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# THE ROLE OF DELAY OF GRATIFICATION AND SELF-REGULATION IN PRESCHOOLERS' SOCIAL, COGNITIVE, AND COPING COMPETENCE

by

Michele A. Opper

A dissertation submitted to the Graduate faculty in Educational Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

2003

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4/7/03
Date

Barry J. Zimmerman
Chair of Examining Committee

4/7/2003
Date

Executive Officer

Professor Georgiana Tryon

Professor Manuel Martinez-Pons

Supervisory Committee

THE CITY UNIVERSITY OF NEW YORK

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Abstract

THE ROLE OF DELAY OF GRATIFICATION AND SELF-REGULATION IN PRESCHOOLERS' SOCIAL, COGNITIVE, AND COPING COMPETENCE

by

Michele A. Opper

Adviser: Professor Barry Zimmerman

The aim of the present study was to test whether delay of gratification (DOG) in preschool children had a direct, causal relation to cognitive, academic, and social competence, or an indirect, causal relationship that was mediated through self-regulation. Also, the relation between parent and teacher ratings of children's behavior was explored. Previous research (e.g., Shoda, Mischel, & Peake, 1990) showed that preschoolers' performance on a DOG task correlated positively with cognitive, coping, and social competence in adolescence. These researchers conceptualized DOG as a measure of self-regulation, but there is no evidence in the literature of a correlation between the DOG paradigm and well-established measures of self-regulation. Delay of gratification may be a component of a larger capability to self-regulate, but no study has investigated 1) the relation between delay of gratification and self-regulation in preschoolers; 2) the relation of children's performance on the DOG task and preschoolers' ability to wait in the real world; and 3) the relation between children's performance on Mischel's DOG task concurrently with preschoolers' competencies.

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The results showed that parents' and teachers' ratings of children's delay behavior and self-regulation loaded on separate factors, and thus, separate models for teachers and parents were proposed. Also, children's performance on the DOG did not load significantly on either the parent or teacher factor. In the teacher model, the self-regulation factor significantly predicted children's competencies and children's performance on the DOG task. Also, teachers' ratings of students' cognitive competence significantly predicted students' performance on an IQ test. Parents' ratings of their children's behavior did not significantly predict their children's performance on any "objective" measures (i.e., the IQ or DOG task). The parent self-regulation factor significantly predicted only parent ratings of their children's competencies. In addition, children's performance on the DOG task was negatively correlated with all parental ratings of their children's behavior. This suggests that parents and teachers are seeing very different aspects of the same behaviors at home and at school. Moreover, it is self-regulation that is important for predicting children's competencies in both the parent and teacher models. Future research may be directed toward teaching preschoolers self-regulation skills.

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# Chapter I

## *Introduction*

The ability to resist temptation and maintain attention and self-control has been considered of paramount importance since psychology began to emerge as a discipline. William James (1892) suggested that the ability to re-direct one's attention repeatedly is the root of judgment and character, and that education to improve this skill would be preeminent.

For the last three decades there has been a great deal of interest in children's ability to wait for a preferred reward. This has been termed "delay of gratification" and has been assessed through varied methods by different experimenters (e.g., Funder, Block, & Block, 1983; Mischel & Baker, 1975; Mischel & Ebbesen, 1970). This variable has shown relationships with ego control and ego resilience in both preschoolers and adolescents (Funder & Block, 1989; Funder et al., 1983). Also, delay of gratification in preschoolers has correlated positively with cognitive and academic competence, and with the ability to cope with frustration and stress in adolescence (Mischel, Shoda, & Peake, 1988; Mischel, Shoda, & Rodriguez, 1989; Rodriguez, Mischel, & Shoda, 1989; Shoda, Mischel, & Peake, 1990). More critically, delay of gratification has taken a prominent role in clinical research because it is believed that goal-directed, self-imposed delay of gratification is important in the prevention of serious developmental and mental health problems that are related to a lack of control, including conduct disorders, antisocial behavior, and addiction (Mischel et al., 1989).

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Mischel and Ebbsesen's (1970) original delay of gratification experiment involved preschoolers who were given a choice to wait for a preferred reward (while the examiner watched in a one-way mirror) or ring a bell if they did not want to wait the entire time and receive a non-preferred reward. There have been several variations of Mischel and Ebbesen's study that have altered the delay task slightly in order to examine the role of cognitive and attentional processes in the delay of gratification. Based on their research, Mischel (1983), Mischel and Mischel (1983), and Mischel et al. (1989) concluded that 4 year-old children have difficulty developing their own strategies to wait for a preferred reward, but by age 5, most children have advanced cognitively to a point in which they understand what it takes to complete the task. This leads to the following question: if most children at age 5 can wait for a preferred reward in the self-imposed delay of gratification paradigm, what is different about the 4-year-olds who are able delay? Mischel and colleagues surmised that 4-year-olds who are able to delay generate their own effective cognitive-attentional strategies to cope with frustration involved in the delay task. Moreover, Shoda et al. (1990) found that these same children tended to exhibit similar resourcefulness in adolescence. Perhaps 4-year-olds who use cognitive and attentional strategies to delay are also more self-regulated and have higher social and cognitive competence already?

Delay of gratification may be a component of a larger capability to self-regulate, which has already shown associations with cognitive and academic competence in children between the ages of 6 and 9 (Brody & Flor, 1998). The construct of self-regulation also assesses goal-directed behavior, anticipation of

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consequences, attentional capabilities, and perseverance, as well as delay of gratification. Although there are researchers (e.g., Ayuduk et al., 2000) who have conceptualized delay of gratification as a measure of self-regulation, there is no evidence in the literature of a correlation between the delay of gratification paradigm and well-established measures of self-regulation.

Furthermore, while delay of gratification has been studied extensively for the last three decades, there have been serious methodological problems that have compromised the validity of those investigations. Delay of gratification tasks have varied considerably across investigations and therefore, have not permitted cross comparisons. In addition, researchers such as Mischel and Funder have correlated individual personality items with delay of gratification tasks. These personality items (e.g., "Competent, skillful," "Is planful, thinks ahead") are measuring constructs assumed to affect delay, but the relationship between those constructs and delay of gratification in the real world is inferred and has not been directly demonstrated. Finally, the representativeness of children in Mischel's and Funder's research is problematic, and Mischel used only parents as informants, which may be a source of bias and further compromise the validity of the results.

The purpose of this study is to examine the relationship between children's delay of gratification, self-regulation, and social and cognitive competence under more stringent conditions that would allow one to draw conclusions with minimal threats to internal and external validity. A sample of preschoolers from various economic and social backgrounds will be sought and both parent and teacher ratings will be secured. A well-established measure of children's self-regulation based on the

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work of Brody and Flor (1998) will be included. Also, rather than relying solely on Mischel's experimental delay task, teacher and parent ratings of delay behavior will be obtained. In addition to parent ratings of their children's cognitive, social, and coping competence, teacher ratings and a standardized intelligence test will be used. Finally, reward definitions will be broadened to include food and non-food items, and children's preferences will be determined. No study to date has investigated the relationship between delay of gratification and cognitive, social, and coping competence in the preschool years; previous studies have only examined this relationship in adolescence.

In summary, the present research will attempt to address the following objectives:

1. To examine the relationship between delay of gratification as measured by parents and teachers, and to examine the relationship between children's performance on an actual delay task and delay of gratification ratings by parents and teachers.
2. To determine whether delay of gratification as measured by parents and teachers and the self-imposed delay paradigm is directly related to cognitive, social, and coping competence, or indirectly, through self-regulation (i.e., how important is delay of gratification for self-regulation in preschoolers?)
3. To test the relationship between parents' and teachers' ratings of social, cognitive, and coping competence.

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4. To investigate the relationship between parents' and teachers' ratings of cognitive competence, as well as, to an individually-administered, standardized test of intelligence.
5. To ascertain whether children's performance on the delay of gratification task is significantly correlated with cognitive, social, and coping competence in a heterogeneous sample of preschoolers.
6. To demonstrate that self-regulation has direct links with cognitive and social competence in preschoolers, as shown by Brody and Flor's (1998) in an experiment with children ages 6 through 9.

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# Chapter II

## Review of the Literature

### *Delay of Gratification*

*Walter Mischel and colleagues.* Mischel's (1961, 1966) early conceptualization of delay behavior was based initially on Rotter's (1954) social learning theory. Mischel hypothesized that whether an individual decides to wait for a larger, delayed reward in lieu of a smaller, immediate one, will be a function of the subjective expectancies and the reinforcement value of the delayed outcomes. Mahrer (1956) found that by altering second and third grade male subjects' expectancy for delayed reinforcements, with other factors being equal, he was able to affect subjects' willingness to delay. Moreover, Mahrer indicated that the results showed that the expectancy for a delayed reinforcement also depends on the social agent (e.g., experimenter) who serves as the cue for the expectancy level. He concluded that subjects' perceptions of the social agents as being related to the occurrence or non-occurrence of delayed reinforcements, affected the subjects' willingness to delay.

Based on the work of Mahrer (1956) and Rotter (1954), Mischel (1961) conducted an experiment with Trinidadian adolescents in order to explore the relationship between delay of reinforcement and the concept of social responsibility. He found that subjects who were classified as juvenile delinquents (by the school they attended) chose smaller, immediate rewards more often, while nondelinquent subjects, chose larger, delayed rewards more often. In addition, subjects completed the Social Responsibility Scale (SRS), which was considered to be a measure of the

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subject's expectancy or trust that the person delivering the reward would actually do so after the delay period. As Mischel had hypothesized, those subjects who had higher social responsibility scores on the SRS, more frequently chose a larger, delayed reward.

Mischel and Staub (1965) explored the effects of situational and generalized expectancies for success on choices of immediate, less valuable noncontingent rewards, and more valuable contingent rewards. First, subjects were asked questions about their generalized expectancies for success, and then three weeks later, they worked on a series of problems and obtained either success, or failure, or no information for their performance. Thereafter, they chose between smaller, noncontingent rewards or larger, contingent rewards with five kinds of requirements for attaining the larger reward.

Results showed that contingent rewards were chosen more after success than failure, and the effects of situational success or failure tended to minimize the effects of the subjects' generalized expectancies for success or failure. In addition, subjects' decisions to wait and work for larger, more valuable rewards were based on the specific contingencies (e.g., whether they had to complete a task similar or dissimilar to the one they had already completed; whether or not they had to delay to obtain the larger reward, etc.). These findings highlighted "...the importance of specific situational contingencies as determinants of behaviors frequently viewed as indices of 'ego strength' and treated as if they were referents for relatively stable, general, and situation-free 'traits' " (Mischel, 1966, p. 91).

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Mischel and his colleagues subsequently conducted several studies exploring the interactive relationship between delay of gratification and several other variables. For example, Mischel and Metzner (1962) found that the preference for a delayed reward was positively related to age and intelligence and negatively related to the length of the delay interval. Mischel and Masters (1966) studied a delay of reward situation in which the attainment of the reward was not under the subject's control (i.e., the subject is forced to wait). The findings indicated that subjects tended to overvalue a reward when its eventual attainment was uncertain. Furthermore, studies of delay behavior have shown that the decision to wait for a larger, more valued reward can be influenced by patient modeling (Bandura & Mischel, 1965; Mischel, 1966; Mischel & Liebert, 1966), positive and negative affect (Moore, Clyburn, & Underwood, 1976; Seeman & Schwarz, 1974), and achievement motivation (Mischel & Gilligan, 1964).

In 1970, Mischel and Ebbesen developed a new delay of gratification methodology that focused on the psychological processes that mediate waiting behavior and facilitate goal-directed behavior, such as perceptual focusing or ideation strategies. Despite Mischel's research on value and expectancy, he felt "the psychological mechanisms through which persons manage to bridge the temporal delay of reward required for attainment of deferred gratification remain remarkably unstudied" (Mischel & Ebbesen, 1970, p. 330). In this delay of gratification methodology, a subject is asked to wait in a room with preferred and non-preferred rewards, while the examiner watches through a one-way mirror. If the subject waits until the examiner returns (usually 15 minutes), then he or she receives the preferred

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reward. Also, the subject is able to terminate the delay session by ringing a bell, but then he or she receives the non-preferred reward. It is this delay of gratification methodology that would be used for research in the next three decades and provide a base for longitudinal data on the topic.

Regarding perceptual processes, Mischel and Ebbesen offered preschool children at the Stanford University Bing Nursery School a choice to wait for a preferred reward (while the examiner watched in a one-way mirror) or ring a bell if they did not want to wait the entire time and receive a non-preferred reward. The subjects were assigned to different conditions in which the delayed and/or immediate rewards or no rewards were exposed while the children were waiting. Mischel and Ebbesen suggested, based on the work of Jones and Gerard, that " any factors (situational or within the individual) that make delayed consequences more salient should enhance impulse control and voluntary delay" (p. 330). Thus, the authors hypothesized that subjects who are exposed to the delayed rewards should be able to wait longer than the other groups, since attending to those rewards should enhance their prominence.

However, Mischel and Ebbesen's (1970) results were exactly contrary to what they predicted; exposure to any rewards undermined delay, while most of the children who were not exposed to the rewards delayed for the entire fifteen minutes. Interestingly, the subjects in the no-exposed-reward group engaged in singing, talking, and sleeping as they waited. The authors concluded that their findings were consistent with Amsel's (1958) frustrative nonreward theory, which suggests that the

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presence of the rewards increased the frustrativeness of its unattainability and impeded delay. Furthermore,

> conditions that decreased the subjects' attention to the blocked [i.e., delayed] reward - and that distract him by internal or overt activity from the frustrative delay of reward - would make it less aversive for him to continue his goal-directed waiting and hence permit him to wait longer for delayed gratifications (Mischel & Ebbesen, 1970, p. 335).

Yates and Revelle (1979) used Mischel and Ebbesen's delay paradigm and also found that distraction facilitated successful delay behavior in preschoolers. In addition, Raver, Blackburn, Bancroft, and Torp (1999) used a different delay paradigm, but found that children's use of self-distraction strategies significantly increased delay time. Likewise, Vaughn, Kopp, Krakow, Johnson, and Schwartz (1986) discovered that looking away from the reward enhanced delay even in children as young as 2 and 3, although these children may not have been aware that directing their attention away from the reward was an effective strategy in promoting delay behavior.

There have been several variations of Mischel and Ebbesen's (1970) study that have altered the delay task slightly in order to examine the role of cognitive and attentional processes in the delay of gratification. In a series of experiments, Mischel, Ebbesen, and Zeiss (1972) manipulated the presence of the rewards and cognitive distracters. For example, children were told to think about fun things, sad things, or the rewards themselves when the rewards were either present or obscured. They discovered that thinking about the rewards, whether they were present or obscured,

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significantly decreased delay time. Similarly, in a different delay paradigm, Toner and Smith (1977) and Toner, Lewis, and Gribble (1979) found that experimenter-manipulated verbalizations that focused on the delayed rewards resulted in significantly less delay behavior than verbalizations that focused on waiting.

Also, Mischel and Moore (1973) exposed children to images of rewards during the delay period, rather than to real rewards. All subjects were given a choice between two rewards and were given the opportunity to wait for their preferred reward, or signal at any time to receive the less preferred reward as in Mischel and Ebbesen's (1970) and Mischel et al.'s (1972) experiments. Half the subjects chose between two marshmallows and a pretzel, and half chose between two pennies and a token. During the delay period, subjects in the treatment groups were exposed to slide-presented images on a screen facing them. In one condition, the images were slides of the rewards between which the subjects had chosen (relevant imagery); in another condition, the slides had pictures of the reward objects that they had not been offered (irrelevant imagery). For example, if a child was offered either two marshmallows or a pretzel, they were shown a picture of the two marshmallows and the pretzel in the relevant condition, and a picture of the two pennies and the token in the irrelevant condition. In a third condition, subjects were exposed to a blank slide (no picture but an illuminated screen). A fourth condition consisted of a no-slide control group.

The results indicated that exposure to visual images (the slides) of the relevant rewards facilitated a longer delay than visual images of irrelevant rewards, no visual images on a slide, and a no-slide control group. This finding regarding relevant,

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visual images, contrasts with those of Mischel and Ebbesen (1970) and Mischel et al. (1972) involving direct exposure to the rewards and instructions to ideate about the rewards. Although exposure to the real rewards or instructions to ideate about the rewards (whether the rewards were present or obscured) decreased delay time, exposure to visual images of relevant rewards actually increased delay time. The authors hypothesized that when young children were exposed to or ideated about a reward, they increased the arousing qualities of the objects (e.g., taste). By contrast, visual images of the rewards may have been less arousing because of their abstract quality. Mischel and Moore (1973) cited research on young children which indicated that children under the age of six tend to ideate about objects in a very vivid and concrete way, rather than more abstractly. This, in turn, can be as arousing and frustrating as having the actual rewards present. The authors deduced that

> when attending to the rewards in this more abstract fashion (through slides), the subject can remind himself of the contingency in the delay situation, can anticipate what he gets if he delays (without this anticipation being so arousing as to frustrate him) and can support his delay behavior by covert self-instructions and self-reinforcement for waiting. Exposure to symbolic representations of the rewards . . . may thus enhance their cue function while reducing their arousal effect (p. 178).

Mischel and Moore (1973) concluded that *how* subjects attend to the rewards is more important than simply whether or not they attend to them. Likewise, Mischel and Baker (1975) examined the effects of different ideations on delay when subjects waited with both the immediate and delayed rewards facing them. Half the subjects

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chose between one versus two marshmallows, and half chose between one versus two pretzels. The children were given consummatory (arousing) or nonconsummatory (transformational) ideations for either the relevant or irrelevant rewards. For example, if a subject chose between one or two pretzels, he or she was given one of the four following instructions: a) consummatory-relevant (CR) - when you look at pretzels, think about how crunchy and salty the pretzels are, how they taste when you lick or chew them, etc; b) consummatory-irrelevant (CIR) - when you think about marshmallows, think about how sweet, soft, and sticky marshmallows are, etc.; c) transform relevant (TR) - when you look at the pretzels, think about how long and brown the pretzels are, think about that they are round and tall, etc.; and d) transform irrelevant (TIR) - when you think about marshmallows, think about how white and puffy they are, think about clouds, etc. There was also a control group that did not receive any instructions.

They found that when children were experimentally prompted to focus on the consummatory qualities of the reward object (CR), delay time decreased; but nonconsummatory or transformational ideation of the relevant reward object (TR) enhanced delay. In addition, the results indicated that consummatory ideation of irrelevant reward objects (CIR) facilitated delay, while transformation ideation of the irrelevant object (TIR) hindered delay. They suggested that thinking about the arousing features of a relevant reward (CR) reduced delay time, but ideating about the consummatory features of a reward object that is unavailable or unattainable in the situation (i.e., the irrelevant rewards)(CIR), may serve to sustain delay behavior toward the relevant goals in the situation. Also, focusing on the non-arousing aspects

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of the relevant reward (TR) increased delay time more than comparable distractions (i.e., focusing on the non-arousing aspects of an irrelevant reward, hence the TIR condition). Thus, a subject's specific cognitive activities can transform the reward stimuli to help or hinder his or her chance of receiving them and the "total pattern of results reveals both the specificity and meaningfulness of the complex relationship between thought and action in self-control" (Mischel & Baker, 1975, p. 260). Moreover, Mischel and Moore's (1973) conclusion that how the children represent the rewards cognitively, not what is physically in front of them, is what is important, was confirmed by Mischel and Baker (1975) and other investigators (e.g., Mischel & Underwood, 1974).

In the research described thus far, Mischel and his colleagues studied delay of gratification as preschoolers waited passively for a larger reward. They went on to examine differences in preschoolers' ability to delay under different working and waiting situations. It was surmised that different strategies may be needed to delay when children are involved in a task-oriented activity, compared to passive waiting. To study this issue, Patterson and Mischel (1976) asked preschoolers to complete a peg board task in order to receive a preferred reward – playing with a clown box apparatus and attractive toys. The unpreferred reward was playing with broken toys. The children had to work in the room with the clown box and were warned that this clown box might tempt them to stop working on their task. The clown apparatus had a tape recording device and would talk, flash lights, bang drums, and engage in other activities on a standardized schedule in attempts to distract the children.

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The children were assigned to one of four conditions in which they were given self-instructional plans to help them resist the temptation from the clown box: 1) Temptation-Inhibiting (TI) - children were given a specific statement to be used to avoid the clown box ("I'm not going to look at Mr. Clown Box," p. 212); 2) Task-Facilitating (TF) - specific statement given to help children focus on the task itself ("I'm going to look at my work," p. 212); 3) Combination Plan - both instructions in TI and TF were given; and 4) a control group in which no plans were given. Children were reminded that task completion was necessary to receive the preferred reward and that the examiner would return in 10 minutes. The task was purposefully designed so that none of the children would complete it. The experimenter made an excuse why she or he had to come back before the 10 minutes was over and allowed all the children to play with the attractive toys.

The results indicated that subjects spent more time working in the face of distractions when presented with temptation-inhibiting plans (TI), than when they had not been presented with any plan. In addition, there was no difference between the time children spent working in the TI plan and combined plan condition (TF and TI), suggesting that the TF plan did not increase children's working time above and beyond the effects of the TI plan. Thus, instructions to avoid the distractions (TI) during the task were significantly more effective at increasing children's working time, than instructions that focused the children on the task itself (TF).

Similarly, Mischel and Patterson (1976) used the same design as Patterson and Mischel (1976), with minor additions. In addition to the TI and TF plans, they added a Reward-Oriented (RO) plan, which encouraged the children to focus on the rewards

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of working ("I want to play with fun toys and Mr. Clown Box later," p. 944). Likewise, they added an extra control group, irrelevant verbalization (IR), in which children were told that in the face of temptation, they could say "Hickory, Dickory, Dock, the mouse ran up the clock" (p. 945). Furthermore, they divided subjects by whether they received elaborate plans (TI, TF, and RO groups) or unelaborated plans, such as "think of something to say to keep yourself from looking at the clown box" (p. 945).

The findings indicated that resistance to temptation was only facilitated in the TI and RO plans, and only in the elaborated versions. Those in the TI and RO groups spent a greater proportion of time working, rather than looking at the clown box. Furthermore, both Mischel and Patterson (1976) and Patterson and Mischel (1976) concluded that plans that focused on the rewards of continued work helped facilitate delay in the working situation, as compared to the passive waiting situation (e.g., in Mischel et al., 1972, children's delay time was shorter when they were told to think about the rewards).

Patterson and Carter (1979) explored delay of gratification under working and waiting conditions, but also manipulated the presence of the rewards. The working task required the subjects to feed marbles to a colorful bird (this task was deemed interesting and engaging by preschoolers according to the authors); the waiting task required the child to simply wait with the bird. They found that delay of gratification decreased under waiting conditions when rewards were present (similar to Mischel & Ebbesen, 1970; Mischel et al, 1972), but increased under working conditions when the contingency for the reward was based on work completion. The authors suggested

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that participants in the working conditions used the motivating properties of the rewards to energize their desire for task completion.

However, in a more recent and detailed study, Peake, Hebl, and Mischel (2002) found results that were slightly different. They used the same paradigm as Patterson and Carter (1979), but used contingent and non-contingent work conditions. In the contingent work condition, the reward was contingent on feeding the bird. In the non-contingent work condition, the preferred reward was obtainable by waiting, but the subject was told that they could feed the bird if they wanted to. Thus, there were four conditions: 1) contingent work, 2) non-contingent work, 3) waiting with the bird, and 4) waiting alone. Also, half the subjects waited with the rewards present and half waited with the rewards absent. All subjects were told that they could ring the bell if they did not want to wait, but they would receive the less preferred reward.

The results showed that there was a significant, increasing linear trend for delay time across the four conditions when the rewards were present (wait alone, 535 seconds; wait with bird, 587.7 sec.; noncontingent work, 703.05 sec; contingent work, 722.62 sec.). Those in the wait alone condition with the rewards exposed waited the shortest amount of time, and those in the contingent work condition waited the longest. The authors noted that the increasing linear trend in the rewards-exposed condition contrasted with the uniformly high waiting times with the rewards absent condition, and is consistent with the distraction hypothesis; delay should vary as a function of the amount of distraction from the rewards provided by the different tasks. In addition, there was a significant, decreasing linear trend in average relative frequency of attention to the rewards. Subjects in the wait alone condition focused

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their attention on the rewards the greatest proportion of time, and subjects in the contingent work condition, focused their attention on the rewards for the smallest proportion of time (wait alone, .49; wait with bird, .29; noncontingent work, .09; and contingent work, .06). Moreover, they found that subjects who paid more attention to the rewards across all conditions, delayed for the shortest period of time. Thus, the authors concluded that the evidence supports the distraction hypothesis; increases in preschoolers' delay time in the working situation with the rewards exposed was due to the distraction provided by the work itself, not due to motivational properties to sustain their work.

In a follow-up study, Peake et al. (2002) altered the design slightly and added a task that was deemed to be non-engaging by the subjects (sorting marbles) in order to determine whether attention to the rewards would have a motivating impact on delay, if the task was deemed non-engaging. There were three conditions: 1) engaging work, 2) non-engaging work, and 3) waiting. Also, the presence and absence of the rewards was varied and all subjects were told that they could terminate the delay period by ringing a bell, but they would receive the less preferred reward.

The unique finding of the follow-up study was that the subjects in the non-engaging task condition with the rewards absent, delayed for a shorter time than the subjects in the nonengaging task with the rewards present. This contrasted with the consistently long delay times in all conditions (i.e., contingent work, non-contingent work, waiting with the bird, and waiting alone) in the first study with the rewards absent, and with longer delay times in this study in the engaging and wait alone conditions with the rewards absent. Although analysis of spontaneous attention

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deployment strategies revealed that fixing one's attention on the rewards proved to be detrimental to delay whether in working or waiting situations, this was not the case when the work was non-engaging. Attention to the rewards seemed to motivate instrumental work and facilitate delay of gratification when the task was not engaging, as long as the subject occasionally glanced at the rewards and did not become fixated on them. Thus, Peake et al. (2002) deduced that "although the bulk of results [in this study] are consistent with the differential distraction hypothesis, this interaction suggests that differential motivation may play a role in some situations (p. 323-324).

In summary, Mischel and his colleagues found that children's delay was enhanced under working conditions with the rewards present, as long as the work was deemed engaging, and the reward was contingent upon completion of the work. Also, subjects' delay time was increased when they were prompted to use consummatory ideation of the irrelevant rewards and nonconsummatory ideation of the relevant rewards, but not the reverse. Moreover, in the face of distraction, elaborate plans to resist temptation and focus on the rewards of work were more effective than plans focusing on the task itself. Finally, delay was facilitated by slide presentations of relevant rewards, whereas exposure to the actual rewards impeded delay.

Because of other investigators' interest in personality variables underlying delay of gratification, Mischel and Peake (1982) investigated constructs, such as "ego strength." They exposed preschoolers to rewards twice in three weeks with and without the experimenter present, using the delay of gratification paradigm (Mischel & Ebbesen, 1970). Also, parents completed Block's (as cited in Mischel, 1983) Child

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California Q Set (CCQ), which is a personality measure. The results indicated that there was only a modest correlation (r =.22) between children's delay in the two situations (experimenter present vs. absent). The correlations of personality variables with the children's two measures of delay were similar, and they reflected a profile of high competence and high ego-strength. In order to investigate the temporal stability of the personal qualities or competencies that underlie delay behavior, Mischel et al. (1988) re-administered the CCQ a decade later to the parents of children who participated in the preschool delay of gratification studies (e.g., Mischel & Baker, 1975; Mischel & Ebbesen, 1970; Mischel et al., 1972;). All of the children attended the Bing Nursery School at Stanford University and participated in at least one condition of the standard delay of gratification experiments (e.g., rewards obscured, no ideation; rewards exposed, suggested ideation; symbolic presentation of rewards, etc.). The parents of 95 students of the 653 (14%) that participated in the initial studies responded to the mailings and filled out the CCQ and a brief questionnaire on adolescent cognitive, social, and coping competencies. The mean age of subjects at follow-up was 15 years, 10 months.

Regardless of the delay of gratification condition that the child participated in, the findings indicated that children who waited longer for a reward in preschool became adolescents whose parents rated them as more academically and socially competent, verbally fluent, rational, attentive, planful, and able to deal with frustration and stress. The authors concluded that "there are enduring links between a single observation of preschooler's delay time while waiting and indices of his or her

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cognitive and social competence, coping skills, and school performance years later" (Mischel et al., 1988, p. 695).

In Mischel et al.'s (1988) study, the authors did not differentiate between the varied conditions of the delay of gratification paradigm in which the children participated. For example, some experiments compared delay with the rewards exposed versus obscured, with no strategies suggested by adults (e.g., Mischel & Ebbesen, 1970). Other studies compared delay by experimentally prompting different thoughts, such as "think fun" and "think sad" (e.g., Mischel et al., 1972). Still others manipulated exposure to the rewards through symbolic presentation (Mischel & Baker, 1975). Since all the experiments altered the conditions of the delay task, it was difficult to draw conclusions regarding the relationship between the subjects' performance in the delay of gratification paradigm with later outcomes. Subsequently, Shoda et al. (1990) embarked on a longitudinal investigation that explored the relationship between preschoolers' delay time in the different delay of gratification experiments, and adolescent academic, social, and coping competence.

In Shoda et al.'s (1990) study, they were able to locate approximately 185 of the 653 (28%) students who participated in the initial study, some of whom also responded to Mischel et al.'s (1988) follow-up study. The mean age at the time of this follow-up was 18 years, 3 months. The authors used an expanded questionnaire to assess adolescent coping, SAT scores, and the CCQ. Parents completed all the questionnaires.

The results revealed that delay time for children in the exposed-rewards without suggested ideation condition, was significantly correlated with parental

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ratings of various coping skills and social and cognitive competence in adolescence. For example, those who delayed longer in preschool in the rewards-exposed-no suggested-ideation condition, were rated as more intelligent, less likely to yield to temptation, more likely to exhibit self-control in frustrating situations, and more academically competent in adolescence. Also, according to parent CCQ ratings, those same children were described as planful, attentive, and able to use and respond to reason in adolescence. Similiarly, SAT scores obtained in adolescence were significantly predicted by preschool delay time when the rewards were exposed and no ideation was suggested (Verbal SAT $\underline{r}$ = .42; Quantatative SAT $\underline{r}$ = .57), but <u>not</u> when the rewards were obscured. Moreover, most correlations of preschool delay time with adolescent outcomes were not statistically significant for subjects who participated in the other delay conditions, such as, when the rewards were obscured or ideation was suggested. Shoda et al.'s findings indicate that only the exposed rewards, no suggested ideation condition, was a significant predictor of adolescent cognitive, academic, and coping competence.

Although Mischel and his colleagues' research provided seminal information about young children's ability to delay gratification, there are significant threats to both internal and external validity inherent in those studies that could compromise the findings. First, in the studies of Mischel and his colleagues (e.g., Mischel & Baker, 1975; Mischel & Ebbesen, 1970; Mischel et al., 1972; Mischel & Moore, 1973; Shoda et al., 1990, etc.), the preschoolers were drawn from a nursery school at a prestigious university in which most of the students attending the nursery were children of faculty and graduate students. Thus, the sample was highly selective and

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homogenous. Also, it is surmised that the average IQ was higher than typical preschool students in the population and they may have shared other highly specific characteristics (e.g., social class, ethnicity, race, etc.).

Second, there is evidence that waiting time in the delay of gratification task is higher with a more heterogeneous population of students. For example, the average waiting time with both rewards exposed in Mischel and Ebbesen's (1970) and Mischel et al.'s (1972) studies were 1 minute, 3 seconds, and less than 30 seconds, respectively. However, an unpublished study by Resnick and Zimmerman (2000) reported an average waiting time of 7 minutes, 46 seconds. The latter study used the exact same delay paradigm, but with a more ethnically, culturally, and socio-economically diverse population. Moreover, approximately 7 of the 26 children in Resnick and Zimmerman's study were able to wait the full 15 minutes with both rewards exposed.

In addition to the selective population of students, the parents in the studies of Mischel and colleagues represented a highly selective population. All the parents who filled out the questionnaires had either attended Stanford University or were on faculty there, and this university draws its students and faculty from a very high-achieving, select population. Recent statistics found on the Stanford University web site (2000) indicated that 95% of undergraduate students were in the top 20% of their high school class and 67% and 71% of those students had verbal and math SAT scores between 700 and 800, respectively. Among faculty, there have been 17 Nobel laureates and 4 Pulitzer prize recipients. These high-achieving parents may have read

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Third, Mischel and Ebbesen (1970) and Mischel et al. (1972) offered children a choice of either pretzels and cookies or pretzels and marshmallows and the children chose their preferred item. However, rewards should be potent, valuable, relevant, and *specific* to each subject (Spiegler & Guevremont, 1993). There is no indication that the rewards used in the above-mentioned studies were particularly powerful or reinforcing. The children picked their preferred reward of two choices, but some children may receive cookies and pretzels, for example, any time in their home and may have not found them sufficiently appealing to warrant waiting. Moreover, some children may not be motivated by food. Thus, the conclusions the authors drew are tenuous since there is no evidence that the children waited because they were motivated by the rewards.

Fourth, all of the ratings of subjects in preschool and adolescence were completed by parents in the investigations of Mischel and colleagues (e.g., Mischel, 1974; Mischel & Peake, 1982; Shoda et al., 1990), and there is no corresponding teacher data. If one is to conclude that these preschool children are more academically and socially competent in adolescence, these domains should be assessed, at least in part, by teachers since they are the ones who evaluate students' academic competence, especially relative to their peers. Furthermore, as Achenbach, McConaughy, and Howell (1987) point out, the average correlation in child ratings between informants who see a child in different settings is only .28, which is due, at least in part, to real situational variability in children's behavior. Thus, what parents report about their children's behavior may be very different compared to what teachers are seeing at school. Moreover, teachers are an important source of

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information in evaluating children's academic and emotional functioning because children spend the majority of their time in school, the multiple demands of the school environment present many challenges to the child that may not be present in other settings, and the demands of the school setting change as the child progresses through school (Kamphaus & Frick, 1996).

Finally, Shoda et al. (1990) concluded that children's behavior in the delay of gratification paradigm in which the rewards were exposed and no strategies were suggested, highlights individual differences in a child's ability to generate effective cognitive-attentional strategies to cope with frustration. In turn, children's behavior is this condition is most predictive of adolescent cognitive, social and academic competence. However, Mischel and Ebbesen (1970) indicated that the children revealed "elaborate self-distractions mainly in the reward-absent condition and *almost never* [italics added] in the both-rewards-present condition, since in the latter group the children quickly terminated the delay period" (p. 335). It seems puzzling that the children would need self-distracting techniques when there were no rewards present because the situation is less frustrating, which is reflected by almost all those children waiting to criterion (15 minutes). Nonetheless, Shoda et al. contended that the delay of gratification task with both rewards exposed and no suggested ideation may be distinguishing children who in preschool have a set of competencies that are important for future self-regulation.

Correspondingly, Mischel, Cantor and Feldman (1996) and Mischel et al. (1989) concluded that the delay of gratification task in preschool is tapping important social and cognitive competencies that are necessary for future academic and social

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success. Therefore, it is important to understand the cognitive-attentional and/or self-regulatory skills that enable preschoolers to wait for a preferred reward. However, there have been several studies (e.g., Mischel & Mischel, 1983; Yates, Lippett, & Yates, 1981; Yates & Mischel, 1979; Yates, Yates, & Beasley, 1987) that showed that children at 4 years of age do not spontaneously use effective strategies to delay. They tend to focus on the objective properties of the real rewards and their consummatory or arousing features, rather than more symbolic representations. This, in turn, makes delay more difficult.

Alternatively, most 5-year-old children, and almost all 6-year-old children discovered delay-facilitating strategies (e.g., covering the rewards) to successfully wait during the delay period. This suggests that there is a shift in cognitive development from the fourth through the sixth year of life, and by age five or six, most children have developed cognitively to a point in which they prefer attentional strategies that avoid frustrative arousal. Therefore, as children get older, the delay of gratification task loses its diagnostic potential due to shifts in cognitive development. Nevertheless, individual differences should be most salient during the preschool years since the task at this age may reflect different self-regulatory strategies or competencies for dealing with temptation and frustration in the pursuit of long-term goals (Mischel et al., 1989). Thus, it is critical to understand the relationship between delay of gratification and self-regulation, as both are deemed important for future academic and social success.

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*Funder, Block, and Block and colleagues.* Among researchers interested in personality variables underlying delay of gratification, Block and colleagues were the most active researchers. They were especially interested in ego-control and ego-resiliency. The terms "ego-control" and "ego-resiliency" were derived from psychoanalytic theory in an attempt to integrate theories of impulse control with the motivational states of individuals. Ego-control is described as "the threshold or operating characteristic of an individual with regard to the expression or containment of impulses, feelings, and desires" (Block & Block, 1980, p. 43). For example, those high in ego-control were described as attentive, able to concentrate, cooperative, planful, relatively conforming, and reasonable. Those low in ego-control or "undercontrollers," were expected to be impulsive, distractible, unable to delay gratification, and less conforming. The authors suggested that "extreme placement at either end of the ego-control continuum implies a constancy . . . in behavior that, given a varying world, can be expected to be adaptively dysfunctional" (Block & Block, p. 44).

Ego-resiliency was defined by Block and Block (1980) as the capacity of an individual to adapt or modify his or her inner controls as a function of the demand characteristics of the environment. For example, ego-resiliency is an individual's ability to flexibly change boundaries in order to accommodate demands of the external environment, and revert back when those demands are no longer impinging. Those high in ego-resiliency are often characterized as competent, resourceful, intelligent, and adaptive under stress. Those low in ego-resiliency may respond to the dynamic requirements of a situation with rigidity and anxiety due to the competing

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demands, and they may perseverate with responses that are not adaptive to the current situation.

In an early study, Block and Martin (1955) investigated the relationship between ego-control and frustration among preschool children attending the nursery school at Stanford University, before Mischel began his work. The delay task in this experiment required the children to put pieces of candy into a jar that they could eat when they finished; however, if they ate one, the delay session was terminated and they could eat all the candy they accumulated thus far. Also, on a separate occasion, the children were introduced to attractive toys and then separated from those attractive toys, but allowed to play with ordinary toys. This was designed to induce frustration. The constructiveness of children's play was measured on a four-point observational scale (1, reflecting very little constructive play, e.g., just looking at the toys, but not actively playing with them; and 4, reflecting high quality, creative play with themes) in both the frustrating and non-frustrating situations. Teacher ratings of children's ego-control were correlated with children's delay behavior and play constructiveness. Block and Martin found that children who were rated higher on measures of ego-control were better able to delay gratification and maintain an integrated play performance under frustration.

Block and Block (1980) examined children at ages 3, 4, 5, 7, and 11 on a variety of tasks and personality measures. They provided evidence for the convergent and discriminant validity of the ego-control and ego-resilience scales. Using the same data from Block and Block's investigation, Funder et al. (1983) reported specifically on the relationship between delay of gratification and the concepts of ego-control and

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ego-resilience. However, Funder et al. used a different delay paradigm than that of Mischel and his colleagues and that of Block and Martin. Funder et al. used two delay tasks and calculated a composite score.

The first delay of gratification task, the *gift delay situation*, required children to complete a puzzle with the examiner's assistance if needed (max = 4 minutes) in order to receive a wrapped gift that was already shown to them. Then there was a 90-second period in which the examiner busied himself or herself with papers; if the child had not already taken the gift, the examiner would then present the gift after 90 seconds. The delay score was based on standardized behavioral indexes of delay time (time until the child reached and took the present), number of verbal and physical behaviors directed toward the present, and delay in opening the present.

In the *resistance to temptation situation*, the child was brought into a room where there are attractive and unattractive toys and told that he or she can play only with the unattractive toys. Then the experimenter left the room (max = 6 minutes), watched through a one-way mirror, and coded the behavior on a 6-point scale related to approach/avoidance of the forbidden toys.

In contrast to Mischel and colleagues, Funder et al. (1983) had several different teachers, as opposed to parents, filling out the California Child Q-set ratings for the same children at ages 3, 4, 7, and 11. Also, the subjects were heterogeneous with respect to socioeconomic and educational levels of their parents. Although Funder et al. (1983) found low correlations between the two different delay tasks (r = .20), they found strong, consistent and psychologically coherent personality and environmental relationships with this narrow index of delay of gratification. Delay of

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gratification measured in preschool and the ability to delay as rated by different teachers over the course of eight years was consistent.

In addition, sex differences in correlates of delay of gratification were demonstrated; Funder et al. (1983) found a positive relationship between ego overcontrollers and delay of gratification in boys but not girls and a positive relationship between ego-resiliency traits and delay of gratification in girls but not boys. Also, girls delayed gratification slightly longer than boys, with this difference approaching statistical significance. Funder et al. cited socialization differences as an explanation for these gender discrepancies. They suggested, based on the literature, that the socialization of boys emphasizes independent action and self-assertion, while the socialization of girls emphasizes impulse control and integration. Thus, a female who delays gratification may simply be responding adaptively to societal pressures inherent in the task; while "a male who delays gratification . . . [may not be] acting the way society has . . . implicitly tried to socialize him to act . . . . [but] may be deriving his tendency to delay gratification from a more individual, psychological source, such as a deeply characterological tendency toward ego overcontrol" (p. 1205). Resnick and Zimmerman (2000) found that girls delayed significantly longer than boys, using Mischel and Ebbessen's (1970) delay of gratification paradigm. Other researchers have found similar sex differences in preschool delay behavior using a variety of delay of gratification measures (e.g., Olson, 1989; Paulsen & Johnson, 1980).

Olson (1989) used Block's gift delay situation to investigate the stability of different measures of impulsivity from preschool to kindergarten. She found that

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teacher ratings of social cooperativeness were significantly related to children's performance on the delay task. Also, those children who obtained high scores on the delay task were less likely to receive negative nominations from peers both concurrently and one year later. Likewise, Olson and Hoza (1989) examined developmental correlates and predictors of conduct problems in children who transitioned from preschool to kindergarten. They discovered that boys who had lower delay scores (using Block's gift delay situation) received more negative peer nominations. In addition, the delay task differentiated boys who showed stable patterns of maladjustment from those whose symptoms were unstable over time, and significantly predicted boys' externalizing problems one year later. Moreover, on measures of cognitive and motor impulsivity, boys with high conduct problem scores did not differ significantly from their peers, but they did differ significantly on the delay task. The authors concluded that the delay of gratification task may be viewed as a socially-referenced situation in that low delay scores reflect a violation of an implicit adult expectation to wait for the gift.

Funder and Block (1989) examined delay of gratification in adolescents by providing the subjects with a choice of an immediate monetary payment or a larger, delayed payment on five occasions over a period of five weeks. They found that delay behavior correlated positively with IQ and Q-sort derived indexes of ego-resiliency and ego-control. Furthermore, they contrasted their findings from this experiment with those of Funder et al. (1983) and with those of Mischel and his colleagues.

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Unlike Funder and Block's (1989) results, Mischel et al. (1988) found that preschool delay of gratification was related to ego-resiliency but not ego-control in adolescence. However, Funder and Block questioned whether the rewards used in Mischel's studies were actually motivating. Funder and Block found (through informal testing) that the motivational impact of pretzel sticks or marshmallows (rewards used by Mischel and colleagues) was minimal, and subjects did not seem to be engaged by the rewards offered. Furthermore, if the rewards were deemed as small or unimportant, then it would make sense that in Mischel's studies delay behavior correlated with later ego-resiliency and IQ, but not with ego-control; the children would not need self-control if they were not particularly interested in or enticed by the rewards. Funder and his colleagues (e.g., Bem & Funder, 1978; Funder and Block, 1989) speculated that these children may have decided to wait during the delay period in Mischel's studies in order to please the investigator or because the situation itself seemed to imply it, rather than because of the motivating power of the rewards.

In contrast, Mischel and his colleagues explained the findings that ego-resiliency, but not ego-control, was related to delay of gratification in their study for both sexes based on task differences; Mischel and his colleagues explained that although their delay paradigm and that of Funder et al. (1983) appear to be conceptually equivalent, they are not. The two delay paradigms appear to be tapping different skills. In Mischel and colleagues' delay of gratification task, the preferred outcome was contingent upon delay. In Funder's gift delay task, for example,

> the child has already fulfilled the contingency (completing the puzzle) so that the rewards are already theirs to take; the delay measure simply assesses the

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> child's hesitation before taking the gift. It is not surprising that such hesitation should be related to ratings of excessive control (ego-overcontrol) rather than indices of cognitive and social competence or ego resilience (Mischel et al., 1988, p. 695).

Mischel et al. (1988) also emphasized that their task focused more on both process and person qualities for a full account of self-regulation. For example, children's ability to delay in a long, frustrating situation is a skill that is often cited as important for self-regulation. In addition, the ability to deploy attention and distract oneself in order to reduce the aversiveness of the delay situation has been shown to be a major determinant of successful delay, and it is these skills that correspond to descriptions of the ego-resilient child. Moreover, Mischel underscored the importance of these qualities as key ingredients of cognitive and social competence and self-regulatory skills. However, Funder and Block (1989) emphasized the importance of examining delay of gratification in the real world; findings in studies related to readily available societal gratifications (e.g., sex, recreational drug use, alcohol) show that delay of gratification is more related to ego over- and under-control and discourages interpretation in terms of cognitive-social competence and meta-cognitive insight (e.g., Block, Block, & Keyes, 1988).

Finally, the present author noted that Mischel et al. (1988) compared their results with those Funder et al. (1983), but Mischel and Funder used different delay paradigms and subjects from different ages and stages of development. Although the subjects in both studies participated in their respective delay of gratification experiments at age 4, the personality assessments were conducted years later at

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different ages. The oldest children in Funder et al.'s experiment were 11, and in Mischel et al.'s study, 14. The three-year difference, especially the years that differentiate adolescence and pre-adolescence, may account for variability in personality descriptions. Although Funder and Block (1989) and Mischel et al. (1988) both used adolescents for their studies, they again used completely different delay of gratification paradigms. Lastly, the studies differed in terms of who rated the subjects: Teachers completed the ratings for Funder's studies but parents completed the ratings in Mischel's investigations.

*Self-regulation*

*Introduction.* Self-regulation is a complex, multidimensional construct that has been receiving a great deal of attention in the last three decades because of its' associated links with academic and social competence (e.g., Barkley, 1998; Brody & Flor, 1998; Eisenberg et al., 1993; Normandeau & Guay, 1998; Olson, 1989; Raver et al., 1999; Wentzel, Weinberger, Ford, & Feldman, 1990). There are numerous skills that may be important for achieving self-regulation, including delaying immediate gratification, inhibiting impulsive behavior, controlling negative feelings, and persisting on difficult tasks (Kashiwagi, 1989; Kochanska, Murray, & Coy, 1997; Kochanska, Murray, Jacques, Koenig, & Vandegeest, 1996; Mischel et. al, 1996; Olson & Kashiwagi, 2000).

In the preschool years, teachers emphasize the importance of self-regulatory skills, such as being able to follow directions, pay attention, and cooperate with peers, as critical components for successful entry into kindergarten (Lewit & Baker, 1995). Also, abilities (e.g., planning, attending, organizing) associated with self-regulation

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have only shown moderate correlations with general intelligence (Krikorian & Bartok, 1998; Welsh, Pennington, & Grossier, 1991), but clear, consistent associations with academic achievement (Gottfried, 1990). This suggests that self-regulation may have direct links with school adjustment and academic success independent of intelligence. Moreover, Rimm-Kaufman, Pianta, and Cox (2000) reported that in a national survey of kindergarten teachers, 46% indicated that over half the children in their class lacked the kinds of skills necessary to function effectively in their classroom, suggesting than many children are entering school deficient in self-regulatory competencies necessary for learning.

Since self-regulation plays such a critical role in the development of academic and social competence and in turn, future success, the present literature review will attempt to provide a working definition of self-regulation and trace its developmental course through the preschool years. Also, specific investigations that detail the relationship between self-regulation and academic and social competencies during the preschool years will be highlighted. This review will primarily be limited to studies involving children from infancy through the preschool years, and will include longitudinal investigations in which preschoolers participated. Also, at times, experiments involving older students and/or adults will be referenced to make a point or to discuss long-term outcomes. However, the main focus of this review is on self-regulation in children younger than five years old.

*Defining self-regulation.* Self-regulation has been variously defined and studied by investigators from different and often conflicting theoretical backgrounds. Bronson (2000) reviewed theories of self-regulation in young children from

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psychoanalytic, behavioral, social learning, Vygotskian, and information-processing perspectives, among many others. Psychoanalytic theories view self-regulation as the struggle to balance the desires of the personality with the demands of the external world. Behavioral theories consider self-regulation as learned self-control through reward and punishment. Social learning theorists, such as Bandura, consider self-regulation the result of internalized performance standards, which are developed through modeling and direct experience. These internalized standards guide behavior and self-reward or self-punishment. Vygotsky emphasized the role of cultural and social factors in the development of self-regulation. He viewed adult language as essential for children's development of "private speech," and in turn, self-regulation. Finally, information-processing theorists described self-regulation in terms of rules, strategies, and plans of action that can be improved through maturity and experience.

Some investigators have discussed self-regulation in terms of "emotional regulation," especially in young children (e.g., Kochanska, Murray, & Harlan, 2000; Kopp, 1992; Raver et al., 1999; Thompson, 1994). Thompson (1994) defines emotional regulation as "consist[ing] of the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals" (p. 27-28). Also, he suggests that emotional regulation is central to the socialization process and critical to future developmental outcomes. Studies (e.g., Eisenberg et al., 1993; Raver et al., 1999) have shown that children who are better able to regulate their emotions are socially preferred by peers and/or teachers, and are described as having greater social skills than children who are unable to regulate their emotions.

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Other investigators (e.g., Schunk, 1989; Zimmerman, 1989, 1990) have specified "academic" or "cognitive" self-regulation in their research, which has primarily been conducted with older children and adults. This seems logical since older children and adults have developed complex cognitive and emotional networks and are able to engage in metacognitive processes necessary for academic self-regulation. For example, Bandura (1986) suggests the following processes for the regulation of cognitive activity in adults: 1) observing themselves and their decision-making process, 2) determining their efficacy for reaching certain goals, 3) self-monitoring, and 4) self-evaluating.

However, preschoolers' cognitive self-regulation of emotions is not as developed as those of older children and adults. According to Blair (2002), adults focus more on the conscious cognitive appraisal of emotion, and negative emotional appraisal leads to difficulties with the regulation of attention, increased disengagement, and continuing negative affect. But with young children, "higher order cognitive control and appraisal processes are nascent or developing, [and] neurobiologically more mature subcognitive emotional structures, such as those associated with temperamental emotionality, are reaching mature levels of functioning and are likely to influence self-regulation ..." (p. 114).

Kopp (1982) defined self-regulation as the child's "ability to use numerous contingency rules to guide behavior, to maintain appropriate monitoring for appreciable lengths of time and in any number of situations, and to learn to produce a series of approximations to standards of expectations" (p. 210). Based on the work of Luria, Kopp proposed that self-regulation does not develop until language is

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internalized, which happens at approximately age 4. Also, she contrasted self-control with self-regulation and suggested that self-regulation is a more mature form of self-control, and the shift is a gradual one that coincides with advances in cognitive development.

Although the above-mentioned conceptions of self-regulation are very different, there are commonalities amongst them. To some degree, all the theories suggest that self-regulation is an attempt to manage desires, goals, and/or needs by flexibly and adaptively adjusting behavior based the constraints and demands of the situation. This conceptualization of self-regulation in preschool children will be used in the proceeding discussion, however, it is noted that there is no consensus on the definition in the literature. Therefore, studies of self-regulation skills in preschool children will be reported, however, there is no assurance that conceptualizations of self-regulation in those investigations are congruent with the definition presented here. Nonetheless, Blair (2002) points out that

> Whether defined as the regulation of emotion in appropriate social responding or the regulation of attention and selective strategy use in the execution of cognitive tasks, self-regulatory skills underlie many of the behaviors and attributes that are associated with successful school adjustment (p. 112).

*The early development of self-regulation from infancy through preschool.*

Bronson (2000) and Kopp (1982) outlined the development of skills that are precursors to self-regulation. During the first year of life, infants begin to modulate arousal and attention and are able to activate organized patterns of behavior, such as

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reaching and grasping. By approximately 18 months of age, children begin to develop control over their behavior and are able to initiate, maintain, cease physical acts and communication, and follow parent commands (e.g., "don't touch"). However, they are limited in their control due to memory constraints, and require external monitors (e.g., parents) to signal them in order to help them reconstruct an awareness of appropriate behaviors. With advances in cognitive development between 24 and 48 months of age, such as the development of representational thinking and recall memory, children begin to develop true self-control. The development of self-control is reflected through self-initiated modification of behavior and an internally generated monitoring system. Children behave according to social expectations in the absence of external monitors.

Kopp (1982) contended that self-control differs from self-regulation in degree, not in kind, and they are linked conceptually because both depend on the development and use of representational thinking and recall memory. A toddler who is beginning to demonstrate self-control may show behaviors that reflect knowledge of social rules even in the absence of his or her caregiver. Whereas toddlers have limited flexibility to meet new situational demands, the self-regulated preschooler is able to use strategies and reflection, for example, to adapt to new situations and demands. Bronson (2000) suggested that children progress from the need for independence and autonomy (self-control) to an increased interest in setting goals, persisting in meeting those goals, and evaluating their outcomes for success (self-regulation).

Evidence for early differences in behaviors that are precursors to self-regulation comes from a series of experiments by Kochanska and her colleagues,

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among many others. Kochanska et al. (1996) developed a battery of tasks in order to measure children's ability to work at controlling their impulses which was termed "inhibitory" or "effortful" control. This battery was made up of tasks that tapped children's ability to delay, control motor activity, modulate the volume of their voice, and suppress/initiate activity to a signal. Also, two scales, "impulsivity" and "inhibitory control" of a temperament questionnaire were completed by the children's mothers. The children were assessed as toddlers (mean age = 32.86 months) and then as preschoolers (mean age = 46.01 months) on repeated occasions, in multiple observational contexts, and using parental reports. Some adjustments were made to the battery between time 1 and time 2 to reflect developmental advances.

Results indicated that individual children's performance was significantly correlated across both assessments, and the battery of tasks showed internal consistency and corresponded with parental ratings. The authors suggested that these tasks were tapping a common temperamental quality (i.e., inhibitory control) that is a precursor to the development of self-regulatory skills. Similarly, Kochanska et al. (2000) reported stability in children's inhibitory control between the ages of 22 and 33 months. They also found that at 33 months of age children who were better able to control their impulses, modulated their emotions more, and were more restrained when faced with the temptation of not being able to play with certain toys that were in the room. Kochanska and colleagues concluded that the results suggested stable, individual differences in children's inhibitory control.

In another longitudinal investigation involving toddlers, Silverman and Ragusa (1992) attempted to determine whether self-regulation at 4 years old could be

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predicted from child and maternal measures at age 24 months. At 24 months old, children participated in delay tasks (e.g., waiting for permission to find a candy hidden under one of three cups) and their mothers rated them on several scales measuring behaviors such as impulsivity, attention span, soothability, self-control, and persistence. At 4 years old, mothers and teachers (when possible) rated the children on similar behaviors as those at 24 months old (e.g., impulsivity, self-control, aggression, etc.), with additions and changes to reflect developmental advances.

Results indicated that children at 24 months old who had difficulty delaying a response and were rated as inattentive and impulsive, were rated as inattentive, hyperactive, impulsive, and aggressive at 4 years old. These results were statistically significant and the authors concluded that there are continuities in self-regulation during early childhood. Likewise, Sethi, Mischel, Aber, Shoda, and Rodriguez (2000) found that toddlers' (mean age = 17.56 months) use of effective attention deployment strategies to cope with separation from their mother predicted the use of effective delay of gratification strategies at age 5.

Continuities in self-regulatory skills have also been found with older students and adults. Using the same sample of children as Kochanska et al. (1996), Kochanska et al. (1997) investigated inhibitory control and conscience of children at early school age (mean age = 65.89 months). As previously mentioned, Kochanska et al. (1996) reported stability from toddler (mean age = 32.86) to preschool age (mean age = 46.01), on the battery of tasks measuring inhibitory control. In the follow-up study Kochanska et al. (1997) developed an internally consistent battery to measure inhibitory control in school-age children. They also measured conscience in school-

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age children through multiple, diverse measures, including observations of moral conduct and moral cognition. Kochanska et al. (1997) reported longitudinal stability in inhibitory control from toddler to school age, and inhibitory control in preschool was the best predictor of multiple, diverse measures of children's conscience at early school age. The authors drew a parallel between the behaviors attributed to inhibitory control, such as the ability to delay or suppress immediate desires, and the component traits prototypical for constraint, such as deliberation, control of impulses, and planfulness.

In addition, Palisin (1986) examined the relationship between maternal ratings of temperament in preschool children (age 4), and IQ and achievement test scores at preschool age and in the second grade. The author used three different measures of maternal temperament ratings for the 4-year-old subjects and individually-administered IQ and achievement tests. The findings indicated that the temperament categories of attention-span and persistence were significantly correlated with IQ in preschool, and IQ and achievement test scores in the second grade. Similarly, Martin, Drew, Gaddis, and Mosley (1988) conducted three studies in which they examined the relationship between temperament and achievement in children between the ages of 46 and 94 months (preschool and elementary school children). They found that distractibility (negatively) and persistence (positively) were significantly related to teacher-assigned grades, even when the interval between the predictor and the criterion was 4 years (i.e., from the 1$^{st}$ grade to the 5$^{th}$ grade). Moreover, in two of the studies they found that distractibility (negatively), persistence (positively), and activity (negatively) were the strongest predictors of standardized achievement scores,

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even when controlling for the effects of aptitude. Finally, Capsi and Silva (1995) and Shoda et al. (1990) cited empirical evidence for the continuity between behavioral qualities at preschool age, such as levels of impulsivity, inhibition, and self-control, and adolescent/early adulthood personality styles and social outcomes.

There seems to be a large body of evidence supporting the notion that there are early differences in behavioral characteristics of children that extend into the preschool, school-age, and adult years. Therefore, Shoda et al.'s (1990) findings that children who delayed gratification at age 4, became adolescents who were rated as more socially and academically competent, is not surprising. Is being able to wait for a reward during the DOG task essential for future academic and social competence? Or is the ability to delay gratification one part of a subset of processes that are important for self-regulation? And does delay behavior as rated by parents and teachers add to the predictability of cognitive, social, and coping competence beyond that of self-regulation? The present study will seek to determine whether delay of gratification has a direct, causal relationship to cognitive, social, and academic competence, or an indirect relationship which is mediated through self-regulation. In addition, the following hypotheses will be tested:

Hypothesis 1:

Parent and teacher ratings of students' delay behavior, self-regulation, cognitive, social, and coping competence, and children's performance on an IQ test, are significantly correlated with student's performance on Mischel's DOG task.

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Hypothesis 2:

Parent and teacher ratings of delay behavior, self-regulation, coping competence, cognitive competence, and social competence are significantly correlated.

Hypothesis 3:

Parent and teacher ratings of cognitive competence and an objective measure of cognitive functioning (IQ) are significantly correlated.

Hypothesis 4:

Students' self-regulation as rated by parents is significantly correlated with parent ratings of students' delay behavior, cognitive, social, and coping competence, and a global parent rating of cognitive and social competence.

Hypothesis 5:

Students' self-regulation as rated by teachers is significantly correlated with teacher ratings of students' delay behavior, cognitive, social, and coping competence, and a global teacher rating of cognitive and social competence.

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# Chapter III

## Method

### *Subjects*

The sites selected were based on the physical structure of the setting (e.g., the presence of a one-way mirror, room availability, etc.,) and the willingness of parents, teachers, students, and administration to cooperate. Consent was obtained from the appropriate personnel in the schools and day care centers after the proposal for the study was approved by the IRB at the City University of New York Graduate School and University Center.

Four sites agreed to participate in the study: a nursery school at a Jewish synagogue in a suburb of New York City in New Jersey, two private preschools in the borough of Queens in New York City, and a university-based day care program in Manhattan. The two private preschools in Queens were publicly funded and have both special and regular education classes. All children and parents who are proficient in English (as described by the classroom teacher) at these sites were eligible to participate in the study. Permission letters were distributed to the children by the teachers and sent home for the parents to read. Also, the investigator was available to answer parents' questions by telephone or to meet with them. Parents were asked to give written permission for their child to participate in the study and, to indicate whether their child had any food allergies because food would be offered as one of the rewards. Teachers collected the permission forms that were signed by the parents and returned by the students. Assent was also obtained from each student and they were informed that their participation was voluntary.

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In a questionnaire given to participating families, parents reported their ethnicity and highest level of education. Five parents did not return the questionnaires, but the investigator was able to obtain the child's ethnic background from school records. The final sample consisted of 62 preschool children (36 girls and 26 boys) with a mean age of 52.6 months (4 years, 4 months). The ethnic background of the children in the sample is as follows: African-American - 2 children (3.2%); Caucasian - 31 children (50%); Asian-American - 17 children (27.4%); and Hispanic/Latino - 12 children (19.4%). The highest level of education of the parents of children who participated in the study is as follows: less than high school - 4 (6.5%); high school graduate - 10 (16.1%); some college - 11 (17.7%); a college graduate - 16 (25.8%); and advanced degree - 16 (25.8%).

All children were assumed to be normally-developing, except for 6 children who were receiving some type of special education related service (e.g., physical therapy, speech therapy, etc.,). These children were deemed to be high functioning by their teachers and these youngsters obtained IQ scores within the average range on the subtests administered for the study. There were 6 children who could not participate in the study: 3 who had limited English proficiency, 2 who had language processing problems (they were referred to the Committee on Preschool Special Education for a full evaluation), and 1 special education child who could not understand the directions on the IQ test. The Average IQ score for the subjects in the study was 103 with a standard deviation of 9.6, which corresponds to the population norms using the full IQ score ($M = 100$, $SD = 16$) (Thorndike, Hagen, & Sattler, 1986).

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*Measures*

A number of measures were used with parents, teachers, and students. Parents and teachers completed identical or parallel forms of scales measuring the following: Delay behavior, self-regulation skills, cognitive competence, social competence, and coping competence. Children participated in a delay task and IQ test. All the measures used in the study will be discussed in the following section.

*Delay of Gratification*

*Delay task.* The delay procedure as described in Mischel and Ebbesen (1970) was carried out. This consisted of the child waiting for a preferred reward while the examiner watched via a one-way mirror. The child was then permitted to play with some toys for a few minutes before returning to class.

*Teacher and parent ratings of delay.* Teachers and parents were asked to rate a child's ability to wait for a reward in a variety of situations at home and in school. The questions were chosen from a scale developed by Kashiwagi as cited in Olson and Kashiwagi (2000). Kashiwagi's rating questionnaire to assess early self-regulatory competence was developed using a preschool population in Japan. The scale consists of 71 contextually specific items on which preschool teachers rate the self-regulatory competence of individual children. According to Olson and Kashiwagi, the "...questionnaire has been proven to have good psychometric properties, including a coherent factor structure and scales with reliability coefficients in the low .90s" (p. 610).

Olson and Kashiwagi (2000) used Kashiwagi's scale to study U.S. preschoolers from middle and upper-middle income families in university-based

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setting. The data revealed two inclusive factors, "Self-Inhibition" and "Self Assertion." Although the results supported the reliability of the Kashiwagi self-regulation questionnaire with a U. S. preschool population, the subscale of "Delay of Gratification" (DOG) failed to load on the "Self-Inhibition" factor in the U. S. sample, as it did in the Japanese sample. The DOG items pertained to such contexts as waiting for a reward, sharing toys, and taking turns. Unfortunately, many studies (e.g., Funder & Block, 1989; Mischel, 1974; Mischel & Peake, 1982; Shoda, Mischel, & Peake, 1990) have inferred DOG from personality or behavior constructs (e.g.,"competent, skillful; "is planful, thinks ahead") that were assumed, but not scientifically shown to affect delay in real world settings. Critics will question whether a trait measure of DOG will be predictive of children's performance in a variety of situations.

Some of the items used in the rating scale by Olson and Kashiwagi (2000) for the narrow band of "capacity to delay" were not included in the present study because they do not meet the operational definition of delay of gratification that is being employed. Delay of gratification is defined here as the ability to wait for a tangible (e.g., toys, food) or intangible (e.g., attention, a turn to speak) reward. Olson and Kashiwagi also included items involving sharing and following instructions, in the subscale of the capacity to delay. As previously mentioned, I sought to find contextually specific measures of delay of gratification and not confound this measure with similar constructs (e.g., patience, impulsivity, etc.). Thus, delay of gratification was rated by parents and teachers on a 5-point Likert-type scale from 1 (very rarely) to 5 (very often), using the following items: 1) When instructed "wait just a minute,"

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s/he can wait, 2) When playing, s/he is able to wait patiently for his/her own turn, 3) Is able to wait patiently if another child is using something s/he wants, 4) Is able to wait patiently for a snack to be distributed (for parents, "a meal to be served"), 5) Can wait his/her own turn if the teacher is speaking with another child (for parents, "if parent is speaking with someone else"), 6)Waits his or her own turn in a group discussion, 7) Can listen to others without interrupting, and 8) Waits patiently when told "later" (for example, you can have ice cream "later").

*Self-Regulation*

Parent and teacher ratings of self-regulation were assessed using the self-control subscale of the Children's Self-Control scale (Humphrey, 1982). Brody and Flor (1998) found that self-regulation assessed through the Children's Self-Control Scale was positively related to children's (ages 6 through 9) cognitive and social competence. This subscale includes these five items : 1) Thinks ahead of time about the consequences of his or her actions, 2) Plans ahead before acting, 3) Pays attention to what he or she is doing, 4) Works toward goals, and 5) Sticks to what he or she is doing until finished even on long, unpleasant tasks. Both mothers and teachers rated the student using a 5-point scale from 1(never) to 5 (very often). Brody and Flor reported Cronbach's alphas for mothers and teacher as .72 and .91, respectively.

*Cognitive/ Academic Competence*

*Parent and teacher ratings.* Cognitive competence was assessed using items from Harter's (1982) Perceived Competence Scale for Children (PCSC). Brody and Flor (1998) used the items on the Cognitive subscale of the PCSC with teachers and found that self-regulation was linked to cognitive competence as measured by the

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PCSC and a global rating of cognitive competence. Brody and Flor reported a Cronbach's alpha of .92 for the Cognitive subscale of the PCSC. However, since not all the items the authors used were appropriate for preschoolers, the scale was adapted. In addition, a forced-choice format was used, but Brody (personal communication, February 20, 2002) indicated that he subsequently used a Likert-type scale because parents had difficulty understanding the forced-choice format. In summary, the items from the Cognitive subscale of the PCSC were adapted for use with preschoolers using a 5-point Likert-type Scale from 1 (Not at all) to 5 (Very Often).

The following items from the Cognitive subscale of the PCSC were used with both parents and teachers, but the wording of "your child" was changed to "this student" for teacher ratings: 1) Your child is good at his/her school work, 2) Your child is just as smart as other kids his/her age, 3) Your child is pretty fast at finishing his/her schoolwork, 4) Your child can remember things easily, and 5) Your child is able to figure out the answers in his/her school work. A global rating of child's competence was also sought by asking, "How intellectually competent do you feel your child [the student for teachers] is?" Ratings were made on a 4-point Likert-type scale ranging from 1 (not at all competent) to 4 (very competent).

*Cognitive test.* Select subtests from the Stanford-Binet Intelligence Scale: Fourth Edition (SB) (Thorndike et al., 1986) were used in order to obtain a direct measure of students' cognitive skills. The SB is a norm-referenced measure of cognitive skills in individuals from ages 2 to adult. The authors of the SB adopted a three-level hierarchical model of the structure of cognitive abilities. One of the broad

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factors, crystallized abilities, "...represents the cognitive skills necessary for acquiring and using information about verbal and quantitative concepts to solve problems" (p. 4). In addition, the authors state that "The crystallized-abilities factor could also be called a scholastic- or academic-ability factor since these verbal and quantitative skills have high positive correlations with school achievement "(p.4). The area scores that comprise the crystallized ability factor are the Verbal Reasoning and Quantitative Reasoning Areas.

Within the Verbal Reasoning Area, two of the three subtests available for use with preschoolers were selected based on their relevance to cognitive and academic achievement. From the Verbal Reasoning Area, the Vocabulary and Comprehension subtests were used. The SB uses multistage testing in order to adjust the difficulty level of the task to the ability level of each examinee (Thorndike et al., 1986). The Vocabulary subtest serves as a routing test which determines the entry level for subsequent subtests. Then a basal (all four items at two consecutive levels are passed) and ceiling (failing three out of four or all four items at two consecutive levels) for each subtest is established. The Vocabulary subtest contains both picture and oral vocabulary. The comprehension subtest begins with six items that require the child to point to body parts and then shifts to questions that require a verbal response. The administration of the first six items depends on the entry level for each particular student. If a child's starting point begins with verbal questions and he or she passes the first four items to achieve a basal, then the examiner continues asking verbal questions. In contrast, if the child does not reach a basal level within the first four items administered, then the examiner presents the previous items in reverse

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sequence until the child obtains a basal. Therefore, some children were presented the first six items that only required pointing, and others were not. For all items that require verbal responses on both the Vocabulary and Comprehension subtests, the manual specifies responses that are passing and failing for each item and those answers that should be queried.

Only one subtest in available within the Quantitative Reasoning Area for use with preschoolers. This subtest also named, Quantitative, involves, matching dice to a model, counting dots, and math problem-solving that involves addition and subtraction concepts, and multiplication and division at higher levels. Again, where a child begins is individually determined and the items administered are guided by basal and ceiling rules.

Reliability for the area scores was calculated using average intercorrelation coefficients, according to the test manual. The reliability for the Verbal Reasoning Area for 4-year-olds who were given two subtests is .91 and the standard error of measurement (SEM) is 4.80. The reliability for the Quantitative Reasoning Area for 4-year-olds (only one subtest available) is .87 and the (SEM) is 5.77. The Kuder-Richardson Formula (KR-20) was used to measure the internal consistency of raw scores for each subtest. For 4-year-old children, the following KR-20 correlation coefficients were reported: Vocabulary: .81; Comprehension: .86; and Quantitative: .87. Anastasi (1989) reviewed the SB and indicated that the instrument ". . . shows a high level of technical quality in its test construction procedures" (p. 772).

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*Social Competence*

Social competence was assessed using items from Harter's (1982) Perceived Competence Scale for Children (PCSC). Brody and Flor (1998) used the items of the Social subscale of the PCSC with teachers and found that self-regulation was linked to social competence as measured by the PCSC and a global rating of social competence. Brody and Flor reported a Cronbach's alpha of .88 for the Social subscale of the PCSC. However, several items the authors used were inappropriate for preschoolers, therefore the scale was adapted. In addition, as with the Cognitive subscale, Brody (personal communication, February 20, 2002) recommended using a Likert-type scale, rather than the forced-choice format.

The following items from the Social subscale of the PCSC were used for both parents and teachers, but the wording of "your child" was changed to "this student" for teacher ratings: 1) Your child finds it easy to make friends, 2) Your child has a lot of friends, 3) Your child is liked by very many others, 4)Your child is popular with others his or her age, and 5)Your child is really easy to like. Each child was rated on a 5-point Likert-type scale ranging from 1 (Not at all) to 5 (Very Often). A global rating of child's competence was also sought by asking, "How socially competent do you feel your child [the student for teachers] is?" Ratings were made on a 4- point Likert-type scale ranging from 1 (not at all competent) to 4 (very competent).

*Coping Competence*

Coping competence was measured by a questionnaire used by Shoda et al. (1990). Shoda and his colleagues administered this questionnaire to parents of adolescents during the follow-up study from preschool in order to assess their ability

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to cope with a variety of situations. Although some of the questions seem to tap other capabilities than coping skills (e.g., intelligence), the items that reached statistical significance in Shoda et al.'s study were used for the sake of comparison.

The following 12 items were used for both parents and teachers, but the wording of "your child" was changed to "this student" for teacher ratings: 1) How likely is your child to be sidetracked by minor setbacks? 2) How likely is your child to exhibit self-control in frustrating situations? 3) How well does your child cope with important problems? 4) How capable is your child of doing well academically when motivated? 5) How likely is your child to yield to temptation? 6) Faced with a choice, how likely is your child to settle for the immediate [but less desirable] one? 7) How able is your child to pursue his or her goals when motivated? 8) How intelligent is your child? 9) When motivated, how capable is your child of exhibiting self-control in tempting situations? 10) When trying to concentrate, how distractible is your child? 11) How capable is your child of exhibiting self-control when frustrated? 12) How well can your child divert attention from the frustrativeness of having to postpone a desired gratification, while continuing to pursue it?

Each child was rated on a 9-point Likert-type scale ranging from 1 (Not at all) to 9 (Extremely). This questionnaire was given to both parents and teachers to complete.

### *Procedures*

The data were collected in October, November, and December 2002. Each subject was seen on two occasions. The first session was used as a warm-up period

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and the three selected subtests from the Stanford-Binet Intelligence Scale: Fourth Edition (Thorndike et al., 1986) were administered.

During the second session, the children were asked about their reward preferences and the delay task was carried out. Rewards choices included 14 different stickers of caricatures (purchased at www.smilemakers.com) that were believed to be popular among four year olds (e.g., Blues Clues, Spiderman, Power Puff girls, Barbie, etc.,) and 3 food items (marshmallows, pretzels, and chocolate chip cookies). The stickers were placed in a row approximately one inch apart on a piece of poster board and the three food rewards were placed on the poster board above the stickers. The child was encouraged to look at all the rewards for a few moments and the examiner swept her finger across the table to assure that the child had scanned all of the food and non-food items. Then the child was asked, "Which is your favorite thing, the one you like the very best?" After the child chose a favorite item, the examiner elicited his or her second and third favorites. This was done to assure that the child was able to qualitatively distinguish between the items and to determine whether most of the children chose the same rewards or different rewards.

The delay procedure was carried out as described in Mischel and Ebbesen (1970). Two of the sites had rooms with one-way mirrors. At the other two sites, the investigator had a piece of one-way mirror glass made and attached it to the window on the door with velcro. At both sites, the imposed one-way mirror was effective in that it obscured the child's view of the examiner during the delay task, but the examiner was able to see the child.

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In each room, there was a small table and child size chair at the table. Two room dividers were placed around the table at each site in order to reduce any distractions that were present in the room (e.g., pictures on the wall, books, etc.,) and to attempt to provide the same environment in each of the sites where the study was being conducted. On the table, a clear plate was placed with the subjects' choice of their preferred reward (e.g., a cookie) and two of that item next to it (e.g., two cookies). There was also a bell placed on the table. The child was then given the following instructions:

> I have to go out of the room now, and if you wait until I come back by myself then you can have this one [pointing to two of the chosen object]. But you know, if you don't want to wait you can ring the bell and bring me back anytime you want to. But if you ring the bell then you can't have this one [pointing to two of the chosen object], but then you can have that one [pointing to one of the chosen object]. So if you ring the bell and bring me back then you can't have the _____ [pointing to two of the chosen object], but you can have the _____ [pointing to one of the chosen object].

The child's comprehension was then assessed by asking three questions: 1) "Can you tell me, which do you get if you wait for me to come back by myself?" 2)"But if you want to, how can you make me come back?" 3) "If you ring the bell and bring me back, then which do you get?" All children were then told that they would have an opportunity to play with a box of toys (the examiner pointed to a box filled with puzzles, dolls, action figures, etc.,) for a short time after they finished the task

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regardless of their performance. The number of seconds each child delayed was recorded by a stopwatch.

Parent rating scales were sent home with the children along with envelopes for their return. Teachers were asked to fill out rating scales and collect all documents the children returned that pertained to the study. Teachers were given $2.50 for each rating scale they filled out. Parents received a written summary about their child's performance on the IQ screener after the study was completed.

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# Chapter IV

## Results

### *Descriptive Statistics*

The means and standard deviations for the data are presented in Table 1. All variable labels that have a "T" at the end indicate that these are teacher ratings. All variable labels that have a "P" at the end signify that these are parent ratings. The following acronyms will be used to refer to each questionnaire with a "T" or "P" following it to signify parent or teacher rated: D for delay behavior; SR for self-regulation skills; COPE for coping skills; COG for cognitive competence; SOC for social competence, GCOG for global ratings of cognitive competence; and GSOC for global ratings of social competence. Performance on Mischel's delay task will be referred to as "DELSEC" and performance on the IQ subtests will be referred to as "IQ."

### *Reliability of Test Forms*

Internal consistency of each questionnaire was calculated using Cronbach's alpha. The Cronbach's alpha for each of the parent questionnaires were as follows: DP = .87, SRP = .73, COPEP = .74, COGP = .73, and SOCP = .87. The Cronbach's alpha for each of the teacher questionnaires were as follows: DT = .96, SRT = .88, COPET = .88, COGT = .95, and SOCT = .94. This suggests that the internal reliability for all of the questionnaires was adequate.

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Table 1

*Means and Standard Deviations of Boys' and Girls' Performance on all Measures*

| | Boys | | Girls | | Total | |
|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| IQ | 105.31 | 8.90 | 101.58 | 9.87 | 103.15 | 9.58 |
| DELSEC[d] | 360.00 | 369.38 | 309.89 | 330.13 | 330.90 | 345.07 |
| DT[b] | 31.27 | 7.76 | 33.31 | 6.17 | 32.45 | 6.89 |
| DP[a, b] | 25.26 | 6.76 | 25.94 | 6.02 | 25.67 | 6.28 |
| SRT[b] | 19.35 | 4.07 | 20.89 | 2.93 | 20.24 | 3.50 |
| SRP[a, b] | 17.48 | 2.79 | 17.31 | 3.14 | 17.38 | 2.98 |
| SOCT[b] | 20.35 | 4.15 | 20.08 | 3.51 | 20.19 | 3.76 |
| SOCP[a, b] | 22.09 | 3.03 | 20.66 | 3.84 | 21.22 | 3.58 |
| COPET[c] | 77.42 | 13.88 | 75.64 | 14.19 | 76.39 | 13.98 |
| COPEP[a, c] | 69.43 | 11.22 | 68.86 | 13.81 | 69.08 | 12.74 |
| COGT[b] | 21.08 | 3.78 | 20.42 | 3.80 | 20.69 | 3.77 |
| COGP[a, b] | 21.74 | 2.65 | 21.40 | 2.55 | 21.53 | 2.57 |

*Note.* $N = 62$ unless otherwise indicated.

[a]$N = 58$. [b]Scale ranged from 1 to 5. [c]Scale ranged from 1 to 9. [d]Maximum = 900 seconds.

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*The Relation Between Parent Educational Level and Ethnicity, and Children's Outcomes*

Since analyses showed that IQ and DELSEC were uncorrelated ($r = .08$), these dependent measures were analyzed separately using ANOVA. A one-way ANOVA was computed using parent educational level as the independent variable and DELSEC as the dependent variable. There was no significant difference found on the amount of time children delayed during Mischel's delay task (DELSEC) based on parents' educational level, $F(4, 56) = .63$, *ns*.

A one-way ANOVA was computed using parent educational level as the independent variable and IQ as the dependent variable. There was a significant difference found in IQ based on parents' educational level, $F(4, 56) = 2.57, p < .05$. In addition, a trend analysis showed a significant, linear increase in IQ based on parent's educational level, $F(1, 56) = 7.44, p < .01$.

A one-way ANOVA was also computed using parent ethnicity as the independent variable and DELSEC as the dependent variable. There was no statistically significant difference found in children's ability to wait during Mischel's delay task based on parent ethnicity (DELSEC), $F(3, 61) = .02$, *ns*. A one-way ANOVA using parent ethnicity as the independent variable and IQ as the dependent variable showed a statistically significant difference in children's IQ based on parent ethnicity, $F(3, 61) = 5.33, p < .01$. Post-hoc analyses were performed using Tukey's test. The findings showed that Caucasians performed significantly better than Asian-Americans ($p < .05$) and Hispanic/Latinos ($p < .01$) on the IQ test.

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*Effect of Gender on Children's Outcomes*

A MANOVA was performed to test gender differences in the dependent variables (IQ, DELSEC, SRT, SRP, COPET, COPEP, DT, SP, SOCT, and SOCP). An overall multivariate test of significance showed no gender effect of any of the dependent variables, Wilks' Lambda = .74, $F = 1.33$, *ns*.

*Correlations Among Variables*

*Correlations between Mischel's delay task and parent and teacher ratings.* Table 2 shows the Pearson correlations between the number of seconds children delayed on Mischel's delay task (DELSEC) and parent and teacher measures of student functioning. The findings indicate significant, positive correlations between seconds of delay and teacher-rated coping skills ($r = .29$), cognitive competence ($r = .31$), a global rating of cognitive competence ($r = .23$), and self-regulation skills ($r = .22$). Teacher-rated delay behavior and DELSEC were positively correlated, but did not reach statistical significance ($r = .17, p = .09$). The correlation between teacher-rated social competence and DELSEC nearly reached statistical significance ($r = .21$, $p = .05$). Only parent-rated self-regulation skills were significantly, negatively correlated with children's seconds of delay ($r = -.27$).

*Correlations between IQ and parent and teacher ratings of cognitive competence.* Pearson correlations between children's IQ and teacher and parent ratings of cognitive competence were computed. The findings showed a significant, positive correlation between IQ and teacher ratings of students' cognitive competence ($r = .21, p < .05$). However, the correlation between students' IQ and parent ratings of their children's cognitive competence was not significant ($r = .11$, *ns*).

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Table 2

*Correlations between DELSEC and Teacher and Parent Measures of Student Functioning*

| | Teacher Ratings and DELSEC | Parent Ratings and DELSEC |
|---|---|---|
| Delay (D) | .17^ | -.02 |
| Coping (COPE) | .29* | -.04 |
| Self-regulation (SR) | .22* | -.27* |
| Cognitive (COG) | .31** | -.15 |
| Social (SOC) | .21^ | -.15 |
| Global cognitive (GCOG) | .23* | -.02 |
| Global social (GSOC) | .13 | -.08 |

*$p < .05$, one-tailed. **$p < .01$, one-tailed. ^$p < .10$, one-tailed.

*Correlations among other measures.* Pearson correlation coefficients for all teacher-rated measures are shown in Table 3, and all parent-rated measures in Table 4. It is noted that teacher-rated scales (DT, SRT, COPET, COGT, and SOCT) were positively and significantly intercorrelated. Also, parent-rated scales (DP, SRP, COPEP, COGP, and SOCP) were positively and significantly intercorrelated with the exception of parent-rated social competence (SOCP). Correlations between parent and teacher ratings are shown in Table 5. The results show that parents' and teachers' ratings of students' coping competence, social competence, and global social competence were significantly correlated, but parent and teacher ratings of self-

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Table 3

*Correlations among Teacher-rated Measures of Student Functioning*

| Measures | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| 1. DT | .79** | .84** | .61** | .37** | .46** | .19 |
| 2. COPET | ---- | .77** | .66** | .41** | .48** | .32** |
| 3. SRT | | ---- | .59** | .37** | .34** | .13 |
| 4. COGT | | | ---- | .47** | .81** | .27* |
| 5. SOCT | | | | ---- | .20 | .63** |
| 6. GCOGT | | | | | ---- | .26* |
| 7. GSOCT | | | | | | ---- |

*$p < .05$, one-tailed. **$p < .01$, one-tailed.

Table 4

*Correlations among Parent-rated Measures of Student Functioning*

| Measures | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| 1. DP | .51** | .34** | .39** | .11 | .14 | .28* |
| 2. COPEP | ---- | .34** | .48** | .22* | .49** | .15 |
| 3. SRP | | ---- | .45** | .17 | .30* | .19 |
| 4. COGP | | | ---- | .42** | .61** | .44** |
| 5. SOCP | | | | ---- | .48** | .67** |
| 6. GCOGP | | | | | ---- | .50** |
| 7. GSOCP | | | | | | ---- |

*$p < .05$, one-tailed. **$p < .01$, one-tailed.

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Table 5

*Correlations among Parent- and Teacher-rated Measures of Student Functioning*

| | Teacher-Parent Correlations |
|---|---|
| Delay (DT/DP) | .06 |
| Coping (COPET/COPEP) | .24* |
| Self-regulation (SRT/SRP) | .19 |
| Cognitive (COGT/COGP) | .16 |
| Social (SOCT/SOCP) | .29* |
| Global Cognitive (GCOGT/GCOGP) | .02 |
| Global Social (GSOCT/GSOCP) | .36** |

*$p < .05$, one-tailed. **$p < .01$, one-tailed.

regulation skills, delay behavior, cognitive competence, and global cognitive competence were not ($r$ = .19, .06, .16, and .02, respectively).

*Factor Analyses*

Since delay (DT) and self-regulation (SRT) as rated by teachers were significantly correlated and delay (DP) and self-regulation (SRP) as rated by parents were significantly correlated, a factor analysis was conducted to determine whether these variables loaded on an underlying factor. Also, since delay and self-regulation as rated by parents were highly, significantly correlated ($r$ = .34, $p < .01$), a factor analysis was conducted in order to determine whether both variables loaded on one factor. The delay task (DELSEC) was added to the analysis to determine whether it

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was loading on the same factor and should be combined as well. All variables (DT, SRT, DP, SRP, DELSEC) were put in together to investigate whether both teacher variables and both parent variables loaded on one factor and not on another. A principal component analysis with promax rotation was used. The pattern matrix is shown in Table 6. A factor loading of .60 or greater was considered statistically significant at the .01 level for this sample size, according to Stevens (1996). Results indicated that SRT and DT loaded on one factor and not on the other; and DP and SRP loaded together on a single factor and not on the other. DELSEC loaded positively on the teacher factor, but not significantly. Also, DELSEC loaded negatively on the parent factor and not significantly. Therefore, for subsequent structural equation analyses, parents and teachers were analyzed separately and DELSEC was not combined with either the parent or teacher self-regulation factor.

Table 6

*Factor Analysis of Parent- and Teacher-rated Delay Behavior and Self-Regulation, and Children's Performance on the DOG task*

| | Component | |
|---|---|---|
| | 1 | 2 |
| SRT | .95 | .10 |
| DT | .93 | -.01 |
| SRP | .07 | .84 |
| DP | .15 | .66 |
| DELSEC | .39 | -.54 |

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*Structural Equations*

To test the relations of delay of gratification with cognitive, social and coping competence, and whether such relations are mediated by self-regulation, the structural equation model in Figure 1 was developed. The variable, Delay of Gratification, was measured by parent and teacher ratings of children's delay and children's performance on Mischel's DOG task. As previously mentioned, delay of gratification was defined as the ability to wait for a tangible or intangible reward. The questionnaire items developed to measure this construct were very specific and designed not to be confounded with other similar constructs (e.g., patience, impulsivity). It was believed that if the DOG task is measuring children's ability to wait for a reward, then parent and teacher ratings of delay behavior should be highly correlated with this task. Thus, the three measures should form part of the same factor. Based on the work of Brody and Flor (1998), the variables of Self-Regulation, Social Competence, and Cognitive Competence were measured by parent and teacher ratings. Also, IQ was included as part of Cognitive Competence since it was believed that if parent and teacher ratings of cognitive competence are valid, then they should correlate with IQ. Thus, the three measures should form part of the same factor. Finally, Coping Competence was measured by parent and teacher ratings and was included in the model based on Shoda et al.'s (1990) study.

After discovering that most parent ratings and teacher ratings of the same behaviors in children were not correlated (see Table 5) and parent ratings and teacher ratings of delay behavior and self-regulation loaded on different factors (Table 6), the model in Figure 1 was discarded and two separate models were proposed. In

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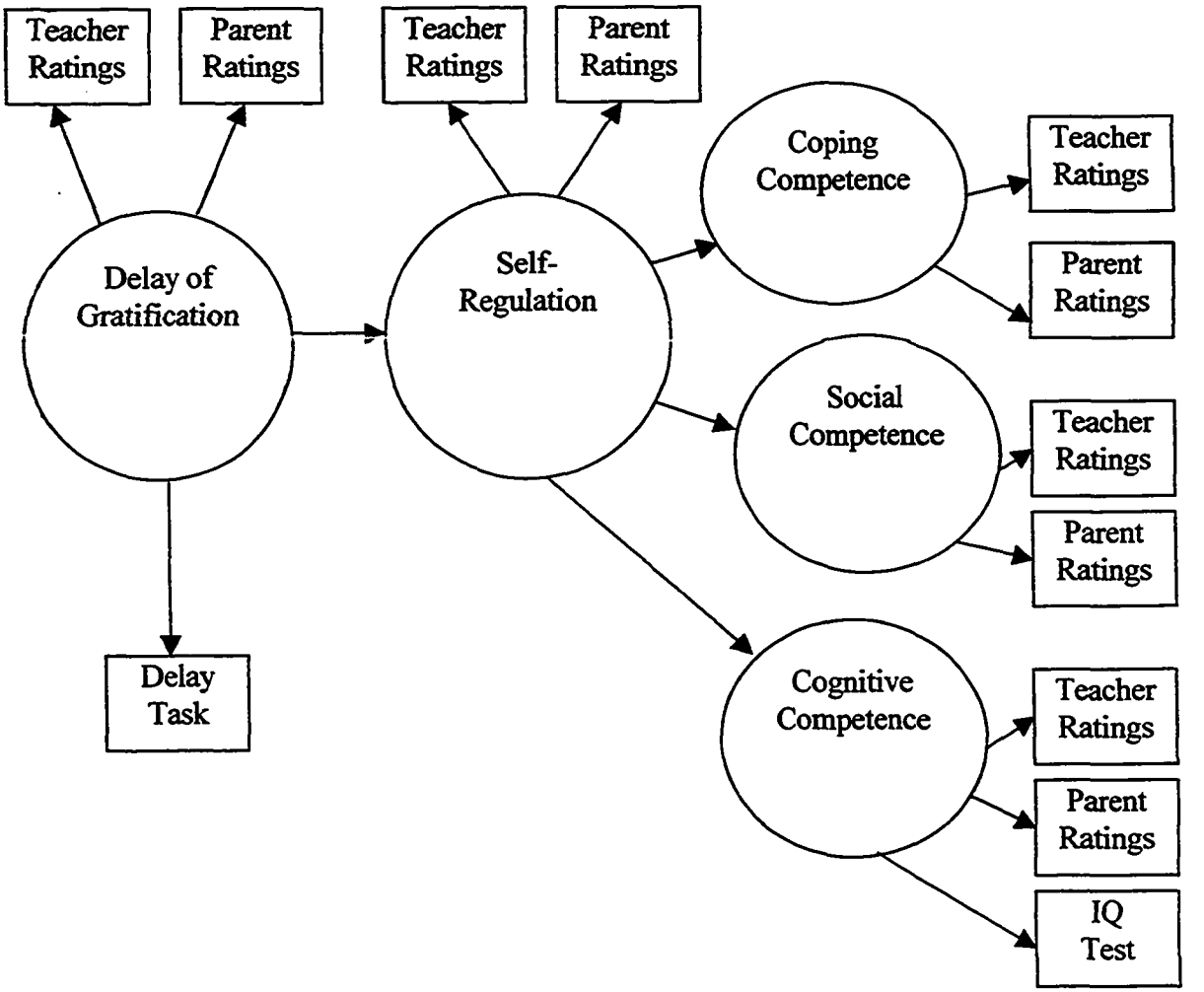


*Figure 1.* Proposed model of the relationship between delay of gratification, self-regulation, and coping, social, and cognitive competence in students.

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addition, DELSEC did not correlate significantly with delay behavior as rated by teachers or parents (see Table 2). Furthermore, DELSEC did not load significantly on the teacher or parent self-regulation factor (Table 6). Therefore it was not combined with the delay ratings as proposed in the initial model. Based on these findings, DELSEC and IQ were viewed as two "objective" measures of students' performance and important determinants of whether parent and teacher ratings could predict student performance.

Structural equation models were evaluated using Amos 4.01 (Arbuckle, 1994). Bentler's (1988) comparative fit index (CFI) was used to test the model's fit of the data. A CFI greater than .95 was interpreted as a good fit, as indicated by Bentler.

*Teacher model.* As reported earlier, teacher-rated delay behavior and self-regulation loaded on a single factor, thus they were combined through structural equation methodology into a composite variable called "self-regulation." The proposed teacher model presented in Figure 2 displayed a good fit of the data, CFI = 1.00. Squared multiple correlations ($R^2$) are denoted in the boxes. As expected, self-regulation had a positive, direct effect on teacher-rated cognitive, social, and coping competence. The self-regulation factor accounted for 77% of the variance in teacher-rated coping skills, 20% of the variance in teacher-rated social skills, and 49% of the variance in teacher-rated cognitive skills. Also, the self-regulation factor accounted for 7% of the variance in children's performance in Michel's DOG task (DELSEC). Self-regulation had an indirect link to IQ, which was mediated through teachers' ratings of students' cognitive competence.

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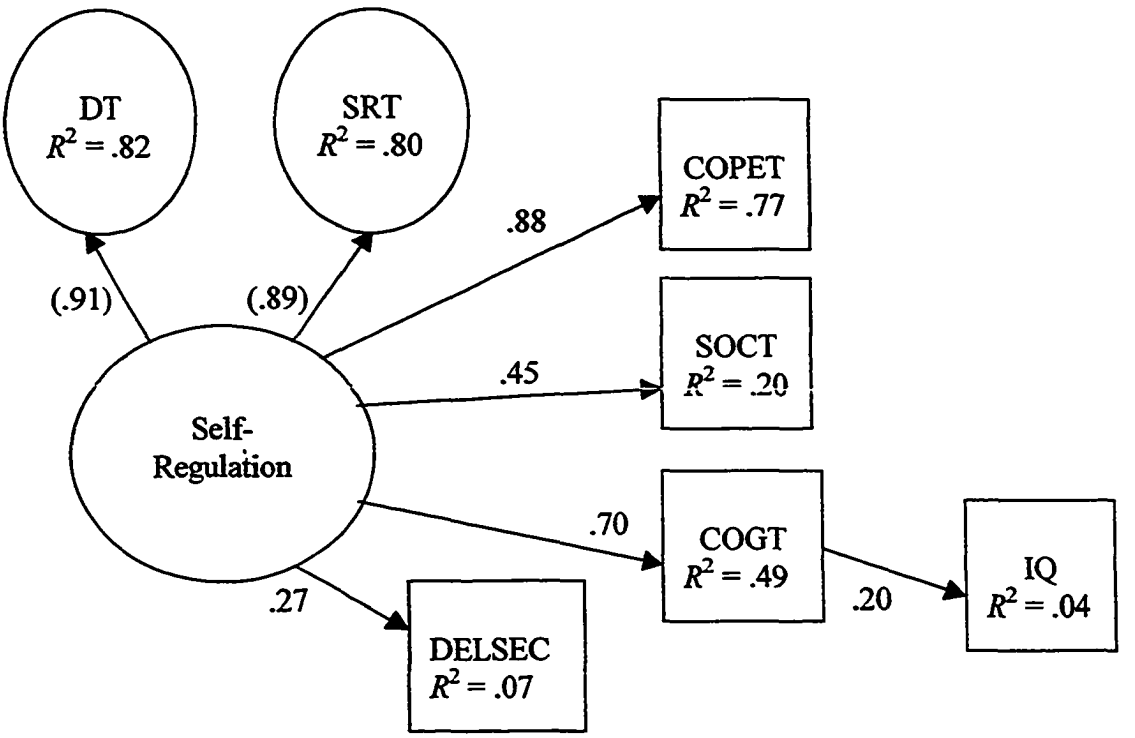


*Figure 2.* Structural equation model for teacher-rated variables and students' performance on "objective" tasks.

*Note.* CFI = 1.00. Coefficients presented in parentheses represent factor loadings whereas coefficients without parentheses represent standardized regression weights.

*Parent model.* As reported earlier, parent-rated delay behavior and self-regulation loaded on a single factor, thus they were combined through structural equation methodology into a composite variable called "self-regulation." Squared multiple correlations ($R^2$) are denoted in the boxes. As expected, self-regulation had a positive, direct effect on parent-rated cognitive, social, and coping competence. The

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proposed parent model is presented in Figure 3 and displayed a good fit of the data, CFI = 1.00. The self-regulation factor accounted for 47% of the variance in parent-rated coping skills, 16% of the variance in parent-rated social skills, and 56% of the variance in parent-rated cognitive skills. However, none of the parent-rated variables had links to DELSEC or IQ, the two "objective" measures.

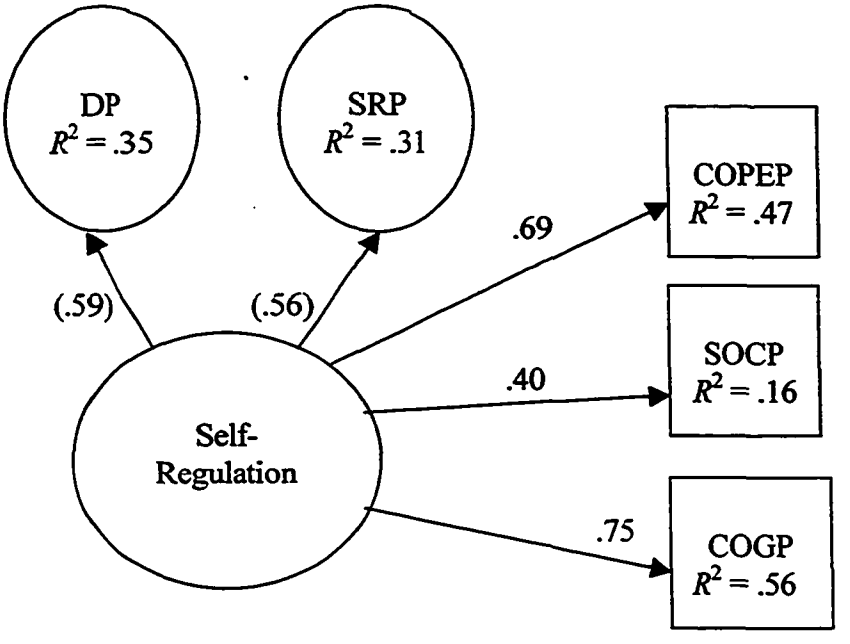


*Figure 3.* Structural equation model for parent-rated variables.

*Note.* CFI = 1.00. Coefficients presented in parentheses represent factor loadings whereas coefficients without parentheses represent standardized regression weights.

*Regression*

The purpose of the regression analyses was to discover whether delay, as rated by teachers and parents, increased prediction of children's cognitive, social, and

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coping competence, above and beyond that which can be attributed to self-regulation regulation ratings by the parent and teachers. Cognitive, social, and coping competence were the dependent measures and self-regulation and delay behavior were the independent variables. Self-regulation was entered first and delay behavior, second in all the regression analyses. Regression analyses for teacher-rated measures will be presented first followed by parent-rated measures.

Self-regulation (SRT) and delay behavior as rated by teachers (DT) significantly predicted teacher-rated coping competence (COPET). The variables accounted for 66% of the variance in teacher-rated coping skills, with self-regulation accounting for 59.7% and delay behavior accounting for an additional 6.5%. The significant $R^2$ revealed that delay behavior as rated by teachers made an important and independent contribution to predicting teacher-rated coping competence beyond teacher-rated self-regulation skills ($R^2$ change = .07, $F$ (1, 59) = 11.33, $p < .01$).

SRT and DT also significantly predicted teacher-rated cognitive competence (COGT). The variables accounted for 39% of the variance in teacher-rated coping skills, with self-regulation accounting for 35% and delay behavior accounting for an additional 5%. The significant $R^2$ revealed that delay behavior as rated by teachers made an important and independent contribution to predicting teacher-rated cognitive competence beyond teacher-rated self-regulation skills ($R^2$ change = .05, $F$ (1, 59) = 4.47, $p < .05$).

In the final regression analysis for teacher-rated measures, SRT, but not DT significantly predicted teacher-rated social competence (SOCT). Self-regulation accounted for 13.8% of the variance in teacher-rated social competence and delay

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behavior only added 1% to the variance. This addition was not statistically significant ($R^2$ change = .01, $F$ (1, 59) = .76, $p$ = *ns*).

For parent-rated measures of self-regulation (SRP) and delay behavior (DP), regression analyses were performed for cognitive and coping competence, but not social competence (parent-rated social competence was not significantly correlated with SRP or DP). SRP and DP significantly predicted parent-rated coping competence (COPEP). The variables accounted for 30% of the variance in parent-rated coping skills, with self-regulation accounting for 11.6% and delay behavior accounting for an additional 17.9%. The significant $R^2$ revealed that delay behavior as rated by parents made an important and independent contribution to predicting parent-rated coping competence beyond parent-rated self-regulation skills ($R^2$ change = .18, $F$ (1, 55) = 13.97, $p < .001$).

SRP and DP also significantly predicted parent-rated cognitive competence (COGP). The variables accounted for 26% of the variance in parent-rated coping skills, with self-regulation accounting for 19.9% and delay behavior accounting for an additional 6.2%. The significant $R^2$ revealed that delay behavior as rated by parents made an important and independent contribution to predicting parent-rated cognitive competence beyond parent-rated self-regulation skills ($R^2$ change = .06, $F$ (1, 55) = 4.61, $p < .05$).

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# Chapter V

# Discussion

## *General Discussion*

The primary aim of the present study was to test whether delay of gratification in preschool children had a direct, causal relation to cognitive, academic, and social competence, or an indirect, causal relationship that was mediated through self-regulation. Also, the relationship between parent and teacher ratings of children's behavior was explored..

In general, the results showed that parents' ratings of their children's delay behavior and self-regulation loaded on one factor, and teachers' ratings of students' delay behavior and self-regulation skills loaded on a separate factor. This discovery led to two separate models for teachers and parents. In addition, this showed that delay behavior is indeed a component of self-regulation.

In the teacher model, the self-regulation factor significantly predicted children's cognitive, social, and coping competence. Also, the teacher self-regulation factor significantly predicted children's performance on Mischel's DOG task. However, children's performance on the DOG task did not predict any of the students' competencies in the model (Figure 2). Finally, teachers' ratings of students' cognitive competence significantly predicted students' performance on the IQ test.

In contrast, parents' ratings of their children's behavior did not significantly predict their children's performance on any "objective" measures, such as IQ or children's performance on the DOG task. The parent self-regulation factor only significantly predicted parent ratings of their children's coping, social, and cognitive

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competence. In addition, children's performance on the DOG task loaded negatively on the parent factor and was negatively correlated with all parents' ratings of their children's behavior. This suggests that parents and teachers are seeing very different aspects of the same behaviors in their respective settings, at home and at school. The following discussion will focus on each of the variables and hypotheses in detail.

With respect to children's performance on Mischel's DOG task (DELSEC), the mean (330.90 seconds) and standard deviation (345.07 seconds) are noteworthy. The findings show that there was a lot of variability in children's performance on this task and DELSEC ranged from 0 seconds to 900 seconds, the maximum delay time. Also, upon inspection, these results are similar to children's average waiting time (466 seconds) in a pilot study by Resnick and Zimmerman (2000). In contrast, as previously mentioned, the average waiting in Mischel and Ebbesen's (1970) and Mischel et al.'s (1972) studies were 63 seconds, and less than 30 seconds, respectively. This may indicate that there has been a historical shift in the and that three decades later, on average, children are able to wait longer for a preferred reward. Children's longer delay time in the present investigation may also be attributed to the potency of the rewards in the present study. The children were given a choice of food rewards and stickers. It was noted that most of the children chose stickers and their sticker choices were quite varied. An alternative explanation is that the DOG paradigm is not reliable and has limited ecological validity common to laboratory tasks (Gay, 1992).

The results from ANOVA analyses showed that there was a significant difference in IQ based on parent educational level and a significant, linear increase in

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IQ based on parent educational level. These results are consistent with prior research (e.g., Mercy & Steelman, 1982) that has shown that family income and educational level is significantly correlated with intelligence. In addition, there was a significant effect of IQ based on parent ethnicity, with Caucasians performing significantly better than Asian-Americans, and Hispanics/Latinos. These findings are not surprising since there is a tremendous body of literature (e.g., Sattler, 1992) citing the strong, white, middle class bias of standardized intelligence tests and the inappropriateness of using national norms for minorities.

To reiterate, findings from the factor analysis showed the parents' and teachers' ratings of delay behavior and self-regulation loaded on two different factors. Thus, although parents and teachers were rating the same behaviors, they were seeing different behaviors in the different contexts (i.e., school and home). The use of separate regressions analyses and structural equation models for parents and teachers were justified based on these findings.

The regression analyses were conducted in order to determine whether delay was adding significant predictability to children's cognitive, social, and coping competence, beyond that already attributed to self-regulation ratings, which have already shown strong relationships to the above-mentioned competencies (Brody & Flor, 1998, Eisenberg et al., 1993; Raver et al., 1999). This was important for future researchers who may want to use these rating scales to predict ratings of children's competencies. The results from the regression analyses for teachers showed that delay behavior as rated by teachers significantly added to the predictability of children's coping and cognitive competence beyond that attributed by self-regulation.

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Alternatively, teacher-rated delay behavior did not significantly add to the predictability of children's social competence beyond that attributed by self-regulation. Thus, teachers' ratings of children's delay behavior makes an independent contribution to predicting teachers' ratings of children's coping and cognitive competence, but is redundant in predicting teachers' ratings of children's social competence, if teacher-rated self-regulation is also being used. With respect to parents, delay behavior as rated by parents significantly added to the predictability of parent ratings of their children's coping and cognitive competence beyond that attributed by parent-rated self-regulation. Neither parents' ratings of their children's self-regulation nor delay behavior significantly predicted parent ratings of their children's social competence and therefore, should not be used when trying to predict this measure. Thus, parents' ratings of their children's delay behavior should be used in addition to parent ratings of their children's self-regulation skills when trying to predict parents' ratings of their children's coping and cognitive competence.

The results from the structural equation analysis for the teachers revealed that the model fit the obtained data very well The teacher self-regulation factor significantly predicted teacher-rated coping, cognitive, and social competence, as well as children's performance on Mischel's DOG task. In addition, the teacher self-regulation factor had an indirect relationship with IQ that was mediated through teacher ratings of students' cognitive competence. The findings suggest that teachers' ratings of self-regulation skills predicted teachers' ratings of students' cognitive, coping, and social skills. Moreover, teachers' ratings of self-regulation skills predicted children's performance on two "objective" measures – IQ and DELSEC.

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This highlights the importance of including teacher-rated measures when trying to predict student outcomes.

Although the parent model from the structural equation analysis revealed a good fit of the obtained data, the parent self-regulation factor did not significantly predict children's performance on Mischel's DOG task (DELSEC). Also, parent ratings of their children's cognitive competence did not significantly predict IQ. This was unexpected since Shoda et al. found that DELSEC in preschool significantly predicted adolescent SAT scores and IQ has shown a strong, positive correlation with total SAT scores (Longstreth, Walsh, Alcorn, Szeszulski, & Manis, 1986). Since parent ratings were not substantiated by any "objective" measures, caution must be used in relying only on parent ratings of their children's cognitive, social, and coping competence.

The following section discusses the hypotheses that were tested in the study.

## *Hypotheses*

### *Hypothesis 1*

The first hypothesis asked whether students' DOG according to Mischel's delay task was significantly correlated with their delay behavior, cognitive, social, and coping competence as rated by parents and teachers, and IQ. The present findings showed that the number of seconds children delayed (DELSEC) was uncorrelated with IQ. This contrasts with Shoda et al.'s (1990) findings that the number of seconds children delayed as preschoolers was significantly predictive of SAT scores as adolescents. When measured concurrently, IQ is not correlated with DELSEC.

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DELSEC was positively and significantly correlated with teachers' ratings of children's coping competence, self-regulation skills, cognitive competence, and a global rating of cognitive competence. In addition, teacher ratings of students' delay behavior and social competence was positively correlated with DELSEC and nearly reached statistical significance ($p < .10$). This suggests that Mischel's DOG task is tapping in to some early competencies of children as rated by their teacher. It should be noted that DELSEC and teacher ratings of children's delay behavior (DT) were both derived in a school related context. In contrast, an interesting pattern of correlations was found between DELSEC and parent ratings of children's behavior. All parent ratings were negatively correlated with DELSEC, but only self-regulation reached statistical significance (see Table 2). This indicates that the longer children delayed on the delay task, the lower their parents rated them on delay behavior, coping skills, self-regulation, and cognitive and social competence. This is noteworthy since Mischel and his colleagues only used parent ratings in their studies (Mischel et al., 1988; Mischel & Peake, 1982; Shoda et al., 1990) and found that the number of seconds children delayed in preschool was significantly, positively correlated with parent-rated academic, coping, and social competence in adolescence (Shoda et al., 1990). It seems that when preschoolers' behavior is rated concurrently with their delay time, only teacher ratings are tapping into the early self-regulatory competencies that are believed to underlie Mischel's DOG task. More importantly, parents' ratings of children's competencies showed a negative relationship with DELSEC.

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*Hypothesis 2*

The second hypothesis stated that parent and teacher ratings of children's delay behavior, self-regulation, and coping, cognitive, and social competence were significantly correlated. As previously mentioned, Achenbach et al. (1987) indicated that the average correlation in child ratings between informants who see a child in different settings is only .28, which is due, at least in part, to real situational variability in children's behavior. Therefore, only modest, but significant, correlations were expected. It was found that parent and teacher ratings of children's social competence, coping competence, and a global rating of social competence were significantly correlated (see Table 5). However, parent and teacher ratings of delay behavior, self-regulation, cognitive competence, and a global rating of cognitive competence were positively, but not significantly correlated. The correlation between children's self-regulation as rated by parents and teachers nearly reached statistical significance, but teacher and parent ratings of delay behavior was virtually unrelated. This highlights the importance of using contextually-specific measures and shows that children's behavior in certain areas may be very different at home when compared to the same behavior at school. Also, one explanation for the lack of a significant correlation between parents and teachers in cognitive competence is that teachers may be comparing students to other students in their class and parents do not usually have an opportunity to compare their children with their peers on cognitive tasks. The significant correlation between parent and teacher ratings of social competence was expected because both parents and teachers have ample opportunity to observe children interacting with their peers.

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*Hypothesis 3*

The third hypothesis stated that parent and teacher ratings of children's cognitive competence was significantly correlated with an objective measure of cognitive functioning (IQ). The findings indicated that only teacher ratings of cognitive competence were significantly correlated with IQ. Again, teachers have the opportunity to rate students by comparing them to their peers and IQ scores are derived by comparing students' scores to those of children the same age.

*Hypothesis 4*

The fourth hypothesis stated that self-regulation as rated by parents is significantly correlated with parent ratings of delay behavior, cognitive, social, and coping competence. The results presented in Table 4 indicated that self-regulation as rated by parents was significantly correlated with parent-rated delay behavior, coping, and cognitive competence beyond the .01 level, but not social competence or a global rating of social competence. The latter finding was contrary to prior self-regulation research indicating that self-regulation has a positive, significant relationship with social competence (Brody & Flor, 1998, Eisenberg et al., 1993; Raver et al., 1999). However, some of these studies were conducted with older children (e.g., Brody and Flor used children between the ages of 6 and 9) and others (Eisenberg et al., 1993; Raver et al., 1999) used teacher ratings of social competence and peer nominations.

*Hypothesis 5*

The fifth hypothesis stated that self-regulation as rated by teachers is significantly correlated with teacher ratings of delay behavior, cognitive, social, and coping competence. The results presented in Table 3 indicated that self-regulation as

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rated by teachers was significantly correlated with teacher-rated delay behavior, coping, cognitive, and social competence beyond the .01 level. These results are consistent with prior self-regulation research (e.g., Eisenberg et al., 1993; Raver et al., 1999) indicating that self-regulation has a positive, significant relationship with social, coping, and cognitive competence. Self-regulation was not significantly correlated with a global rating of children's social competence, but the social competence scale is deemed to be a more valid indicator of these skills.

*Conclusions and Educational Implications*

Educators and psychologists seek to improve students' performance in school and their peer relationships. This study showed that self-regulation skills are critical to the development of cognitive, social, and coping competencies in young children. Also, teacher ratings of children's self-regulation skills significantly predicted children's performance on two "objective" measures, which validates the use of teacher rating scales in predicting students' competencies. Alternatively, parental rating scales did not predict children's performance on the "objective" measures and may not be suitable in predicting children's competencies. Parents may be providing a different aspect of children's behavior that contrasts with what teachers are seeing in school. As Achenbach et al. (1987) indicated, the discrepancies between parent and teacher ratings of the same behaviors in children may be due to true situational variability. Nonetheless, this suggests that teacher ratings must be included when trying to predict early childhood competencies.

Also, teacher ratings of delay behavior are an important addition to teacher ratings of self-regulation skills when trying to predict children's coping and cognitive

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competence, but not social competence. Teacher-rated self-regulation skills should be used alone when trying to predict teacher ratings of children's social competence. And parents' ratings of delay behavior are an important addition to parent ratings of self-regulation skills when trying to predict children's coping and cognitive competence. Neither parent ratings of self-regulation nor delay behavior should be used when trying to predict parents' ratings of children's social competence.

The findings from the present research raise questions about the delay of gratification research conducted by Mischel and his colleagues (Mischel & Ebbesen, 1970; Mischel et al., 1972; Shoda et al., 1990). They only used parents as informants and according to the present results, parents' ratings of children's cognitive, social, and coping competencies were negatively correlated with the DOG task and did not correlate with IQ. Since this investigation found that only teachers' ratings of children's behavior significantly predicted IQ and children's performance on the DOG task, this would lend itself to question the results of Mischel's studies, which relied only on parental ratings.

Mischel also reported that children's delay time at four years old significantly predicted their SAT scores as adolescents, but never tested their intelligence at four years old. In order to show a causal relationship between the DOG task and intelligence or achievement, it would be more desirable to show this relationship concurrently.

Moreover, the present results clearly indicated that delay behavior is a component of self-regulation and that it was self-regulation, not Mischel's DOG task, that significantly predicted children's competencies in the teacher model. This

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suggests that it was not just that children were able to wait for a preferred reward; but these children were described as more planful and attentive, able to set goals, and anticipate the consequences of their behavior (i.e., self-regulate).

Since self-regulation skills appear to be so critical to the development of early childhood competencies, educators and psychologists can design specific interventions for use with preschoolers to improve self-regulation skills. Teaching self-regulation skills early in life may set in motion a trajectory of academic and social success, and obviate the multiple, negative effects (e.g., low self-esteem, conduct problems, school drop out, etc.,) associated with academic and social failure.

### *Directions for Future Research*

One topic for future research would be to develop a self-regulation curriculum to be used with preschoolers who are lacking self-regulation skills. A pre- and post-test design could show whether such a program would be effective in improving children's self-regulation skills and in turn, academic, social, and coping competencies. Also, these children may be followed longitudinally to determine whether the effects of the program are long lasting. This line of research may be appropriate with both general and special education populations.

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# Appendix A

## Teacher Packet

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**Teacher's Packet**

Please respond to each question in the packet to the best of your ability. Please note - all responses all confidential and will not be shared.

Thank you,
Michele Opper

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**(Coping Competence)**

**Student's name**_____

**Directions: In this section we want you to think about this student in comparison to his or her peers, such as classmates and other same-age friends. We would like to get your impression of how this student compares to those peers, each time on a rating scale from 1-9. Please circle the number that best describes this student compared to his or her peers.**

**How likely is this student to be sidetracked by minor setbacks?**

1 2 3 4 5 6 7 8 9
Not Moderately Extremely
at all

**How likely is this student to exhibit self-control in frustrating situations?**

1 2 3 4 5 6 7 8 9
Not Moderately Extremely
at all

**How well does this student cope with important problems?**

1 2 3 4 5 6 7 8 9
Not Moderately Extremely
at all

**How capable is this student of doing well academically when motivated?**

1 2 3 4 5 6 7 8 9
Not Moderately Extremely
at all

**How likely is this student to yield to temptation?**

1 2 3 4 5 6 7 8 9
Not Moderately Extremely
at all

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**Faced with a choice, how likely is this student to settle for the immediate [but less desirable] one?**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Not at all | | | | Moderately | | | | Extremely |

**How able is this student to pursue his or her goals when motivated?**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Not at all | | | | Moderately | | | | Extremely |

**How intelligent is this student?**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Not at all | | | | Moderately | | | | Extremely |

**When motivated, how capable is this student of exhibiting self-control in tempting situations?**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Not at all | | | | Moderately | | | | Extremely |

**When trying to concentrate, how distractible is this student?**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Not at all | | | | Moderately | | | | Extremely |

**How capable is this student of exhibiting self-control when frustrated?**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Not at all | | | | Moderately | | | | Extremely |

**How well can this student divert attention from the frustrativeness of having to postpone a desired gratification, while continuing to pursue it?**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Not | | | | Moderately | | | | Extremely |

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**(Delay Behavior)**

**Directions:** Below is a list of characteristics which describe the behavior of young children. Please read each characteristic carefully. Next, indicate the extent to which it describes the typical behavior of this child by circling a number from **1** to **5**. If the behavior never or rarely occurs, circle a **1**; if the behavior occurs infrequently, circle a **2**; of the behavior occurs moderately often, circle a **3**; and so on. Please base your ratings on the current or recent behavior of the child, and on your first impressions after reading each item. Please complete every item. Thank you very much!

| | Very Rarely | Infrequently | Moderately Often | Often | Very Often |
|---|---|---|---|---|---|
| 1. When instructed "wait just a minute," s/he can wait | 1 | 2 | 3 | 4 | 5 |
| 2. When playing, s/he is able to wait patiently for his/her own turn | 1 | 2 | 3 | 4 | 5 |
| 3. Is able to wait patiently if another child is using something s/he wants | 1 | 2 | 3 | 4 | 5 |
| 4. Is able to wait patiently for a snack to be distributed | 1 | 2 | 3 | 4 | 5 |
| 5. Can wait his/her own turn if teacher is speaking with someone else | 1 | 2 | 3 | 4 | 5 |
| 6. Waits his or her own turn in a group discussion. | 1 | 2 | 3 | 4 | 5 |
| 7. Can listen to others without interrupting | 1 | 2 | 3 | 4 | 5 |
| 8. Waits patiently when told "later" (for example, you can have ice cream "later") | 1 | 2 | 3 | 4 | 5 |

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**(Self-regulation Skills)**

**DIRECTIONS: Please read each question carefully and place an "X" on the response that best describes this student.**

1. How often does this student stick to what he/she is doing, even on long, unpleasant tasks until finished?

| NEVER | NOT VERY OFTEN | SOMETIMES | USUALLY | ALMOST ALWAYS |
|---|---|---|---|---|

2. How often does this student work toward a goal?

| NEVER | NOT VERY OFTEN | SOMETIMES | USUALLY | ALMOST ALWAYS |
|---|---|---|---|---|

3. How often does this student pay attention to what he/she is doing?

| NEVER | NOT VERY OFTEN | SOMETIMES | USUALLY | ALMOST ALWAYS |
|---|---|---|---|---|

4. How often does this student plan ahead before acting?

| NEVER | NOT VERY OFTEN | SOMETIMES | USUALLY | ALMOST ALWAYS |
|---|---|---|---|---|

5. How often does this student think ahead of time about the consequences of his/her actions?

| NEVER | NOT VERY OFTEN | SOMETIMES | USUALLY | ALMOST ALWAYS |
|---|---|---|---|---|

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**(Social Competence)**

**DIRECTIONS: Please read each question carefully and place an "X" on the response that best describes _____.**

1. This student finds it easy to make friends.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

2. This student is liked by very many others.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

3. This student has a lot of friends.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

4. This student is popular with others his or her age.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

5. This student is really easy to like.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

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**(Cognitive Competence)**

6. This student is just as smart as other kids his/her age.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

7. This student is very good at his/her school work.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

8. This student is pretty fast at finishing his/her school work.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

9. This student can remember things easily.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

10. This student is able to figure out the answers in his/her school work.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

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**(Global ratings of Social and Cognitive Competence)**

DIRECTIONS: Please read these two questions and place an "X" on the response that best describes this student.

**How socially competent do you feel this student is?"**

| NOT AT ALL COMPETENT | A LITTLE BIT COMPETENT | SOMEWHAT COMPETENT | VERY COMPETENT |
|---|---|---|---|

**How academically competent do you feel this student is?"**

| NOT AT ALL COMPETENT | A LITTLE BIT COMPETENT | SOMEWHAT COMPETENT | VERY COMPETENT |
|---|---|---|---|

THE END ☺
THANK YOU!!!!!

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# Appendix B

## Parent Packet

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**Parent Packet**

Thank you for allowing your child to participate in my research study. As part of the study, please respond to each question in the packet to the best of your ability. Please note - all responses all confidential and will not be shared with your child's teacher. Please send the completed packet back in your child's knapsack in the same envelope. You will be receiving a written summary of your child's performance on the cognitive/intellectual screener shortly, as indicated in the permission letter.

Thank you,
Michele Opper

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Child's Name:_____

**Please circle your responses to the following questions:**

1. **Are you the child's:** Mother Father Other

2. **Child's Ethnic background:**
   African-American
   Caucasian
   Asian-American
   Hispanic/Latino
   Native-American
   Other _____

3. **What is the highest level of education you have completed?**
   Less than high school
   High school graduate
   Some college
   A college graduate
   Advanced degree

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**(Coping Competence)**

**Child's name**_____

**Directions: In this section we want you to think about your child in comparison to his or her peers, such as classmates and other same-age friends. We would like to get your impression of how your child compares to those peers, each time on a rating scale from 1-9. Please circle the number that best describes your child compared to his or her peers.**

**How likely is your child to be sidetracked by minor setbacks?**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Not at all | | | | Moderately | | | | Extremely |

**How likely is your child to exhibit self-control in frustrating situations?**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Not at all | | | | Moderately | | | | Extremely |

**How well does your child cope with important problems?**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Not at all | | | | Moderately | | | | Extremely |

**How capable is your child of doing well academically when motivated?**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Not at all | | | | Moderately | | | | Extremely |

**How likely is your child to yield to temptation?**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Not at all | | | | Moderately | | | | Extremely |

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**Faced with a choice, how likely is your child to settle for the immediate [but less desirable] one?**

1 2 3 4 5 6 7 8 9
Not at all — Moderately — Extremely

**How able is your child to pursue his or her goals when motivated?**

1 2 3 4 5 6 7 8 9
Not at all — Moderately — Extremely

**How intelligent is your child?**

1 2 3 4 5 6 7 8 9
Not at all — Moderately — Extremely

**When motivated, how capable is your child of exhibiting self-control in tempting situations?**

1 2 3 4 5 6 7 8 9
Not at all — Moderately — Extremely

**When trying to concentrate, how distractible is your child?**

1 2 3 4 5 6 7 8 9
Not at all — Moderately — Extremely

**How capable is your child of exhibiting self-control when frustrated?**

1 2 3 4 5 6 7 8 9
Not at all — Moderately — Extremely

**How well can your child divert attention from the frustrativeness of having to postpone a desired gratification, while continuing to pursue it?**

1 2 3 4 5 6 7 8 9
Not at all — Moderately — Extremely

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**(Delay Behavior)**

**Directions**: Below is a list of characteristics which describe the behavior of young children. Please read each characteristic carefully. Next, indicate the extent to which it describes the typical behavior of your child by circling a number from **1** to **5**. If the behavior never or rarely occurs, circle a **1**; if the behavior occurs infrequently, circle a **2**; of the behavior occurs moderately often, circle a **3**; and so on. Please base your ratings on the current or recent behavior of the child, and on your first impressions after reading each item. Please complete every item. Thank you very much!

| | **Very Rarely** | **Infrequently** | **Moderately Often** | **Often** | **Very Often** |
|---|---|---|---|---|---|
| 1. When instructed "wait just a minute," s/he can wait | **1** | **2** | **3** | **4** | **5** |
| 2. When playing, s/he is able to wait patiently for his/her own turn | **1** | **2** | **3** | **4** | **5** |
| 3. Is able to wait patiently if another child is using something s/he wants | **1** | **2** | **3** | **4** | **5** |
| 4. Is able to wait patiently for a meal to be served | **1** | **2** | **3** | **4** | **5** |
| 5. Can wait his/her own turn if parent is speaking with someone else | **1** | **2** | **3** | **4** | **5** |
| 6. Waits his or her own turn in a group discussion. | **1** | **2** | **3** | **4** | **5** |
| 7. Can listen to others without interrupting | **1** | **2** | **3** | **4** | **5** |
| 8. Waits patiently when told "later" (for example, you can have ice cream "later") | **1** | **2** | **3** | **4** | **5** |

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**(Self-regulation Skills)**

DIRECTIONS: Please read each question carefully and place an "X" on the response that best describes your child.

1. How often does your child stick to what he/she is doing, even on long, unpleasant tasks until finished?

| NEVER | NOT VERY OFTEN | SOMETIMES | USUALLY | ALMOST ALWAYS |
|---|---|---|---|---|

2. How often does your child work toward a goal?

| NEVER | NOT VERY OFTEN | SOMETIMES | USUALLY | ALMOST ALWAYS |
|---|---|---|---|---|

3. How often does your child pay attention to what he/she is doing?

| NEVER | NOT VERY OFTEN | SOMETIMES | USUALLY | ALMOST ALWAYS |
|---|---|---|---|---|

4. How often does your child plan ahead before acting?

| NEVER | NOT VERY OFTEN | SOMETIMES | USUALLY | ALMOST ALWAYS |
|---|---|---|---|---|

5. How often does your child think ahead of time about the consequences of his/her actions?

| NEVER | NOT VERY OFTEN | SOMETIMES | USUALLY | ALMOST ALWAYS |
|---|---|---|---|---|

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**(Social Competence)**

DIRECTIONS: Please read each question carefully and place an "X" on the response that best describes your child.

1. Your child finds it easy to make friends.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

2. Your child is liked by very many others.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

3. Your child has a lot of friends.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

4. Your child is popular with others his or her age.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

5. Your child is really easy to like.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

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**(Cognitive Competence)**

6. Your child is just as smart as other kids his/her age.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

7. Your child is very good at his/her school work.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

8. Your child is pretty fast at finishing his/her school work.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

9. Your child can remember things easily.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

10. Your child is able to figure out the answers in his/her school work.

NOT AT ALL LITTLE BIT SOMEWHAT QUITE A BIT VERY OFTEN

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**(Global ratings of Social and Cognitive Competence)**

Directions: Please read these two questions and place an "X" on the response that best describes your child.

**How socially competent do you feel your child is?"**

| NOT AT ALL COMPETENT | A LITTLE BIT COMPETENT | SOMEWHAT COMPETENT | VERY COMPETENT |
|---|---|---|---|

**How academically competent do you feel your child is?"**

| NOT AT ALL COMPETENT | A LITTLE BIT COMPETENT | SOMEWHAT COMPETENT | VERY COMPETENT |
|---|---|---|---|

THE END ☺
THANK YOU!!!!!

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Abstract

THE ROLE OF DELAY OF GRATIFICATION AND SELF-REGULATION IN PRESCHOOLERS' SOCIAL, COGNITIVE, AND COPING COMPETENCE

by

Michele A. Opper

Adviser: Professor Barry Zimmerman

The aim of the present study was to test whether delay of gratification (DOG) in preschool children had a direct, causal relation to cognitive, academic, and social competence, or an indirect, causal relationship that was mediated through self-regulation. Also, the relation between parent and teacher ratings of children's behavior was explored. Previous research (e.g., Shoda, Mischel, & Peake, 1990) showed that preschoolers' performance on a DOG task correlated positively with cognitive, coping, and social competence in adolescence. These researchers conceptualized DOG as a measure of self-regulation, but there is no evidence in the literature of a correlation between the DOG paradigm and well-established measures of self-regulation. Delay of gratification may be a component of a larger capability to self-regulate, but no study has investigated 1) the relation between delay of gratification and self-regulation in preschoolers; 2) the relation of children's performance on the DOG task and preschoolers' ability to wait in the real world; and 3) the relation between children's performance on Mischel's DOG task concurrently with preschoolers' competencies.

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