findings (Stern & Kalof, 1996). In light of this, researchers gradually refine and improve a theoretical model by delineating instances where the theory holds and instances where it does not (Stern & Kalof, 1996). Our present findings provide evidence for direct and indirect links between temperament predispositions, personality dimension of agreeableness, and behavioral adjustment in the Asian context. These findings replicate and expand existing findings in the

developmental literature. In addition, present empirical findings suggest a theoretical distinction between temperament and personality correlates of behavioral adjustment, which have already shown support within Western samples (e.g., Cumberland-Li et al., 2004), may be generalized to Asian samples. In other words, our present findings provide evidence to support Abe's (2005) and Jensen-Campbell et al.'s (2002) notions that effortful control is a common developmental substrate of agreeableness, which plays a crucial role in modulating preschoolers' concentration and behavior in response to social interactions. Taken together, our mediational models provide additional building blocks to refining a relatively robust theoretical framework that can be generalized across different settings.

Second, present findings also lend support to recent theoretical and empirical work on culture and early childhood development. Indeed, distinct patterns of socialization in particular societies or communities are central in developmental studies (Chen & Eisenberg, 2012). From a contextual-developmental perspective, social interaction processes serve to mediate cultural influence on socioemotional functioning (Chen & French, 2008). Based on these arguments, cross-cultural variability might contribute to how temperament or personality characteristics are manifested and how these then relate to behavioral adjustment (Zhou et al., 2009). Specifically, cross-cultural variability could be characterized as collectivism versus individualism (Triandis, 2001). We acknowledge that even within collectivist cultures, there is much within cultural variability. However, it is equally important to acknowledge cross-cultural variability. To this end, there are two distinct cultural regions of the world, each with different needs and structures that are valued (Liou, 2007); one represents individualist cultures (e.g., the United States, the United Kingdom, Canada, Australia, New Zealand, France, Germany, Italy, Spain, and

Switzerland), the other represents collectivist cultures (e.g., China, Hong Kong, Korea, India, Indonesia, Japan, Malaysia, the Philippines, Singapore, Taiwan, Thailand, and Vietnam). In individualist contexts and cultures, individual needs, independence, and self-actualization are highly praised (Chen & Eisenberg, 2012; Triandis, 2001). In collectivist contexts and cultures, interdependent ties among individuals, group loyalty, and conformity to group standard are highly emphasized (Chen & Eisenberg, 2012; Triandis, 2001). Each culture could shape a unique personality structure. For example, Spanish are less individualistic and more collectivist as compared to Anglo American culture (Benet-Martinez & John, 1998). In such a collectivist culture, mutualism-and antagonism-related traits such as interdependence and achievement of goals, expression of positive emotions, and avoidance of interpersonal conflict are highly valued (Triandis, 2001). Taken together, this broad trait shapes a culture-level concept and is called *simpatia*, a need for positive interpersonal behaviors that encourage smooth and harmonious relationships (Benet-Martinez & John, 1998), which is truly unique to Spanish. Likewise, Malaysia, a collectivist society, is created as a result of peoples from diverse cultures, with diverse ethnicities, languages, and religions (Chan, 2011). It is reasonable to posit that one's efforts to maintain his or her positive relationships (i.e., core aspects of agreeableness) for familial and societal obligations and to meet the behavioral expectations of significant others in Malaysia are deemed important. In support of this premise, a recent study by Schmitt et al. (2007) found that *T*-score of Agreeableness for the Malaysia ($M = 48.55$, $SD = 6.77$) sample was higher than that of other countries in East Asia (e.g., Hong Kong, $M = 42.69$, $SD = 8.31$; Japan, $M = 42.21$, $SD = 8.81$; Republic of Korea, $M = 44.11$, $SD = 6.81$; Taiwan, $M = 44.74$, $SD = 8.04$). Given the political, religious, cultural, and economic climate in Malaysia, it is not surprising that college students from Malaysia reported higher

levels of agreeableness compared to college students from East Asia. Republic of Korea, for example, is a country with largely a single ethnic group and in a more homogenous society, discontentment and racial segregation issues are less noticeable.

For our sample, the Agreeableness scale showed reliability estimates of .65 and .61 for parent-and teacher ratings, respectively, which are more or less comparable to the results obtained by Benet-Martinez and John (1998, α s range from .65 to .75). Benet-Martinez and John (1998) found that Spanish samples, a collectivist culture, showed somewhat lower alpha coefficients for Agreeableness. They posited that cultural or sample differences are probably responsible for these discrepancies—the culture-level concept such as *simpatia* might be structured somewhat differently in Spanish. As postulated by Benet-Martinez and John (1998), the Big Five factors represent a broad, higher level of abstraction. At such level, its factor structures are quite general across cultural groups. However, personality factor structures at lower levels of abstraction (e.g., personal gains and strivings, life goals, and self-concepts) may appear more culturally specific. Despite the methodological shortcomings such as different sample characteristics, cultures, or a mixture of both, to some extent, our findings provide insights into the role of cross-cultural specificity and generality concerning agreeableness in a collectivist culture like Malaysia. The results obtained so far, however, fully warrant a more intensive study of the Big Five factors focusing on levels of abstraction, across East Asian cultures, comparing Malaysian children with other East Asian children.

As previously noted, researchers have classified Southeast Asian culture as being a relatively collectivistic culture (Oyserman, Coon, & Kemmelmeier, 2002) in which the individual's conformity to societal and in-group rules are highly valued (Huang, 2010). In the present study, we posited that preschoolers who can modulate

their emotions and behaviors well, thus enhancing their attention on others' needs and interests is something that is important in Southeast Asia and within Malaysia in particular. This assertion is in line with Chen and French's (2008) views that one's behavioral control is often regarded as less important in individualistic contexts and cultures, especially when he or she is in conflict with the pursuit of social and psychological goals. In contrast, to maintain interpersonal and group harmony, one's behavioral control may be manifested in a more consistent and absolute manner in collectivistic contexts and cultures (Chen & French, 2008).

Two recent theoretical and empirical studies on culture and child development could lend further credence to present findings. In the first study, Chen (2012) emphasized the role of peer social interaction as a context in mediating the links between cultural values and social functioning. During social interaction, preschoolers appraise and respond to others' behavior according to the norms, values, and social initiative, which in turn, serve to regulate their behaviors and developmental patterns. In the second study, Chen and Eisenberg (2012) argued that agency in most Asian societies is reflected in changing the self to fit the world, and this seems to be associated with one's acceptance of external demands, awareness of limitations, and striving for strong self-discipline. Therefore, cultural models of agency reflect preschoolers' socialization beliefs and practices, which in turn, enhance their regulatory behavior to accomplish social harmony and individual functioning.

Third, the present study's findings have implications for prevention and intervention efforts that target agreeableness. At the preliminary level, these findings have important implications both for understanding preschoolers' behavioral adjustment and the underlying mechanisms related to agreeableness. Specifically, Our findings provide a better understanding for delineating the pathways through which

preschoolers' individual differences contribute to positive adaptation (aspects of adaptive skills) and the emergence of psychopathology (aspects of externalizing problems). At such young age, preschoolers' personalities are both potentially changeable and malleable; therefore, this stage presents a good developmental milieu for preschoolers to establish and maintain positive behavioral adjustment (Dweck, 2008; Kernberg et al., 2000; Watson & Humrichouse, 2006).

Extant research has documented that personality traits in young children are modifiable, suggesting that prevention and intervention efforts could include modification of oppositional and antagonistic qualities—the opposite poles of agreeableness (Carver & Connor-Smith, 2010; Löckenhoff et al., 2008; McAdams & Olson, 2010; Soto et al., 2008). If interventions target personality dimension of agreeableness, there is great capacity for improving preschoolers' behavioral adjustment. For example, efforts to ameliorate psychopathology and to buffer one from developing externalizing problems, could target individuals' understanding of emotions and enabling them to elicit positive interpersonal relationship with others.

Shure (2006) introduced I Can Problem Solve (ICPS), a program designed to enhance a child's interpersonal cognitive problem solving skills (preschool through Grade 6). ICPS employs the problem solving approach, where children learn *how* to think, not *what* to think (Shure, 2006). In light of this, ICPS encompasses changing children's thinking style through a series of games and exercises. This, and other similar programs, is one way to promote children's behavioral adjustment and prosocial behavior, thus enriching their interpersonal relationships with others. ICPS also has the potential to reduce preschoolers' impulsivity and inhibition by improving problem-solving language and their ability to recognize others' feeling in social situations (Shure, 2006).

6.3 Limitations and Future Direction

A few limitations warrant comment. The main findings of the present study should be interpreted within the context of its limitations. First of all, the present study reports the mediating effect of agreeableness on the relation between temperament predispositions and behavioral adjustment using a preschool sample. The sample was a school-based, non-clinic sample of preschoolers which has limited generalizability for other types of settings. It would be interesting to examine similar models using a clinical sample (e.g., a sample from a psychiatric clinic or a community sample) to see if the present findings would be replicated. A related concern was that the preschoolers and their parents were mostly ethnic Chinese. In addition, there were far more mothers and female teachers in the study sample. Taken together, these participant characteristics are not representative and limit generalizability.

Second, even though present findings find support for two mediational models, given the cross-sectional design of the study, causal relationships between constructs of interest cannot be unequivocally determined. For example, concurrent SEM approach cannot be applied to prove causality, so it is unclear if the relation between temperamental predispositions and the personality dimension of agreeableness is merely correlational or if temperamental predispositions *affect* the personality dimension of agreeableness. The use of longitudinal designs would give greater confidence on the processes and the directionality of the effects found in the present study.

Third, the present study examined the correlates of preschoolers' behavioral adjustment with a focus on individual differences. Despite its strength for delineating the indirect pathways through which temperament predisposition appears to exert its

influence on preschoolers' behavioral adjustment along with the presence of agreeableness as a mediator, there may be other omitted mediating variables, however. Environmental variables such as parenting style and familial factors could contribute to affecting temperament or personality characteristics (Chen, Zhou, Eisenberg, Valiente, & Wang, 2011; Cumberland-Li et al, 2004; Eisenberg, Chang, Ma, & Huang, 2009; Eisenberg, Spinrad et al., 2010; Eisenberg, Vidmar et al., 2010) and these factors were not included in our mediational models.

6.4. Summary

The above limitations notwithstanding, the present study extended previous research by testing agreeableness as a mediator between temperament predispositions, operationalized as effortful control and surgency, and behavioral adjustment, operationalized as adaptive skills and externalizing problems, in a preschool sample from Malaysia. Grounded in the literature on personality psychology, specifically theory and research on early childhood development, these findings suggest that the pathway from what could be considered as more enduring temperament predispositions to preschoolers' behavioral adjustment is an indirect one; temperament predispositions can affect behavioral adjustment through the personality dimension of agreeableness which could be modified through intervention efforts.

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Appendix 1

Table A1

Correlations between All Major Observed Variables

Variable	1	2	3	4	5	6	7	8	9	10
1 Effortful Control										
2 Inhibitory Control	.59**									
3 Attentional Focusing	.73**	.25**								
4 Low Intensity Pleasure	.68**	.20**	.44**							
5 Perceptual Sensitivity	.70**	.38**	.36**	.35**						
6 Surgency	-.18*	.05	.21**	.22**	.04					
7 Impulsivity	-.14	-.05	.14	.18*	-.01	.78**				
8 Lack of Shyness	-.03	-.01	.07	.05	-.05	.66**	.46**			
9 Activity Level	-.19**	.01	.16*	.17*	.20**	.75**	.54**	.32**		
10 High Intensity Pleasure	-.19**	-.10	.29**	.19*	.02	.76**	.53**	.35**	.46**	
11 Parent-rated Agreeableness	.35**	.40	.25**	.20**	.18*	-.10	-.08	.01	-.07	-.16*
12 Teacher-rated Agreeableness	.08	.12	.12	-.02	-.06	-.06	-.13	.01	-.04	-.07
13 Adaptive Skills	.54**	.39**	.43**	.33**	.37**	.36**	.35**	.28	.36	.17*
14 Adaptability	.44**	.19**	.40**	.31**	.33**	.34**	.32**	.29**	.34**	.14
15 Social Skills	.47**	.34**	.43**	.32**	.21**	.31**	.29**	.23**	.24**	.26**
16 Functional Communication	.44**	.41	.39**	.19**	.31**	.24**	.18*	.22**	.26**	.14
17 Activities of Daily Living	-.06	.02	-.16*	.06	-.01	.01	.02	-.02	.09	-.08
18 Externalizing Problems	.11	-.11	.02	.16*	.18**	.32**	.31**	.14	.27**	.26**
19 Aggression	.11	-.04	.07	.15*	.27**	.27**	.26**	.11	.30**	.24**
20 Hyperactivity	.01	-.15*	-.03	.13	.07	.27**	.24**	.14	.28**	.24**

(table continues)

Table A1 (*continued*)

Variable	11	12	13	14	15	16	17	18	19	20
1 Effortful Control										
2 Inhibitory Control										
3 Attentional Focusing										
4 Low Intensity Pleasure										
5 Perceptual Sensitivity										
6 Surgency										
7 Impulsivity										
8 Lack of Shyness										
9 Activity Level										
10 High Intensity Pleasure										
11 Parent-rated Agreeableness										
12 Teacher-rated Agreeableness	.32**									
13 Adaptive Skills	.35**	.09								
14 Adaptability	.33**	.04	.82**							
15 Social Skills	.37**	.10	.80**	.62**						
16 Functional Communication	.22**	.09	.84**	.59**	.62**					
17 Activities of Daily Living	.01	-.02	.09	.13	.22**	.20**				
18 Externalizing Problems	-.40**	-.26**	-.16*	.11	-.05	.02	.43**			
19 Aggression	-.36**	-.28**	.21**	.15*	.04	.09	.32**	.91**		
20 Hyperactivity	-.37**	-.19**	.09	.05	-.13	-.05	.45**	.91**	.65**	

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