WAIT FOR ME: A PROCESS ACCOUNT OF INHIBITION

by

Stuart I. Hammond
MA Philosophy, Université de Montréal, 2004
BA Honours Psychology, University of Ottawa, 1999

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Name: Stuart Hammond

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Title of Thesis: Wait For Me: A Process Account of Inhibition

Chair: Dr. Cathy McFarland
Professor

Dr. Bryan Sokol
Senior Supervisor
Assistant Professor

Dr. Jeremy Carpendale
Supervisor
Professor

External Examiner: Dr. Maureen Hoskyn
Associate Professor
Faculty of Education

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ABSTRACT

At around age 2, children begin to *inhibit* their actions to meet social demands. Contrary to expectations, short, supervised inhibitory delays are more difficult for young children than long, unsupervised delays. This contradictory finding may have emerged because the dominant *executive function* tradition takes an *outcome* approach to inhibition, where only the success or failure of inhibition is monitored. In contrast, the minority *delay of gratification* tradition takes a *process* approach, examining the activities of children during the delay period. The present study adopts process methods to examine why young children are more successful on a long delay than a brief delay. Sixty-one 2-year-old children were presented with two tasks commonly used to measure inhibition. Their inhibitory activities were coded for *externalisation* and *internalisation*. Results showed that the strategies were differentially related to success on the two tasks. The implications for current approaches to social inhibition are discussed.

Keywords: INHIBITION; DELAY OF GRATIFICATION; EXECUTIVE FUNCTION; AGENCY

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INTRODUCTION

The ability to *inhibit* actions is essential to social life. Life in society requires that people accommodate to one another. Social inhibition first appears at around two years of age as a form of obedience to caregivers' requests, and subsequently develops into the ability to comply with requests and social norms in the absence of adult supervision. This form of inhibition occurs through social interaction; as such, research on social inhibition presents, if tacitly, a view of the relation between society and the individual.

Sociological approaches to this relation lie along an axis of *agency* and *structure* (also known as *individualism* and *collectivism*). Those taking an agentic position portray the individual as negotiating social problems through a series of personal choices. Examples of agentic approaches include existentialism and rational choice theory. Those who emphasise structure portray society as the dominant element, with social forces imposing behaviour on the individual. Examples of theories taking a structural approach include Durkheim's sociology and the Marxist tradition.

Analogous to the *nature-nurture* debate in psychology, everyone recognises that both elements (biology, the environment; the individual, society) play a role in behaviour. The crucial question is whether this recognition translates into a significant role for both elements in the resultant theory, or whether one element is soon downgraded or dismissed in favour of the other

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(Oyama, 2000). For example, the existentialist Jean-Paul Sartre admitted that a social factor, World War II, confronted one of his students with a difficult decision: the student could join the Free French Forces in England and fight for liberation, or stay in Nazi-occupied France to care for his mother. Despite the imposition of this agonizing choice by a social factor, Sartre argued that the decision was fundamentally the same as any other individual decision and that social factors were, in the end, irrelevant (Sartre, 1996, pp. 41-46).

Developmental psychologists have explored social inhibition with approaches that fall along the structure-agency axis. All researchers recognise a role for both social and individual factors in inhibition. However, a relative contrast in emphasis is evident in the two different research enterprises that have emerged in the field. Generally, the *delay of gratification* tradition has emphasised agency, so that inhibition is directed towards personal gain, and the inhibitory process is made up of individual choices. In contrast, the *executive function* tradition has emphasised social structure, so that inhibition is directed towards obeying social demands, and the inhibitory process involves a suppression of activity in order to conform to society.

As calls for understanding the role of social inhibition increase (e.g., Beer, Shimamura, & Knight, 2004; Carlson, Mandell, & Williams, 2004), so has the realisation that the "relations among... different meanings of inhibition are not clearly articulated" (Nigg, 2000, p. 220). This results in difficulties in creating "widely accepted, reliable assessments" (Kochanska, *et al*, 1996, p. 492; Carlson, 2005). A critical examination of the role of social structure and agency

in existing conceptions of inhibition may provide a new means to explore social inhibition. Although there are exceptions to these sociological generalisations in each tradition, these exceptions will remain just that –exceptions– unless the problems and lacunae within the general approaches are identified. To this end, the present study will attempt to highlight and contrast the differences between the delay and gratification and executive function traditions in hopes that the issues raised will help advance the state of the field.

Delay of gratification and executive function approach inhibition differently, but share a methodology, a 'forbidden object' paradigm, where unsupervised children are asked to refrain from touching a tempting object. Following their respective agentic or structural focus, the use and interpretation of this methodology differs greatly.

Research on the delay of gratification examines the *process* of social inhibition (e.g., Cournoyer & Trudel, 1991; Miller & Karniol, 1976; W. Mischel & Ebbesen, 1970). The behaviours that make up efforts to inhibit a particular response represent the "'natural plans' of young children" (Vaughn, Kopp, Krakow, Johnson, & Schwartz, 1986, p. 753). Children's agency is visible in these natural plans. A quality of this research is its appreciation of the creativity of inhibition, as children engage in games, self-talk, and other diversions to avoid touching the forbidden object. Yet delay of gratification research remains idiographic, generally avoiding systematising children's delay strategies, and having little to say about normative development. Consequently, the study of

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delay of gratification has had little influence on theories of social inhibition (J. Block, 2002, p. 177).

Researchers adopting an executive function approach have tended to examine the *outcome* of social inhibition. Inhibition is assessed as the ability to "initiate, cease, or modulate... behaviour in response to parental requests" (Karreman, van Tuijl, van Aken, & Dekovic, 2006, p. 562). Overall, executive function approaches inhibition as an indicator of the child's level of socialisation and integration into society, thereby emphasizing societal structure over individual agency.

Linking a structural view to *executive function* may seem surprising given that executive functioning is often presented as the "conscious control of thought and action" (Kerr & Zelazo, 2004, p. 148). However, the appeal to 'conscious control' dissolves on further examination. The 'executor' or decision centre in most accounts is "little more than a homunculus" (Baddeley, 1998, p. 524) covering for some unknown neural processes. The assumption in much of this work is that inhibition results from motor control processes in the prefrontal cortex (e.g., Beer, Shimamura, & Knight, 2004; S. A. Bunge & Zelazo, 2006; Carlson, 2005; Carlson, Mandell, & Williams, 2004; Kochanska, Murray, & Harlan, 2000). These neural processes allow the individual to respond to the social system by suppressing the individual's "initial prepotent response" (Barkley, 2005, p. 47) in favour of carrying out "societally desirable acts without surveillance" (Kochanska & Thompson, 1997, p. 54).

Tasks that measure inhibition are seen as markers for brain processes and brain development (e.g., Diamond & Gilbert, 1989). As such, this research draws on a wide battery of tasks, all of which are assumed to represent manifestations of the same inhibitory brain processes (see review in Nigg, 2000). Despite its theoretical successes, the executive function approach rarely examines the activity of children, and presents a hegemonic, downward view of the role of society, where social norms enforce themselves on the individual.

Furthermore, this research has accumulated contradictory findings (e.g., Alvarez & Emory, 2006; Band & Scheres, 2005; Barkley, 2005, pp. 11-12; Halperin & Schulz, 2006). One such finding is that 2-year-olds find short, supervised delays more difficult than long, unsupervised delays (Carlson, 2005, p. 609). The present study will attempt to explain this contradiction by drawing insights from both the agentic and structural approaches to social inhibition.

This study will examine the behaviour of sixty-one 2-year-old children on two tasks commonly used to assess inhibition, and categorise this behaviour as *internalised* or *externalised*. Internalised inhibition follows the executive function view of social inhibition as a form of motor control. Externalised inhibition involves an increase in activity during the delay period, of the variety noted by research on the delay of gratification. The internalising and externalising categories will be proposed as explanatory mechanisms to help understand why children may find an unsupervised, long delay task easier, and a shorter, supervised task more difficult.

CHAPTER 1: A PROCESS APPROACH TO INHIBITION

The Social Role of Inhibition

Life in society often requires children to restrain their actions. Social inhibition is the ability to hold off some action for a time, or entirely. Whether relegating play until after chores, remaining quiet in school, or waiting until parents wake up to open the presents under the tree, it is "difficult to conceive of socialization (or, indeed, of civilization) without ... self-imposed delays" (W. Mischel, 1974, p. 250).

Failure to inhibit can present serious problems. As a result, even the uninhibited behaviour typical of early childhood is becoming pathologized. Those children who are "unable to sustain their attention, interest, or persistence as well as their peers with regard to their activities, longer-term goals, or the tasks assigned to them by others... [are] no longer simply expressing the *joie de vivre* that characterizes childhood" (Barkley, 2005, p. 1). Instead, they may be at risk for *attention-deficit hyperactivity disorder* (ADHD; Barkley, 1997, 2005), learning difficulties (Dempster & Corkill, 1999), and a host of psychopathologies (see review in Nigg, 2000).

Social inhibition is generally seen to emerge early in life, mostly in response to social interaction with caregivers (e.g., Schunk & Zimmerman, 1997). Inhibition "makes it possible for the child to begin to comply to parental demands" (Kochanska, Murray, & Coy, 1997, p. 263). By age two, most children

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have "limited flexibility in adapting acts to meet new situational demands and a limited capacity for delay and waiting" (Kopp, 1982, p. 207; Aksan & Kochanska, 2004, p. 1479).

Although there is widespread recognition that social inhibition develops in the context of child-caregiver interaction, discussions of the larger social role of inhibition are rare. Tacit views on the role of inhibition are apparent in the relative emphasis placed on inhibition as means for individual ends, or a means for societal ends. For some, inhibition allows children to "postpone immediate gratification for the sake of future consequences" (W. Mischel, 1974, p. 249), such as a reward. For others, "[i]nhibitory control ... underpin[s] the developing internalization of conduct standards... such as the tendency to violate prohibitions while without surveillance" (Kochanska, Murray, & Coy, 1997, p. 264), so that the child follows the society's rules.

Running through these conceptions of social inhibition are views on the relation between society and individual. Sociology has examined this relation along an axis of *agency* and *structure*, or *individualism* and *collectivism* (Archer, 1995; M. Bunge, 1999, 2000; Piaget, 1977). Theories that portray a bottom-up view of society as the sum total of individuals are agentic. Theories that take a top-down view and argue that the social system shapes its component members are structural. The most difficult aspect of the structure-agency problem is that both agency and structure are partially correct; human existence is "to feel both free and enchained, capable of shaping our own future and yet confronted by towering, seemingly impersonal, constraints" (Archer, 1995, p. 65). People

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navigate a world that is in part of their own choosing, and yet also made by others. As a result, agency and structure, rather than being independent positions, actually focus on different aspects present in all social interactions, so that "agency and structure are just two sides of the same coin" (M. Bunge, 1999, p. 89).

A strict agentic approach to social inhibition would emphasise the origins of inhibition in purposeful action, and downplay the social conditions that structured these thoughts and actions. This approach to inhibition characterises the *delay of gratification* tradition, where children "overcome 'stimulus control' and achieve increasing mastery and volitional control over their own behavior and the conditions of their lives" (W. Mischel, 1983, p. 150). In contrast, a thoroughly structural approach to social inhibition would emphasise that inhibition is socially imposed, whether by particular authority figures, or by society at large. This approach to inhibition characterises the *executive function* tradition, where "emerging inhibitory ...control makes it possible for the child to begin to comply to parental demands" (Kochanska, Murray, & Coy, 1997, p. 263).

The importance of identifying agentic and structural approaches to inhibition becomes clearest in applied contexts. Consider the policy implications of a structural view that expects individuals to measure up to social norms, or an agentic view that social values should serve the freedom of individuals. For example, the structural view that society influences people by "exerting pressure on individual consciousnesses" (Durkheim, 1964 [1902], p. 101), colours the psychological concept of *school readiness* (Blair, 2002) so that its focus is the

child's ability to behave in school. Conversely, an agentic approach could ask whether schools are ready for their students!

Echoing the *nature-nurture* (e.g., Oyama, 2000) and *person-situation* (e.g., W. Mischel, 1968) debates in psychology, accommodating agency and structure requires a systemic approach (e.g., Archer, 1995; M. Bunge, 2000; Piaget, 1977; Rutter & Sroufe, 2000), where "structure and agency [are]... linked by examining the *interplay between them over time*" (Archer, 1995, p. 65). An important first step towards a systemic approach to social inhibition is recognising how both agency and structure run through its conceptions of the inhibitory process.

Delay of Gratification and the Process Approach

Research on the *delay of gratification* (e.g., Cournoyer, Solomon, & Trudel, 1998; Miller & Karniol, 1976; W. Mischel & Ebbesen, 1970; Vaughn, *et al*, 1986) emphasises the role of individual choices and activities in social inhibition. This approach to inhibition uses a *forbidden object* paradigm, originally created to test aspects of Freudian theory (Singer, 1955). The researcher designates some desirable object (e.g., a gift, a toy, or a snack) as 'untouchable'. Children are then asked to wait in a room with the object while the researcher leaves for a certain period of time. Children who avoid touching the object often receive an even better reward at the end of the delay period (e.g., W. Mischel & Ebbesen, 1970). In some versions of the task, the child is merely told to avoid touching the object, and is later rewarded with the object itself (e.g., Cournoyer, Solomon, & Trudel, 1998).

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Reflecting an emphasis on agency, researchers studying the delay of gratification have tended towards a *process* approach, examining "behavioural tactics used by young children to sustain imposed delays" (Cournoyer & Trudel, 1991, p. 498). Children often demonstrate great ingenuity in the delay period. W. Mischel and Ebbesen (1970) reported that children "seemed to try to reduce the frustration of delay of reward by generating their own diversions: they talked to themselves, sang, invented games with their hands and feet" (p. 335). Vaughn *et al* (1986) noted that even when the children were in a "relatively unadorned testing room, [they displayed] an impressive array of spontaneous 'diversions'" (p. 754).

The diverse strategies of young children are evidently very effective. In pilot work, where the delay period was left unrestricted, W. Mischel and Ebbesen (1970) report that "some of the preschool youngsters waited ...seated alone in a chair for periods sometimes exceeding 1 hour—an observation that is surprising, considering the widespread belief that young children are incapable of sustained delay of gratification" (p. 335). In one instance, a child even fell "into a deep slumber" (W. Mischel, 1974, p. 267) while waiting!

Somnolence is a rarity. In fact, "movement of the whole or parts of the body... [is] the most frequent behavior observed during the delay period" (Cournoyer & Trudel, 1991, p. 501). These activities divert attention (W. Mischel, Shoda, & Rodriguez, 1989), enabling a "strategic use of 'looking away behavior'" (Vaughn, *et al*, 1986, p. 753) that is correlated with longer delay times.

Speaking to the child's agentiveness, participants in this research are capable of transforming their social circumstances. W. Mischel and Ebbesen (1970) note that "[o]ne of the most striking delay strategies used by some subjects was exceedingly simple and effective. These children seemed to facilitate their waiting by converting the aversive waiting situation into a more pleasant non-waiting one" (p. 335). Despite these intriguing findings, delay of gratification research has had little impact on theory, as "only a few studies have examined the spontaneous behavior of young children to determine how, or if, they employ behavioral routines to regulate their behavior" (Vaughn, *et al*, 1986, p. 753).

The reason for this lack of impact may lie in an insistence that, "self-control patterns ... tend to be highly discriminative and idiosyncratically organized within individuals" (W. Mischel, 1974, p. 254). Although delay of gratification is related to long-term scholastic success (W. Mischel, Shoda, & Rodriguez, 1989), there has been relatively little effort by researchers to understand and compare inhibition across individuals (J. Block, 2002, pp. 178-179). Another problem is that the construct of 'delay of gratification' is operationally defined. Delay of gratification is inhibition in the service of rewards. In sticking with a single empirical paradigm, and forging relatively few links with other developmental theories, the delay of gratification tradition has advanced little since receiving its "major support from the research program of Mischel a quarter century ago" (J. Block, 2002, p. 179).

Executive Function and Measures of Outcome

In contrast to the focus on choice and agency in studies of delay of gratification, research on executive function tends to characterize social inhibition as a form of motor control that responds to social norms. The term executive function is used synonymously with *self-regulation* (e.g., Barkley, 1997, 2005, 2001; Beer, Shimamura, & Knight, 2004; Carlson, 2005; Carlson, Mandell, & Williams, 2004; Nigg, 2000, 2001), and *inhibitory* or *effortful control* (e.g., Kochanska, Murray, & Coy, 1997). As a whole, this tradition has emphasised how "higher-order... cognitive processes ... aid in the monitoring and control of thought and action" (Carlson, 2005, p. 595) and "play an important role in retrieving rules for governing behavior in the current context" (S. A. Bunge & Zelazo, 2006, p. 118).

The relative emphasis is on the individual fitting into a social context, so that "executive inhibition" (Nigg, 2001, p. 579) allows the individual to suppress the "initial prepotent response" (Barkley, 2005, p. 47). The 'prepotent response' is often a socially unacceptable response, such as thinking egocentrically rather than considering others (e.g., Carlson & Moses, 2001), failing to suppress emotional disappointment in a gift (e.g., Kieras, Tobin, Graziano, & Rothbart, 2005), or failing to follow moral rules (e.g., Kochanska, Murray, Jacques, Koenig, & Vandegeest, 1996). Inhibition allows people to overcome selfish, instinctual, or merely idiosyncratic responses and to respond in ways that reflect and serve the social system. In this way, executive function is a "means to a greater social end" (Barkley, 2001, p. 24).

Although social structures are clearly involved in executive function, the recognition that these executive functions might be social is, in fact, a non-canonical view. Instead executive function is typically viewed as a *biological* construct, synonymous with the prefrontal cortex (see critical review in Alvarez & Emory, 2006). In most accounts, the connection to society is left implicit, and is evident only in the great emphasis on compliance, so that executive function is assessed in "a structured situation in which the examiner dictates what the subject is to do, with what, and when" (Lezak, 1982, p. 283).

The failure to consider the constitutive role of society in executive function is ironic given that the pioneer of this approach, Aleksandr Luria, argued that "higher mental functions are complex, organized functional systems that are social in origin" (Luria, 1966, p. 34). Furthermore, Luria expressed basic agreement with sociologist Émile Durkheim's view that psychology originates in society, criticizing only the latter's neglect of the Marxist tenet that "particular forms of work and... economic conditions for[m] the basis of all social life" (Luria, 1976, p. 7). There are telling parallels emerging between past, sociological, and current, executive function, approaches. Just as Durkheim saw inhibition as "the means by which social constraint produces its psychological effects" (Durkheim, 1964, p. 102), current approaches portray executive function as the ability to "modify and control behavior in order to conform to social norms" (Beer, Shimamura, & Knight, 2004, p. 1091).

The lurking danger in accounts that fail to attend to the society-biology relation is that society is seen as 'fixed' in biology, with social norms encoded at

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the biological level (e.g., Cosmides & Tooby, 1992; and see Barkley, 2001 for an evolutionary account of executive function drawing on their work). Promoting this danger is the way in which biology has become a crucible for social inhibition, so that what is learned through diverse activities with caregivers is assumed to apply to all other areas of social life. Such a biological account has the effect of centralising inhibitory mechanisms derived from a wide range of social interactions so that with development, "central inhibitory processes are of greater import" (Nigg, 2000, p.221), and all inhibition stems from the same "neuroanatomical structures and processes" (Kochanska, Murray, & Harlan, 2000, p. 230). This allows for a unified theory of inhibition that portrays development as the "progressive inhibitory control of action" (Diamond & Gilbert, 1989, p. 223).

The emphasis on a common set of "'higher-level' cognitive functions involved in the control and regulation of 'lower-level' cognitive processes" (Alvarez & Emory, 2006, p. 17) lends executive function to an *outcome* approach for measuring inhibition. If all forms of inhibition originate in the same neural processes, then the behavioural expressions of inhibition are of little interest, except inasmuch as they are outward markers for these internal neural processes. Furthermore, many have assumed that all inhibitory behaviour takes the form of motor control. Perhaps because "[s]topping is a clear case of executive intervention" (Logan, 1994, p. 190), social inhibition is also depicted as "inhibition of motor approach" (Aksan & Kochanska, 2004, p. 1478).

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The outcome approach has important implications for the use of the forbidden object procedures (e.g., Carlson, Mandell, & Williams, 2004; Kochanska, Murray, & Harlan, 2000). These procedures are used to examine whether, rather than how, children can avoid touching the object. The tasks assess only if children can "withhold a dominant response over a temporal delay" (Carlson, Mandell, & Williams, 2004, p. 1117). On any given task, children may succeed or fail to inhibit; amalgamating a number of different pass-fail measures of social inhibition gives a sense of the child's overall inhibitory control (e.g., Carlson, 2005). At the same time, the use of outcome measures may "result… in a loss of sensitivity" (*ibid*, p. 611).

The executive function approach tends to downplay the choices children make during the inhibitory period, that is, downplay their agency, and treat measures of inhibition as essentially identical, as they all involve the same neural processes. Disregarding the child's activity results in a view of 'active passivity' and carries with it the expectation that children's social inhibition is expressed by remaining 'still'. The result is that researchers tend to conflate stillness with inhibiting a particular response. Not surprisingly, coding schemes of social inhibition frequently 'punish' movement. For example, Kochanska, *et al* (1996) used a coding scheme that assigns a 0 if the child fails to comply with a task, and 1 if he or she succeeds in complying (pp. 493-494). This coding is supplemented with additional scores if the child refrains from additional movement, even though this movement is unrelated to complying with the task (see also Kochanska,

Murray, & Harlan, 2000). In effect, these coding strategies monitor the process of the child's inhibition only in so much as it deviates from sitting still.

In seeing inhibition as motor control in response social demands, the structural approach risks reducing social inhibition to "following ... directions in the presence and absence of others" (Feldman & Sarnat, 1986, p. 365). Children come to follow the dictates of society not by "external means, such as law enforcement or judicial systems, to ensure people's compliance with shared rules and standards, [but with] inner guidance systems [that] are by far the most effective" (Kochanska & Aksan, 2006, p. 1588). Unfortunately for this hegemonic view, many children are deliberately uncooperative. Even as children become capable of more compliance, their "noncompliance strategies [also] show a developmental progression from toddler to preschool years" (Abe & Izard, 1999, p. 4).

Problems and Predictions

Although research on delay of gratification may have remained in stasis (J. Block, 2002, pp. 178-179), its findings on the active strategies of children were never rejected, only neglected. Retrieving this early work could inform current research on social inhibition in important ways. The activity of children may explain why inhibition seems "greatly affected ... by a variety of situational and contextual factors" (Barkley, 2005, p. 11), and the exclusion of activity from executive function approaches may explain inconsistent findings (see, e.g., Andres & Van Der Linden, 2004; Band & Scheres, 2005; Halperin & Schulz,

2006), such as low to moderate correlations between measures of inhibition (e.g., Carlson, 2005; Carlson, Mandell, & Williams, 2004). This means that a centralised inhibitory system- as proposed by the executive function research- is poorly supported (Alvarez & Emory, 2006; Andres & Van Der Linden, 2004).

Carlson (2005) reviewed tests of young children's inhibition in a more general review of executive function. A sub-section of this review tested one-hundred-and-eighteen 2-year-old children on measures that assessed "inhibition demands" (*ibid*, p. 612). Carlson ranked these inhibitory tasks according to difficulty. One of these tasks, the *gift delay* (e.g., Carlson, Mandell, & Williams, 2004, p. 1108), follows the forbidden object paradigm, with an unsupervised delay period. The other, the *snack delay* (e.g., *ibid*, p. 1108), is characterised by the same basic pattern, only using a shorter, monitored delay period. The gift delay has a delay of nearly 3 minutes (180 seconds), and the snack delay has four brief delay periods totalling 50 seconds. Despite having a delay time that is over 3 times as long, the gift delay was ranked as significantly easier to complete than the snack delay (*ibid*, p. 609).

Commenting on Carlson's finding, Blair, Zelazo, and Greenberg (2005) note that the study gives "the first sound basis for estimating the expected probability of success on a given task at a given age" (p. 562). This claim is surprising given the expectation that, all things being equal, longer waiting periods should prove more difficult. Furthermore, tasks undertaken in the presence of a monitor would be easier than those in the absence of a monitor, given that inhibition is, at least for the executive function tradition, a measure of

the "internalization of conduct standards... [and lessening] the tendency to violate prohibitions while without surveillance" (Kochanska, Murray, & Coy, 1997, p. 264).

Research Strategy

The present study will examine the finding that a short, supervised delay could be more difficult than a long unsupervised delay (Carlson, 2005, p. 609) by bringing together the research methods that have characterized the agentic and structural approaches to social inhibition.

This will entail fusing the outcome approach to inhibition, where children are measured on success or failure, to the process approach to inhibition, where the strategies of children are examined. Children may delay by relying on relatively controlled behaviour, as suggested by executive function, or by relatively active behaviour, as suggested by delay of gratification. This suggests two rough categories of inhibitory strategies: *internalised* and *externalised* behaviour. Internalised behaviour follows the existing view of inhibition: 'in the head', and involving active-passivity. Externalised behaviour is active and may involve a great deal of movement.

The use of the word *strategy* is potentially misleading. Researchers are generally "not prepared to claim that ... children are consciously applying the behavioral strateg[ies]" (Vaughn *et al*, 1986, p. 757). Indeed, children seem to have very poor knowledge of their delay strategies, even when these are effective. If asked to describe effective strategies, they will often describe

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ineffective ones (Yates & W. Mischel, 1979). Nevertheless, the term 'strategy' is consistent with the developmental framework guiding the present research. This disjoint between effective action and ineffective reasoning is characteristic of action patterns in young children (Campbell & Bickhard, 1986; Piaget, 1974), and is typically reduced as children develop more conscious control of their behaviour over time.

The general prediction in the current project is that the internalisation and externalisation strategies will be differentially effective in the two inhibition tasks. This hypothesis can be further refined. Research on the delay of gratification has shown that both internalised and externalised strategies are effective in the gift delay (e.g., H.N. Mischel & W. Mischel, 1983). Perhaps certain features of the snack delay, and its short, supervised delay period, alter the effectiveness of these inhibitory strategies.

CHAPTER 2: METHOD

Participants

One hundred parent-child dyads took part in the first session of a three-year longitudinal study on the relations between social interaction and executive function. The dyads came from two Western Canadian cities, and participated at a university laboratory in their respective city by responding to a newspaper advertisement. Parents provided informed consent for participation in the study and agreed to have the session recorded on video. Participants were paid a $30 honorarium.

Some dyads were excluded from the study based on criteria discussed below. In the end, 61 participants were included in the analyses (39 excluded). The children (31 female, 30 male) had a mean age of 24.9 months (range 20 months to 32 months, SD=2.79). Two of the parents were fathers (59 mothers).

Criteria for exclusion

Generally, process coding requires a higher quality of video recording than outcome coding (Thiel, personal communication, June 1, 2007). Outcome coding monitors those behaviours relevant to determining whether some outcome took place. For example, a child could be coded as having waited out the entire delay period, or as having avoided touching the gift, and remain off-

camera during this time. In process coding, the camera needs to follow the child as they move.

The longitudinal study from which this study was derived was designed to accommodate conventional outcome coding rather than process coding. As a result, each video recording had to be assessed for its suitability for process coding. Process coding considerations, as well as some miscellaneous technical and experimenter errors, resulted in 26 participants being excluded from the analysis. This exclusion policy may have had the effect of under representing the children who engaged in externalised inhibition during the gift delay, as these children were more likely to leave the camera frame.

Parental behaviour

Parents were in the room with their children at all times. Many parents inquired about whether they would be present with their child during the study during recruitment. As a result, the decision was made to keep parents in the room during the gift delay. Parents are routinely present in the room in other studies of inhibition and delay with young children (e.g., Cournoyer, Solomon, & Trudel, 1998; Vaughn, *et al*, 1986). In fact, the presence of parents goes unreported in some research (Carlson, personal communication, June 2, 2007), suggesting that most studies have parents in the room during the delay period. Considerations of having parents in the room are discussed further in Chapter 4.

In a small number of occasions, a grandparent was also present in the room (two cases), or a young infant (two cases). This meant that during the

snack delay, at least two adults (researcher and parent) were in the test room, and during the gift delay, one fewer adult was in the test room.

During the tasks, parents (and grandparents) were asked to quietly observe the experimental procedures, either completing, or pretending to complete, a questionnaire. Therefore, most parents appeared, or were, occupied during the tasks. During the gift delay, parents were asked to avoid interacting with their child, replying when spoken to, but otherwise remaining occupied with their own work (Cournoyer, Solomon, Trudel, 1998). In the nine cases where parents did not follow instructions, the dyads were excluded from the analysis.

Miscellany

Because of concerns about understanding the experimenter, two participants did who not speak English as a primary language were excluded from the analysis. Finally, although children generally enjoyed participating in the study, two children who were too upset to engage in all of the tasks were also excluded from the analysis.

Measures of Delay

Snack delay

The experimenter was seated across from the child at a small table. A plate was placed on the table and a snack put on the plate. The standard snack was a small cracker. Parents were invited to bring in their own snacks if the child had preferences or allergies. The researcher covered the snack with an opaque

plastic cup, easily within reach of the child, and the rules of the game were explained. The child was told that they were going to play a game. The instructions were, "Wait until I ring the bell, and then you can lift the cup and eat the snack". The instructions were repeated twice initially, and before each trial. There were four trials, lasting 5, 10, 20, and 15 seconds (total of 50 seconds).

The experimenter remained facing the child, watching, but otherwise not interacting with, the child during the delay periods. The child received the snack regardless of their performance on the trial.

Gift delay

The child was shown a brightly coloured gift bag. The child was told, "I have a gift for you, but, Oh no! I forgot the bow! Wait here until I come back with the bow and then you can open it" (Carlson, Mandell, & Williams, 2004, p. 1108). The child was seated facing away from the parent, and the gift was easily accessible, most often placed behind the child. The trial was 150 seconds long (as per Cournoyer & Trudel, 1991; Vaughn, *et al*, 1986).

The experimenter left the room during the delay period. The parent was seated in the room, and asked to work on a questionnaire. At the end of the time period, the child was allowed to open the gift, which contained a small toy. The child received the gift regardless of their performance on the task.

Site differences

The study was conducted at two laboratory sites. Both were small, furnished rooms (table, small child-sized chairs). The sites had differences that are significant given the behaviour of children during the gift delay.

At *site A*, there was a large one-way mirror. The materials used in the study (e.g., blocks, plastic buckets) were stored on two shelves about 1.5 meters of the ground (i.e. inaccessible to the children). Parents were seated in a chair capable of seating a single adult. At *site B*, the camera was in the room with the participants, mounted on a tripod. There was no mirror. The table had a tablecloth. Parents were seated on a couch that could accommodate several people. Finally, the shelf that held the materials for other tasks in the study was on the ground and accessible to children.

Replicating the findings of Vaughn, *et al* (1986, p. 757), the children used seemingly boring or trivial items in the room during the gift delay. For example, children at site A often made faces in the one-way mirror. Those at site B played with the tablecloth (e.g., by bunching it up), examined the camera, or rifled through the study materials. Additionally, children at site B could easily climb up and sit next to their parents, without distracting the parents, whereas children at site A had to climb up on top of their parents, which proved a distraction to the parent.

Although all of these objects and room features were also present during the snack delay, children rarely used them. The significance of this is discussed further in Chapter 4.

Coding

Videotapes were first coded for length of delay. The time of delay for each task was demarcated. For the gift delay, the start time was when the experimenter left the room, and the end time was when the experimenter came back and told the child they could open the present. The exception was when children opened the gift early. In these cases, the moment that the child began to open the bag was used as the end point. For the snack delay, the start time was when the experimenter put down the opaque cup and removed their hand. The end time was the end of the 5, 10, 15, or 20 second delay period when the experimenter rang the bell. In cases where the child opened the cup early, the moment the child lifted the cup was used as the end point.

Pass-fail scores

The time that the children waited was used to devise passing scores. For the gift delay, passing was waiting out the entire 150 seconds period. For the snack delay, passing was waiting out the final three trials of 10, 20, and 15 seconds, for a total of 45 seconds. The 5-second trial was excluded in order to provide a conservative comparison of the difficulty of the two tasks, balanced for time on the one hand, and number of trials on the other. If children were at-chance to pass each trial, the gift delay, with one trial, would be easier than the snack delay with four trials. Alternatively, if the children have an at-chance level of passing each 50-second block of time, then the gift delay, with three blocks of

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50 seconds, would be more difficult than the snack delay with one block of 50 seconds. A balance was reached by considering the three longer trials of the snack delay against the single-trial gift delay.

Internalisation and externalisation

The demarcated time periods were coded for internalisation and externalisation. Raw time scores were used. Children could have a maximum of 150 seconds of internalisation or externalisation on the gift delay, and a maximum of 45 seconds of internalisation or externalisation on the snack delay. The 5-second trial was excluded.

Although internalisation and externalisation are mutually exclusive (i.e. a given child is doing either one or the other at any given time), they are not necessarily negatively correlated with one another in the present analysis. Children can display both internalisation and externalisation during the same trial at different time point within it. Also, children can terminate the trials (i.e. by touching the forbidden object). For example, in a 150-second trial, one child could internalise for a total of 80 seconds, and externalise for a total of 70 seconds, another for 0 and 150 seconds, and a third for 13 seconds and 4 seconds.

Internalisation is characterised by quiet and subdued activity. The child shows little movement, other than looking around, or slight fidgeting. This behaviour would be considered undisruptive and unremarkable in a classroom or

waiting-room setting. Internalisation does not distinguish between depressed and restrained activity, or between restrained activity and inactivity.

Externalisation is characterised by movement and engagement. The child may kick their legs against a chair or beat their hands on a table, interact with objects or their parent, talk, laugh, sing or complain. This behaviour would generally be considered disruptive in a classroom or waiting-room setting. However, externalisation does not distinguish between children having fun (laughing, smiling, amusing themselves), and those who seem upset (complaining, pouting, seemingly annoyed to wait). In other words, the present coding scheme does not distinguish between potentially harmful and benign manifestations of internalising and externalising strategies (e.g., Moffitt, 2005; Zahn-Waxler, Klimes-Dougan, & Slattery, 2000).

Inter-rater reliability

A research assistant, blind to the hypotheses, coded 22 participant tapes (36% of the total) for both the gift delay and snack delay tasks (36% of the total). Over the 41 minutes of the gift delay examined for reliability, Cohen's kappa was .83 (93% agreement). Over the 14 minutes of the snack delay examined for reliability, Cohen's kappa was .92 (96% agreement). The author's coding was used in cases of disagreement.

CHAPTER 3: RESULTS

Children's behaviour

Children generally interacted face-to-face with the experimenter during the snack delay. Internalised behaviours included sitting and watching the experimenter. Externalised behaviour included pointing, and walking around the table to stand next to the experimenter. A few children commented on the task to the experimenter or their parents.

In the gift delay, a focal point was less obvious. In successful cases of delay, internalised behaviour consisted of sitting or standing quietly and waiting. Externalised behaviour varied greatly. Some children spoke with their parents. Many children played with objects in the room, such as the materials used for other tasks in the study, and furniture.

Descriptives

Table 1 contains the range, mean, median, and standard deviations for delay time, internalisation, and externalisation on the gift delay and snack delay tasks. Externalisation occurred more often than internalisation during the gift delay, whereas internalisation occurred more often than externalisation during the snack delay.

Table 1

Descriptives for study variables (in seconds)

Variables	Range	Minimum	Maximum	Mean	Median	Standard deviation
Time on gift delay	146	4	150	105.79	150	56.70
Time on snack delay	41	4	45	28.83	32	15.39
Internalisation on gift delay	150	0	150	37.46	12	43.87
Externalisation on gift delay	150	0	150	65.80	60	49.77
Internalisation on snack delay	45	0	45	15.18	9	16.04
Externalisation on snack delay	45	0	45	1.82	6	12.70

The scores for wait time on both tasks were negatively skewed and platykurtic. The negative skew indicates that most children either completed, or waited for a large part of, the maximal delay time. Both of these variables were converted into dichotomous pass-fail scores, where skew and kurtosis was no longer relevant.

The scores for internalisation and externalisation on both tasks were positively skewed and platykurtic. The positive skew reflects the fact that many children engaged in either predominantly internalisation or predominantly externalisation, or neither (i.e. by touching the forbidden object). This meant that there were often low scores on the opposing inhibitory style (e.g., a child who spent 150 seconds on internalisation would necessarily score 0 on externalisation).

A conservative criterion of determining that a distribution is normal is to create a confidence interval by adding and subtracting twice the standard error of skew (or kurtosis) to the obtained skew value and check to see if 0 is found in that interval. Using this conservative criterion, the distributions for internalisation on gift delay, internalisation on snack delay, and externalisation on snack delay were skewed, though not platykurtic. Nonetheless, the decision was made to keep these variables untransformed, based on the robustness of correlation to skewed distributions with skew values of less than 1 (e.g., Stevens, 1999; Vasu, 1979).

Task Difficulty

Table 2 contains the pass-fail frequencies for the gift delay and snack delay. A McNemar test was conducted on the dichotomous pass-fail scores for each task, and similar to Carlson's (2005) finding, snack delay was significantly more difficult for children of this age to pass than gift delay (p<0.05).

Zero-order Correlations Among All Study Variables

Table 3 presents the zero-order correlations for the variables of interest. A sequential Bonferroni correction for multiple comparisons was applied to the correlations (Holm, 1979). Passing the gift delay was uncorrelated with passing the snack delay. Both externalisation (r=.598, p<.001) and internalisation (r= .612, p<.001) were correlated with passing the gift delay. Only internalisation was correlated with passing the snack delay (r= .610, p<.001). Internalisation on one task was not significantly correlated with internalisation on another task, and the same was true for externalisation.

Zero-order Correlations Among Study and Other Variables

With correction for multiple comparisons (Holm, 1979), correlations were calculated for age, site, and gender with the study variables. Only gender was correlated with the study variables; the use of internalisation on the snack delay was associated with gender (.362, p<.005), favouring girls. Table 4 presents task pass-fail frequencies by gender. There were no significant correlations between age or site and the study variables, and all study variables maintained the significance levels reported in Table 3.

Table 2

Pass rates for gift delay and snack delay (number of participants, percentage)

Passed gift delay	35 (57.4 %) of 61
Passed snack delay	22 (36%) of 61
Passed both gift delay and snack delay	14 (23 %) of 61
Passed only gift delay	21 (34 %) of 61
Passed only snack delay	8 (13 %) of 61
Passed neither task	18 (29.5 %) of 61

Table 3

Zero-order correlations of study variables, controlling for multiple comparisons

	1	2	3	4	5
1. Pass gift delay					
2. Pass snack delay	.095				
3. Internalisation on gift delay	.612**	.161			
4. Externalisation on gift delay	.598**	-.013	-.139		
5. Internalisation on snack delay	.110	.610**	.153	-.035	
6. Externalisation on snack delay	-.060	.282	-.055	.087	-.278

**p<0.001

Table 4

Pass rates for gift delay and snack delay by gender (number of participants, percentage)

Girls		**Boys**	
Passed gift delay	19 (61.3 %) of 31	Passed gift delay	16 (53.3 %) of 30
Passed snack delay	15 (48.4%) of 31	Passed snack delay	7 (23.3%) of 30
Passed both tasks	11 (35.5 %) of 31	Passed both tasks	3 (10%) of 30
Passed neither task	8 (25.8 %) of 31	Passed neither task	10 (33.3 %) of 30

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CHAPTER 4: DISCUSSION

Consistent with Carlson (2005), the present study found that a short, supervised delay, the snack delay task, was more difficult for children than a long, unsupervised delay, the gift delay task. Success on the gift delay was correlated with two strategies of inhibition, one internalised, characterised by the control of motor activity, and one externalised, characterised by an increase in activity. Success on the snack delay was correlated exclusively with the internalised strategy. The present discussion will address these findings primarily from the viewpoint of the delay of gratification and executive function traditions. At the same time, this discussion will look to constructing an integrative approach, identifying problems, and potential solutions, that will inform this integrative approach.

A subsequent correlational analysis of age, gender, and site showed that girls were more likely to use the internalised strategy in the snack delay. Gender differences that favour girls are occasionally found in both the delay of gratification literature (e.g., Peake, Hebl, & W. Mischel, 2002, p. 317) and the executive function literature (e.g., Carlson, Mandell, & Williams, 2004, p. 1111). In this study, the difference was tied to a particular strategy of inhibition, namely internalisation. Research on developmental psychopathology supports the view that girls are more likely to internalise in many social contexts (e.g., Zahn-Waxler, Klimes-Dougan, & Slattery, 2000). This tendency is partly attributed to

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socialization, as "[p]arents more often discourage exploration of the physical environment in girls than boys" (*ibid*, p. 458). However, because exploring gender differences was not the primary focus of the present study, the remaining discussion will elaborate on the general features of social interaction that influence children's social inhibition.

Findings

There are two findings to address. The first is the relative task difficulty, i.e. why the snack delay was more difficult than the gift delay. The second is the success of particular styles of social inhibition on each task. Although the delay of gratification and executive function literatures can deploy different resources to interpret the findings, the findings raise unique problems for each approach. In particular, externalised inhibition poses a challenge: the failure of this strategy on the snack delay task is problematic for the delay of gratification approach, and the successful application of externalising on the gift delay is problematic for the executive function approach.

In so far as the delay of gratification tradition emphasises the child's agency, its challenge is explaining why increased activity is not correlated with success on the snack delay. The executive function tradition, in contrast, emphasises the outcome of delay as a marker for motor control that conforms to social norms. For this tradition, the challenge is explaining why increased motor activity is correlated with success on the gift delay task. The problems faced by each tradition may provide some direction for the creation of a systemic

approach that incorporates features from both the delay of gratification and executive function accounts.

Delay through agency

The delay of gratification tradition has a tendency to allow for idiosyncratic delay performance within individuals (J. Block, 2002), so that "the same person who exhibits self-control in one situation may fail to do so in another, even when it appears to be highly similar" (W. Mischel, Shoda, & Rodriguez, 1989, p. 933). Nevertheless, a systematic difference in task difficulty *across* individuals is important to address. This approach could argue that the difficulty of the snack delay originated in increased reward salience. Previous findings suggest that children delay longer when rewards are obscured, rather than in plain sight (e.g., W. Mischel, Shoda, & Rodriguez, 1989). In the snack delay, the children see the snack before it is put under the cup. As such, the reward stimuli may be more salient than the unseen gift wrapped inside the gift bag during the gift delay. However, reward salience has so far referred to whether or not the forbidden object is obscured *during* the delay period. Both the snack and the gift were obscured during this period. A further problem with this interpretation is that the gift bag is made to be enticing (the gift is placed inside an attractive, colourful bag). In contrast, the snack is placed under a plain cup.

Gift delay

The finding that externalisation, a form of increased activity, was related to success on the gift delay task supports past findings in the delay of gratification

research tradition, where children create diversions to delay a response. The finding that internalisation was related to success on both delay tasks is also likely unproblematic, as the approach could claim that internalisation accomplishes the same function as externalisation, by diverting the child's attention. The crucial question would be to address what the children were attending to when internalising. Prior studies (Cournoyer & Trudel, 1991; Vaughn, *et al*, 1986) suggest that looking away from the reward is correlated with delay. If the children were otherwise fairly still when looking away, the present coding scheme would classify the behaviour as internalised. The quality of video recording in the present study would preclude reliable coding of looking behaviour.

Snack delay

In contrast to gift delay findings, the lack of relation between externalisation and success on the snack delay presents a problem for the delay of gratification approach. Nothing was stopping the children from diverting their attention by moving away from the forbidden object, and distracting themselves with activities as they had during the gift delay. However, in another sense the children were constrained by interaction with the experimenter. The term 'constraint' is usually used in a restrictive sense, such as when one thing stops another thing from moving. Yet constraint can also be used in a generative sense (Gould, 1989), in that a lawfully organized process invariably constrains other possibilities. These other possibilities are not being constrained in a restrictive sense. Rather, when a process proceeds lawfully, it necessarily

excludes other events from occurring. For example, the fish's gills allow it to respire in water; yet the mechanism of these gills constrains the lungs from working on land.

Although a great deal of controversy surrounds this claim, social interaction may have its own laws (Sawyer, 2005; Turnbull, 2003) such as turn-taking and joint attention. To the extent that children engage with the experimenter during the snack delay, their interaction has properties that generate, and thus constrain, certain outcomes. Although the child is physically able to divert their attention in the presence or absence of another person, in the context of social interaction, breaking off joint attention could have the effect of severing the interaction. The child's choice to cooperate with the experimenter constrained other forms of activity. Facing the experimenter also meant facing the forbidden object, and actions were more likely to be directed at this object. This means that the snack delay was mediated in part by a structural condition (the presence of the experimenter), itself related to an agentic condition (the decision of the child to interact).

Structured inhibition

Snack delay

The executive function approach could explain differential task difficulty by arguing that the snack delay task is more complex than the gift delay task. Indeed, task complexity is the usual route for explaining differential performance on executive function tasks. Although both tasks are thought to measure inhibitory control, snack delay may tap some other aspects of executive function,

such as memory, that are unused in gift delay. Complexity arguments can be carried out with impunity in that "there continues to be no consensus on the definition of the term [executive function]" (Carlson, 2005, p. 596). Given the multiplicity of interpretations, researchers can easily argue that the same task taps any number of functions. However, a complexity interpretation would need to offset the fact that the delay period in gift delay is considerably longer than in the snack delay. Furthermore, it would need to account for why a supervised task, where the experimenter reminds the child of the task instructions, is more difficult than an unsupervised task.

Although the snack delay task appeared to exclusively favour an internalised strategy, the finding that this strategy was successful in both inhibition tasks supports the executive function approach to inhibition as a form of motor control. In internalisation, little is occurring at the level of process, at least as regards gross motor movement. To the extent that children internalise during the delay period, then the outcome approach to inhibition does a reasonably good job of approximating the process of inhibition.

Gift delay

To explain the relation of both internalised and externalised inhibition to successful completion of the gift delay, the executive function approach could claim that a similar neural process was activated in both cases, so that the mechanism of inhibition was identical. However, given the diversity of externalising behaviours, this interpretation risks vacuity. The common set of processes may be so general as to devolve into the claim that the frontal lobes

are involved in the delay period in both cases. Yet the "participation of the frontal lobes in virtually any 'executive process' is probably a necessary, but largely insufficient, requirement" (Alvarez & Emory, 2006, p. 34).

Another possibility would be to claim that an absence of social norms specifying appropriate behaviour in the gift delay, so children could appropriately behave with either strategy. This interpretation would have to address how and why children would choose to engage in predominantly externalized behaviours in certain cases, and in internalized behaviours in other cases if the 'social rules' by which children putatively operate do not sufficiently specify whether to use a particular strategy. If there is no precise norm for a given situation, then agency begins to impinge on the problem. The child constructs, rather than applies, a norm for their activity. Tellingly, Durkheim faced this problem in his work *Moral Education*, noting that because any given social rule is "a general prescription, it cannot be applied exactly and mechanically in identical ways in each particular circumstance. It is up to the person to see how it applies in a given situation" (Durkheim, 1961, p.23).

Integration of findings

Both approaches could attempt to dismiss the finding that the snack delay was more difficult than the gift delay either by noting the snack delay was characterised by the increased salience of reward, or increased complexity. Problems would arise for the delay of gratification approach in explaining the failure of the externalisation strategy on the snack delay. The executive function approach would have difficulties in explaining the success of the externalisation

strategy on the gift delay. The failure of externalisation on the snack delay

indicates that the role of social interaction may be quite different than previously

conceived.

In a traditional interpretation, social interaction should make delay easier,

if the other actor plays the role of an "external monitor" (Kopp, 1982, p. 200).

The 'monitor' is conceived as an adult authority projecting social norms onto the

child. This is a coercive view of social interaction where people follow social

norms "not because the required conduct is attractive to us, not because we are

inclined by some predisposition either innate or acquired, but because there is

some compelling influence in the authority dictating it" (Durkheim, 1961, p. 29).

By contrast, children can also encounter others as peers, and this engenders a

different sort of respect, one borne out of a spirit of cooperation (Piaget, 2000, p.

292). Typically, peers are understood as same-age children, altough age

differences do not preclude cooperative interaction (Carpendale, 2000). In the

context of a cooperative interaction, the child's delay strategies in both tasks may

take on a different meaning. This will be discussed further in the limitations

section.

The role of externalisation poses a challenge to the executive function

tradition. There is a strong bias in our society to value self-control, exemplified in

the view that "self-control deserves consideration as the core psychological trait

underlying the majority of virtues" (Baumeister & Exline, 1999, p. 1166). One

example is how researchers devalue externalisation in coding schemes (e.g.,

Kochanska, *et al*, 1996).

If self-control is such a highly praised virtue, then children should be expected to always inhibit their behaviour. A child's prefrontal cortex would presumably select the internalisation rule in all situations (e.g., S. A. Bunge & Zelazo, 2006, p. 118). A larger problem is that the uncritical praise for self-control overlooks the fact that there are "contexts wherein spontaneity rather than self-control is appropriate and desirable, where self-control may be maladaptive and spoil the experience and savorings of life" (J. Block, 2002, p. 9). A more rounded view of inhibition is preserved in approaches to developmental psychopathology that acknowledge that optimum regulation can involve both acting out and internalising (Buckner, Mezzacappa, & Beardslee, 2003, p. 142). These balanced approaches follow J. Block's work (e.g., J. H. Block & J. Block, 1980; J. Block 2002) on *overcontrol* and *undercontrol*.

Limitations and Considerations

This study had several limitations that may have influenced the children's delay performance. However, a critical look at these factors provides an opportunity to further develop an integrative approach.

Presence of parents

The presence of parents may have boosted the children's capacity to delay, as parents may have scaffolded their children's performance during the gift delay. Some parents did seem to extend their child's delay by taking an active role in distracting the child. However, these dyads were eliminated from

the analysis. The problem with the claim that parents extend delay is that the parents were also present during the snack delay, and children rarely interacted with them. Therefore, the 'use' of parents was dependent on the activity of the child, and reflected a competency of the child to distract their attention.

The issue of the role of caregivers in inhibition is actually one of both construct validity and ecological validity. Questions of validity are serious, given that everyday measures of executive function tend to be uncorrelated or weakly correlated with laboratory measures (e.g., Vriezen & Pigott, 2002). Disallowing the child from seeking out social interaction in the laboratory may do a poor job of representing what the child does in everyday life. Furthermore, isolation must be considered in light of everyday circumstances, particularly in the case of young children, for whom isolation is a rare occurrence. Of course, an isolation paradigm could legitimately be used to study instances where children are isolated from others (e.g., how the child behaves when the parents are out of the room).

Presence of distractors

The study occurred at two sites, *A* and *B*, each with slightly different configurations. At both site A and B, children interacted with seemingly trivial objects in the room, such as a mirror, and tablecloth, materials for other aspects of the study, and even with the room itself, for example, by toying with a rubber guard on the wall that protected the wall from being dented by the doorknob.

The presence of these distractors may simplify the process of inhibition. For example, the presence of toys may make inhibition during the gift delay may

make the process of distraction simpler and externalisation more likely. Yet there are problems with this interpretation, namely that children rarely made use of distractors during the snack delay, even though the same objects were present in the room. The mere presence of objects is insufficient to make them 'distractors'. The child's activity changes the role of the objects present in the room.

Given limits to how bare a laboratory can be stripped, the more salient question is one of ecological validity. What sort of sort of everyday situation does a bare laboratory mimic, and what sort of situations does a room full of objects mimic? The issue of potential distractors should be considered both in terms of the setting and of the type delay strategy of interest. For example the presence of toys may signal that 'it's OK to relax and play', and their absence signal that 'it's time to be quiet'. The fact that some children did not use the distractors at all, even during the gift delay, is of interest. What can be made of a child who fails to play, or explore? The question of whether internalisation can be undesirable requires careful consideration.

Linguistic complexity

There was no language measure in this study. Perhaps the snack delay requires greater linguistic ability than the gift delay. However, the interpretation is difficult to support with a conventional view of language. The instructions of the two tasks, "Wait until I come back" (gift delay), and "Wait until I ring the bell" (snack delay), are similar. If child understands one set of instructions, it is reasonable to expect the child would understand the other set.

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A pragmatic approach to language (e.g., Turnbull, 2003) would note that the experimenter *leaving the room* has significance and meaning to the child. The child in the gift delay may be cooperating, by waiting for the experimenter to return, in order to continue playing games. In the snack delay, the continued presence of the experimenter may make the situation innocuous, and the child may approach the task as a game.

The social structure of the gift delay is one where the child is asked to extend social interaction with the experimenter over time. When the experimenter returns, the two of them will open a present. The child can maintain this interaction with internalised or externalised activities. If the child opens the gift, he or she interrupts the flow of this interaction. The gift delay task may require some orientation towards the return of the experimenter. Perhaps it is in this sense that Barkley (2005), writing in the executive function tradition, argues that "[t]*ime, or the individual's sense of the future, is ultimately the central executive*" (p. 202 [*italics* in the original]). However, the claim that time is central executor is somewhat surprising, given Barkley's contention that inhibition and self-control are genetically determined (*ibid*, p. 318).

In contrast to the orientation towards future interaction in the gift delay, the structure of the snack delay is more immediate, and the social interaction continues, regardless of the child's actions. The child is cooperating with the experimenter whether they lift the cup or not. Of course, the snack delay also involves another level of cooperation, one where experimenter asks the child to play a game. The child's inhibition has a different meaning in the two tasks,

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although this meaning is non-linguistic, at least in the traditional sense. In the gift delay, the meaning of inhibition is tied to preserving a social interaction. In the snack delay, the meaning of inhibition is tied to cooperation while playing a game.

Future Directions

Future research should critically consider the presence of parents and type of setting and match these to the sorts of real-world settings that are of interest. If the situation of interest is the child's behaviour in isolated and unsupervised circumstances, then isolation in the laboratory may be appropriate. The careful consideration of social setting would bolster existing attempts to examine ADHD in real world, rather than laboratory, settings (e.g., Lawrence, Houghton, Tannock, Douglas, Durkin, & Whiting, 2002; Manchester, Priestly, & Jackson, 2004).

Future research should also consider setting in terms of internalised and externalised strategies and their appropriateness in different settings. For example, if gift delay is carried out in a room filled with toys, the tendency of a child to internalise could be of clinical interest.

Future research should also note the ability of children to cooperate using externalisation, at least in certain circumstances. Although externalisation may entail violating certain social norms, e.g., by being boisterous, the effort of children to cooperate is important to recognise. This research may have

applications with ADHD children, exploring the use of externalising strategies that accomplish compliance without motor control.

CONCLUSION

Sociological issues of structure and agency may seem to be an exciting new angle to view the research. Or sociology may be another can of worms to open. Actually, the sociological angle is old, and the can is already open. A call to examine structure and agency reiterates Piaget's view that developmental psychology is "a branch of sociology, concerned with the study of the socialization of the individual at the same time as a branch of psychology itself" (Piaget, 1995, p. 36). Integration of this view is difficult because, "[m]any students of human development continue to take for granted that behavior is somehow based on or determined by more 'fundamental' or 'primary' processes that occur at the genetic and/or neurophysiological level" (Gottlieb, Wahlstein, & Lickliter, 2006, p. 245). However, some psychological models, such as the *phenomenological variant of ecological systems theory* (PVEST; Spencer, Dupree, & Hartmann, 1997), have begun to explore the individual in a social context.

The controversy over agency and structure rages in the ADHD literature. Some see the diagnosis and treatment of ADHD as an attempt to impose social norms for behaviour that actually vary from culture to culture, and even classroom to classroom (Brewis, Schmidt, & Meyer, 2000, p. 824; Nissen, 2006; Singh, 2002). Others see attempts to deny the importance of social integration as a relativist academic attack that potentially harms children by depriving them

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of needed medications and therapies (e.g., Barkley, 2002). The issues raised in the present study could perhaps offer practical solutions to this debate.

If both agency and structure are acknowledged, one possibility is to merely lay them side-by-side, and ignore the connections between them. For example, Durkheim recognised the existence of both agentic and structural inhibition, noting that "we can restrain our impulses, habits, and even instincts, ... by an act of inhibition...[b]ut these inhibitory movements should not be confused with those constituting social constraint" (Durkheim, 1964, pp. 101-102). However, he made no effort to relate one form of inhibition to the other.

The alternative is to formulate a system in which structure and agency are systemically related (Archer, 1995). An example of an integrative approach is Piaget's work, The moral judgment of the child, written in response to Durkheim's Moral education. Piaget (2000) links structure to agency, noting how the structure of an interaction is transformed by the relative agency of the people interacting. Relatively equal agency characterises peer interactions. This peer structure in turn influences agency, as interaction tends to take on a more cooperative, reciprocal pattern.

Piaget argued that Durkheim had considered the child in a society of adults. Durkheim (1961; 2005) treats society as a form of rigid constraints, so that the norms, rules, and expectations of adults loom above the child. Society can also be viewed as a form of cooperation. Although Durkheim recognised that society allowed for mutual solidarity (Boudon & Bourricaud, 2002; Durkheim, 1973), he failed to extend this view of mutual solidarity to children, in particular,

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by considering children's interactions with peers (Piaget, 2000). Peer interactions also provide constraints, although in a manner different than stereotypical adult-child interactions. Peer interactions are characterised by relative equality and are marked by democratic negotiation. Even within this flexible democratic process, social relations between peers have normative standards, such as reciprocity, and respect for others. In contrast to adult generated norms, which seem to come from outside the child, norms emerging from peer contexts are norms that the child has a greater role in constructing (Piaget, 2000).

The result is an approach that recognises social order as arising from both cooperation and constraint (Piaget, 1977). A future approach to social inhibition based in part on cooperation, rather than on unalloyed agency and compliance to social constraint, could potentially link the two social inhibition research traditions. Cooperation captures both the respect for social norms that is characteristic of structural accounts, and the freedom and creativity that characterises agency.

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