Children's Private Speech During an Emotion-Eliciting Task

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ABSTRACT

This study informs research on how private speech, which is typically seen as a cognitive ability, is utilized during an emotion-eliciting task. This research helps to bridge the divide between cognitive and emotional aspects of children's self-regulation by integrating how cognitive private speech strategies may be used to regulate emotion. Preschool-aged children (n = 116) completed a frustration task. Emotional expressions (anger and sadness), emotion regulation strategies (distraction and self-comforting behaviors), persistence (latency to quit and duration of on-task behavior), and children's private speech were coded. Whereas higher levels of nonfacilitative task-relevant private speech were associated with higher levels of both sadness and anger, social speech was positively associated with sadness, and inaudible muttering was positively associated with anger. Private speech, specifically vocalizations and task-irrelevant private speech, was also positively associated with the regulation strategies of self-comforting and distraction. Facilitative task-relevant private speech, however, was negatively associated with distraction. Finally, higher levels of social speech were associated with less persistence, while higher levels of facilitative task-relevant private speech was associated with more persistence. Findings from this study support the idea that private speech can have a regulatory effect during frustrating situations that children experience. Private speech occurred alongside emotions and regulation strategies in meaningful ways. Including measures of private speech in future studies on emotion regulation will add more detail and depth to researchers' understanding

of children's regulatory abilities. In the future, interventions could be created to encourage

children's use of private speech to enhance their emotion regulatory abilities.

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Chapter 1

Introduction

Sokol and Müller (2007) stated that the divide between thought and emotion in self-regulation research needs to be dissolved because development cannot be fully understood without considering both constructs. In addition, Bell and Wolfe (2004) put forth the idea that cognition and emotion are developmentally bound and that researchers must integrate the emotional and cognitive aspects of emotional self-regulation in future work. This study will discuss how research that ties cognitive private speech with emotional self-regulation during a frustrating situation will enlighten our views on preschool children's self-regulation. Incorporating cognition and emotion in research is necessary for a complete understanding of all aspects of children's self-regulation, which is important because self-regulation is necessary for adaptive psychological functioning and future autonomy (Cole, Michel, & Teti, 1994).

Private speech, typically perceived as a cognitive ability, is speech directed to the self for the purpose of self-regulation (Berk & Winsler, 1995). Self-regulation, as defined in the cognitive literature, is the ability to manage goal-directed actions and includes processes such as physiological, motivational-affective, cognitive, and social (Sokol & Müller, 2007). Another important aspect of self-regulation is emotional self-regulation, which consists of internal and external processes that monitor, evaluate, and modify emotional reactions to achieve one's goals and includes the study of the intensity and timing of emotional expressions (Thompson, 1994). The cognitive definition of self-regulation focuses on mental aspects, while the emotional definition focuses on emotional aspects. However, it is important to incorporate emotional and cognitive self-regulation because the growth of emotions and emotional self-regulation is framed

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by cognitive development, which allows children to develop new intellectual capabilities and improves their appraisal processes (Thompson, 1990).

Considering how self-regulation develops is particularly important because if emotions are not properly regulated, emotional dysregulation can occur. Emotional dysregulation is when emotions become over- or under-regulated. According to Cole et al. (1994), overregulated children might find social stimulation uncomfortable and end up refusing to participate in any play to the point where they have difficulty with peers. In contrast, underregulated children might be impulsive and have intense emotions (Cole et al., 1994). For example, underregulated children may start fights or not be liked by their peers because they dominate the play. It is important for researchers to examine private speech alongside emotional self-regulation so that they may find if private speech better explains the regulation taking place and if private speech is being used as an emotional self-regulation strategy. This research on cognitive strategies utilized in an emotion-eliciting context could be used in the implementation of interventions to teach more adaptive forms of private speech to aide children's emotional regulation.

The emotions of children are important motivators of behavior, and to understand any developmental accomplishment completely, the emotions that are occurring during that accomplishment must be understood (Cole, Martin, & Dennis, 2004). Researchers' knowledge of children's private speech is not complete without understanding the emotional self-regulatory aspects of private speech and the emotions involved. During an emotionally taxing task, children can be found spontaneously speaking to themselves and to others when attempting to manage emotions (Thompson, 1990). Without investigating the speech being elicited by these emotion-regulatory tasks, researchers do not have a full understanding how that speech may or may not be supporting the children's regulation of their emotions.

According to Thompson (1990), communication abilities and language growth are among the most important cognitive components of emotional self-regulation. They increase children's ability to be aided by outside regulatory influences and assist in their early self-regulatory abilities. Therefore, it would make sense that the cognitive ability of utilizing private speech effectively may be assisting children's emotional self-regulatory abilities. Because speech can occur alongside emotional self-regulation, research should be incorporating how the two potentially interact to advance children's development. If emotion and cognition are linked, then it is likely that preschool-aged children's private speech during an emotion-eliciting task may be related to the regulation strategies employed and the distress being exhibited.

Within the emotional self-regulation literature, there has been theoretical interest in language, which lends support to examining empirical associations between private speech and emotion regulation. Kopp (1989) proposed that language was important in toddlers' ability to self-regulate distress and negative emotions. According to Kopp, improved verbal ability would lead to greater internal regulation because language gives children the ability to describe their feelings and be able to hear how their emotions affect other people and how they receive and understand this feedback. Thompson (1990) stated that language ability fosters children's awareness of emotions and helps children better understand events that elicit emotion and the experience of emotion itself. Therefore, language may play an important role in emotional self-regulation. Language, including private speech, should be investigated alongside emotion regulation strategies and emotional expression.

Often times, emotion regulation strategies are investigated with emotions to determine the effectiveness of the strategy (e.g., Dennis, Cole, Wiggins, Cohen, & Zalewski, 2009; Diener & Mangelsdorf, 1999; Grolnick, Bridges, & Connell, 1996; Stifter & Braungart, 1995). The

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emotions of sadness and anger were concentrated on in this study because their motivational functions relate most to a frustrating situation. Sadness tends to be elicited when a goal is perceived to be unattainable, while anger is a response to the perception that a goal is unattainable because of an obstacle (Campos, Barrett, Lamb, Goldsmith, & Sternberg, 1983). According to Campos et al. (1983), the action in response to sadness caused by an unattainable goal, is disengagement. The adaptive actions would include the conservation of energy, redirection of resources to another goal, and encouraging nurturance from others. When there is a perceived obstacle blocking the goal, anger is experienced, and the action tends to be the elimination of the obstacle. In this case, the adaptive actions would be attempting to progress toward another goal and effecting change in the behavior of another person. For this study, sadness and anger were expected to have similar relations with private speech because children are not aware that the task is impossible. Research investigating private speech in emotional situations may better describe children's emotions and the function of the emotions they are experiencing. The relations between emotional expression and the effectiveness of emotion regulation strategies may be untangled by focusing on what preschool-aged children are saying and how this speech relates to the task.

In the current research, the regulation strategies of self-comforting and distraction are focused on. Self-stimulation or self-comforting involves repetitive manipulation of clothing or body parts for self-soothing purposes, whereas distraction is a disengagement behavior where children are looking away from the frustrating stimulus and focusing on something else (Buss & Goldsmith, 1998). Both strategies are generally seen as adaptive and beneficial for children to help control their emotions; however, results for both strategies have been mixed. Stifter and Braungart (1995) found that orienting toward other objects (distraction) was less helpful than

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self-comforting, which was more common with decreasing negative arousal. Grolnick et al. (1996) found that passive use of other objects and exploration (distraction) were negatively related to distress, while self-comforting had a positive relation with distress in some fear and anger situations. In addition, Buss and Goldsmith (1998) found that distraction appeared to reduce anger, but self-stimulation was dropped from analyses because it occurred at too low of a frequency with the infant sample. Diener and Mangelsdorf (1999) found that distraction maintained anger while tension-release (self-comforting) minimized anger. Lastly, Dennis, Cole, Wiggins, and Zalewski (2009) found that the degree of emotions were related to actions rather than the emotions themselves. Self-soothing was only engaged in by less than 20% of 3-and-4-year-old children and was equally common following anger and sadness, while anger more commonly preceded behavioral and attentional distraction in comparison to sadness. By including private speech categories in the analysis of emotion regulation, we may be able to gain a better understanding of how effective emotion regulation strategies are and if private speech is also being utilized as a regulation strategy.

Research on private speech has primarily focused on cognitive tasks (e.g., Bivens & Berk, 1990; Manfra & Winsler, 2006; Winsler & Naglieri, 2003) and has commonly been classified for its relevance toward the task (e.g., Al-Namlah, Fernyhough, & Meins, 2006; Berk, 1986; Manfra & Winsler, 2006; Patrick & Abravanel, 2000). These categories have included self-stimulating task-irrelevant private speech, task-relevant externalized private speech, and task-relevant external manifestations of inner speech (Berk, 1986). More recently, researchers have begun to categorize private speech according to whether it revealed cognitive and/or metacognitive aspects and have incorporated aspects of emotional self-regulation into their categorization of private speech (Chiu & Alexander, 2000; Manning, White, & Daugherty,

1994). According to Manning et al. (1994), these cognitive and metacognitive aspects can be

seen as related to emotional self-regulation in that they utilized coping with mistakes (e.g., "I

messed up but that's why I have an eraser") and reinforced progress and accomplishments (e.g.,

"This is really looking good", "I did my best"). These comments may be assisting children's

emotional self-regulation during a difficult task along with their cognitive self-regulation. In

order to see how private speech is being used to help children regulate their emotions, it must be

investigated concurrently with emotional self-regulation strategies and emotional expression.

This study categorized private speech drawing from methods used by Chiu and

Alexander (2000), Krafft and Berk (1998), and Manning et al. (1994). Chiu and Alexander and

Manning et al. divided private speech into task-irrelevant (not related to the task), task-relevant

(related to the task in some way), and then task-relevant was divided into nonfacilitative,

cognitive, and metacognitive. Nonfacilitative stopped or inhibited efforts and included giving up

and quitting (e.g., "I can't do this"). Cognitive included efforts at focusing, directing attention,

describing, and questioning (e.g., "Do I put this here?" "Maybe I do this"). The higher level of

private speech was categorized as metacognitive and included comments that reinforce, cope,

correct, and solve and are more motivational (e.g., "I can do this well" "I can keep trying").

When reviewing the categories alongside mastery motivation, the only significant relations were

for metacognitive private speech, but different findings may be uncovered when relating similar

categories to children's emotional expression and their strategies to regulate their emotions. In

addition, Manning et al. found that children who exhibited more autonomy, performed better

academically, and exhibited more creativity used more cognitive and metacognitive private

speech and less task-irrelevant and nonfacilitative private speech than children who exhibited

less autonomy, performed poorer academically, and exhibited less creativity. Therefore, task-

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irrelevant and nonfacilitative were seen as the least beneficial forms of private speech, while cognitive and metacognitive was seen as the most positive and beneficial forms.

As a result of the different circumstances of examining private speech in a frustrating situation, Chiu and Alexander's (2000) and Manning et al.'s (1994) cognitive and metacognitive private speech were combined so that it was more similar to Krafft and Berk's (1998) facilitative task-relevant private speech. This category better captured the private speech during a frustration task because the task is unsolvable while the activities in the previous studies were difficult but attainable (e.g., Chiu and Alexander, 2000; Krafft & Berk, 1998; Manning et al., 1994). Facilitative task-relevant private speech included utterances describing what children were doing, goal-directed plans, and thinking aloud. Lastly, social speech has often been categorized to include the awareness that children do not always use only private speech during a task (e.g., Chiu & Alexander, 2000; Krafft & Berk, 1998).

Children that were 4-years-old were included in this study because their private speech is believed to be the highest around this time. Vygotsky (1934/1986) found that there was an inverted U-shape for private speech and age, so that the amount of private speech was low when children were very young, highest during the middle to end of the preschool years, and then decreased, becoming more internalized in older children. Private speech also becomes less understandable as it is abbreviated and internalized as children become older. Therefore, at 4 to 6 years of age, the children are old enough so that their speech is easy to understand, but their private speech should not be completely internalized, especially during challenging tasks such as the frustration task used in this study. Vygotsky's theory has been supported by research focusing on children 4 to 6 years old (e.g., Berk & Spuhl, 1995; Duncan & Pratt, 1997; Fenyhough & Fradley, 2005; Patrick & Abravanel, 2000).

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As a result of this information, nonfacilitative task-relevant private speech and task-irrelevant private speech would be expected to be negatively correlated with latency to quit and duration of on-task behavior. If children were frustrated enough to have used private speech that is either not related to the task or inhibited and stopped their efforts, they were expected to have quit the task early and to have not spent as much time attempting to deal with their frustration. However, nonfacilitative and task-irrelevant private speech were expected to be related differently to emotional expression. Nonfacilitative task-relevant private speech was expected to have a positive relation with anger and sadness because the children would be focused on the task difficulty because their emotions about the obstacle to their goal of playing with the toys and their inability to play with the toys would be overwhelming to them. It would be a reciprocal relation since children who are speaking about the difficulty would be focusing on the task and therefore may be increasing their own frustration. Task-irrelevant private speech would be expected to have a negative relation with anger and sadness. Children who used task-irrelevant private speech might have been distracting themselves during this time, and therefore they would have exhibited less anger and sadness.

Facilitative task-relevant private speech was expected to have a positive relation with latency to quit and duration of on-task behavior because the children were able to focus on the task without as many negative thoughts becoming involved. The task would have been easier to focus on for longer periods of time. In addition, it was expected that facilitative task-relevant private speech would have a negative relation with anger and sadness. Children who were not as emotional about the obstacle and their inability to play with the toys would have been more able to regulate their emotions and been able to talk through the task in a more beneficial way. Children who would be describing their own activity would have needed to keep their anger and

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sadness low to be able to calmly focus on the task and make goals. In contrast, social speech was expected to have a positive relation with anger and sadness because it would have most likely been used to request assistance with the task. However, parents were requested to not aid in the task so that children would become more emotional because of this lack of aid. Therefore, children would be frustrated that they cannot open the box, frustrated that they cannot play with the toys, and then become even more frustrated when their mothers would refuse to assist them.

Task-irrelevant private speech was expected to have a positive relation with the emotional self-regulatory strategy of distraction because both were focused away from the task. Task-irrelevant private speech may better explain children's distraction if they were not only looking away from the source of the frustration but are also uttering private speech unrelated to the task. In contrast, distraction should be negatively related to facilitative and nonfacilitative task-relevant private speech because the speech would be about the task and the children would most likely be focusing on the task and not distracting themselves during this time.

Lastly, nonfacilitative task-relevant private speech would be expected to have a positive relation with self-comforting behaviors. Nonfacilitative task-relevant private speech was also hypothesized to have a positive relation with anger and sadness. Because distress was expected to be highest when children were using nonfacilitative task-relevant private speech and self-comforting has been found to be common during periods of high distress (Grolnick et al. 1996), more nonfacilitative task-relevant private speech would be expected alongside more self-comforting behaviors.

Research Questions and Hypotheses

The purpose of this study was to investigate children's private speech during an emotionally frustrating task and to relate that private speech to the emotions and emotional self-

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regulatory strategies utilized by children within the same task. To achieve this, the following research questions and hypotheses were examined:

The first research question was to examine the relations between children's private speech and their emotion regulation strategies during a frustration-eliciting task. The first hypothesis was that nonfacilitative task-relevant private speech and task-irrelevant private speech would be negatively related to latency to quit and duration of on-task behavior. Next, facilitative private speech would be positively related to latency to quit and duration of on-task behavior. Third, distraction would have a positive relation with task-irrelevant private speech, but a negative association with facilitative task-relevant private speech and nonfacilitative task-relevant private speech. Lastly, nonfacilitative task-relevant private speech was expected to be positively related to self-comforting.

The second research question was to explore the relations between children's private speech and their emotional expression during a frustration-eliciting task. The first hypothesis was that nonfacilitative task-relevant private speech and social speech would have a positive relation with anger and sadness. The second hypothesis was that facilitative task-relevant private speech along with task-irrelevant private speech would have negative relations with anger and sadness.

Chapter 2

Method

Participants

Participants were part of a longitudinal study. Mothers and their children, $n = 116$, 63 boys, 53 girls, participated in this assessment when the children were 4.5 to 6 years old, $M = 54.03$ months, $SD = 3.60$. The majority of the mothers were married, 91%, and the average income was 4.9 (1 = less than \$15,000, 2 = \$15,000-\$30,000, 3 = \$30,000-\$45,000, 4 = \$45,000-\$65,000, 5 = \$60,000-\$75,000, 6 = \$75,000-\$100,000, 7 = over \$100,000). The ethnicity of the mothers was 95.7% white/Caucasian, 1.7% Hispanic/white, 0.9% Black/African American, 0.9% Native American, and 0.9% other. Five percent of the mothers had a high school degree or less education, 21.6% had some college or a 2-year degree, 38.8% have a 4-year college degree, and 35% had an advanced degree. Twelve percent of the fathers had a high school degree or less education, 18.1% had completed some college or a 2-year degree, 31.9% had 4-year college degree, and 38% had an advanced degree.

Procedure

The DVD-recorded laboratory assessment took approximately an hour to complete and included tasks measuring children's emotionality and emotion regulation along with mother-child interaction. The mothers and children came to a college campus on a scheduled date and were greeted by two experimenters. The laboratory room in which the tasks took place was set up to be warm and welcoming with age-appropriate pictures on the wall, a child-sized table and chair, along with a chair for the mother. Two video cameras were affixed to the walls and controlled remotely by one of the experimenters during the tasks. The primary role of one

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experimenter (E1) was to complete the tasks with the children, while the primary role of the other experimenter (E2) was to film the tasks. At the beginning of the assessment, E2 played with the children, while E1 gave an overview of the tasks that would occur and asked the mothers to sign an informed consent. After parental consent was obtained, children gave their assent to play games to E1. During some tasks, the mothers and children interacted with each other and during other tasks the children completed the tasks by themselves or with the experimenters while their mothers completed questionnaires. Multiple tasks took place in a set order with the frustration task occurring eighth out of 15 tasks.

The frustration task was adapted from the Laboratory Temperament Assessment Battery (Lab-TAB; Goldsmith & Rothbart, 1999) and was a locked box task that included a clear box, attractive toys, locks, and keys. The child was sitting at a child-sized table and the mother was sitting at the other end of the room, approximately 8 feet away. E1 brought into the room a transparent box, a practice lock and key, and another lock with a ring of keys. E1 showed the children how to operate the lock using the practice lock and key. Children were asked which set of toys they liked best, choosing from either two superheroes or a prince and princess. The desired toys were put into the box, which was then closed and locked. E1 told the children that they could use the keys to open the lock and play with the toys while she was gone. However, the correct key was not on the ring of keys given to the children. E1 left the children alone with the locked box and the set of keys for 4 minutes. After the time passed, the experimenters returned with the correct key and apologized for forgetting to include the correct key. After opening the box, the children were allowed to play with the toys for 1 minute.

During the initial introduction at the beginning of the visit and again before the task, mothers were quietly told that if their children attempted to talk to them or ask for help to say

that they could not help because they were working on something and that they would help them when they finished their work. In addition to being quietly reminded of how to act during the task, mothers also had a list of the tasks with directions outlined for each task. Because this task was not originally expected to be coded for private speech, Frauenglass and Diaz's (1985) recommendation of telling the children that they could talk aloud during the task was not followed. This recommendation was a result of the belief that children may equate the strange setting to a classroom in which they must be quiet. However, the inclusion of the children's mothers in the room did help create a friendly environment that has been found to encourage private speech through a supportive, friendly adult who encourages the child to take responsibility for the task (e.g., Diaz, 1992).

Measures

Two separate sets of students coded the DVDs of the frustration task for emotion and emotion regulation strategies. One team coded the emotions and a separate team coded the regulation strategies. To calculate reliability, 20-percent of the sample was coded independently by two individuals in each coding team, and intraclass correlations were used to calculate the reliability for each code.

Emotion. The emotions coded during the frustration task included children's sadness and anger. For both emotions coded during the 5-sec episode, facial, body, and vocal indicators as described in Lab-TAB were used to determine the level of the emotion across the episode.

Indicators of sadness included the upper lip protruding at the center, eyes narrow or squinted, appearing deflated, and rhythmic crying (0 = no sadness, 1 = low intensity sadness, 2 = moderate sadness, 3 = intense sadness). The intraclass reliability correlation was .96 for sadness during the locked box task.

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Anger indicators included brows drawn together, bodily tension indicating frustration, and angry protests or crying (0 = no anger observed, 1 = low intensity anger, 2 = moderate anger, 3 = intense anger). The intraclass reliability correlation was .95 for anger.

Emotion regulation strategies. Children's emotion regulation strategies included distraction and self-comforting behaviors coded following the emotion regulation literature (Buss & Goldsmith, 1998; Grolnick et al., 1996; Stifter & Braungart, 1995).

Distraction was coded when a child was focused on another object other than the locked box for 2-sec or more during an epoch. This could include singing and talking about things unrelated to the task as long as it was not directed toward the mothers or experimenters. The intraclass reliability correlation was .96 for distraction.

Self-comforting behavior was coded when children engaged in any manipulation of body, clothing, or material (e.g., clasping hands, hair face; sucking on fingers, thumbs, hands; rubbing face or clothing). Behaviors appeared to be unconscious and for soothing purposes and lasted more than 2-sec. The intraclass reliability correlation was .80 for self-comfort.

Persistence. Children's latency to first quit and duration of on-task behavior were coded as signs of persistence on the task.

Duration of on-task behavior is the time, in seconds, children were actively trying to open the locked box. On-task behaviors included acts such as trying to open the box or lock, sorting the keys, and investigating the box or keys. The intraclass reliability correlation was .91 for duration of on-task behavior.

Latency to first quit was coded based on how long, in seconds, children attempted to open the locked box until the first time they stopped trying. First quit occurred when children

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were not actively trying to manipulate the box in order to open it for more than 1-sec. The intraclass reliability correlation was .84 for latency to first quit

Private speech. For this study, three individuals transcribed the speech from the DVDs. Once the individuals felt comfortable with the transcription process, they split up the recordings and transcribed the speech made by the children and mothers. The transcribers were encouraged to ask questions and for assistance, when necessary. Once the task was transcribed, the author was the main coder and worked with another coder to reach an acceptable reliability (intraclass correlation of .70 or higher) for each category of speech. Both the author and the reliability person coded the transcripts while watching the DVDs, so that the transcripts were checked through this process. Both the author and a reliability coder coded twenty-percent of the sample.

The speech during the frustration task was transcribed and then separated into utterances as described by Winsler, Fernyhough, McClaren, and Way (2005). An utterance is a clause with intentional markers of termination, a complete sentence, a sentence fragment, a conversational turn, or any string of speech that is separated from another by at least 2-sec. Utterances cannot include any temporal or semantic discontinuities. A semantic discontinuity includes any significant change of content, regardless of whether a pause is present or not, while a temporal discontinuity is a pause of at least 2 seconds.

The speech was then labeled as either social speech or one of the following mutually exclusive categories, based off Chiu and Alexander (2000), Winsler et al. (2005), and Krafft and Berk (1998). Social speech is speech toward another individual, which can be indicated by a gaze to another person, a pronoun reference, conversational turn taking, or argumentation. The intraclass reliability correlation was .97 for social speech. The private speech categories included vocalizations, inaudible muttering, task-irrelevant private speech, and two types of task-

relevant private speech. The task-relevant private speech categories included nonfacilitative and facilitative.

The category of vocalizations was created because it was found that children made many noises that were not actual words. Utterances included "uh", "umph", "oh", along with other mouth noises and movements. The intraclass reliability correlation was .98 for vocalizations.

The category of inaudible muttering included utterances that appeared to be works, but the words were not understandable. The intraclass reliability correlation was .89 for inaudible muttering.

Task-irrelevant private speech was speech not related to the task at hand (e.g., "I wonder if it is raining", "I'm hungry."). The intraclass reliability correlation was .94 for task-irrelevant private speech.

Nonfacilitative task-relevant private speech was speech that inhibited or stopped efforts and can include giving up and quitting (e.g., "I can't do this," "I don't know why they are making me do this."). The intraclass reliability correlation was .79 for nonfacilitative task-relevant private speech.

Facilitative task-relevant private speech included any speech that was related to the task but was not seen as inhibiting or stopping efforts. Utterances included questions to the self, making goals, and a description of hindrances (e.g., "Which key could it be?", "I'll try this key", "This key won't work"). The intraclass reliability correlation was .96 for facilitative task-relevant private speech.

Chapter 3

Results

Preliminary Analyses

Raw scores and proportions of private speech were utilized for the analyses. Proportions

of private speech categories were calculated by dividing the raw score of a category by the total

speech (private and social) children used during the task. The proportion scores took into

account how much children talked during the task and equated their category scores to the same

level as children who spoke less overall. Because raw scores and proportions describe the

private speech in two separate ways, both will be presented.

Descriptive statistics for all variables are presented in Tables 1 and 2. Preliminary

analyses examined possible gender and age differences related to the task variables. T-tests

examining gender differences were not significant; however, significant age differences were

found. Children who used a greater proportion of social speech tended to be younger, $r(114) = -.24, p < .05$. Children who used more vocalizations tended to be older, $r(114) = .23, p < .05$. In

addition, children who used more facilitative task-relevant private speech tended to be older,

$r(114) = .23, p < .05$. Lastly, children displayed more sadness when they were older, $r(114) = .20, p < .05$. Because of these preliminary findings, age was controlled for in all subsequent

analyses.

Private Speech and Emotion

Partial correlation analyses, controlling for child age, examined relations between private

speech and emotional expressions (see Table 3). The hypothesized positive relation between

social speech and sadness was supported for the raw score and proportion of social speech.

There were also significant positive relations between nonfacilitative task-relevant private speech and sadness, but for the raw score only. Children with higher levels of social and nonfacilitative task-relevant private speech displayed more sadness. There were no significant relations between social speech and anger, or task-irrelevant private speech and facilitative task-relevant private speech to anger or sadness, as hypothesized. The only unexpected relation found between private speech categories and emotion was a positive relation between the raw score of vocalizations and anger. Children with higher levels of vocalizations had higher levels of anger.

To examine how much of the variance in each private speech category was explained by both emotions, separate regression analyses were conducted for each private speech variable, which was the dependent variable in each analysis. In all regression analyses, there were two steps. Age was entered in the first step as a control variable, and anger and sadness were entered in the second step.

The results for the regression analyses are presented in Table 4. After controlling for child age, emotions did predict a significant amount of the variance in social speech. Children with higher levels of sadness used more social speech. After controlling for age, emotions predicted a significant amount of the variance in the raw score of nonfacilitative task-relevant private speech. Children with higher levels of anger and sadness also had higher levels of nonfacilitative task-relevant private speech. Although unexpected, emotions predicted a unique amount of the variance in the raw score of vocalizations, controlling for child age. Children with higher levels of anger had higher levels of vocalizations.

Private Speech and Emotion Regulation Strategies

Table 3 also presents the partial correlations between private speech and regulation strategies, controlling for child age. As expected, a positive relation between task-irrelevant

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private speech and distraction was found. Children with higher levels of task-irrelevant private speech had higher levels of distraction. In addition, a hypothesized negative relation between facilitative task-relevant private speech and distraction was found for the raw score and proportion. Children with higher levels of facilitative task-relevant private speech had higher levels of distraction. However, there were no significant relations between nonfacilitative task-relevant private speech and self-comforting or distraction.

Contrary to expectations, there was a positive relation between inaudible muttering and self-comforting and distraction. Children who had higher levels of inaudible muttering had higher levels of self-comforting and distraction. In addition, task-irrelevant private speech (raw and proportion scores) was positively correlated to self-comforting. Children who had higher levels of task-irrelevant private speech had higher levels of self-comforting.

To examine how much of the variance in each private speech category was explained by both regulation strategies, separate regression analyses were conducted for each private speech variable, which was the dependent variable in each analysis. As with the regression analyses for emotion, there were two steps: age was entered in the first step as a control variable and self-comforting and distraction were entered in the second step.

The results for the regression analyses are presented in Table 5. After controlling for age, regulation strategies did predict a significant amount of the variance in task-irrelevant private speech. Unexpectedly, children who used higher levels of self-comforting used more task-irrelevant private speech, while distraction was unrelated. Although unexpected, after controlling for child age, regulation strategies did predict a significant amount of the variance in the raw score of vocalizations. Children with higher levels of self-comforting and lower levels of distraction used more vocalizations. After controlling for age, regulation strategies also

predicted a significant amount of the variance in inaudible muttering. Children with higher

levels of self-comforting and distraction had a higher level of inaudible muttering.

Private Speech and Persistence

Table 3 also presents the partial correlations between private speech and task persistence,

controlling for child age. As hypothesized, a significant positive relation between facilitative

task-relevant private speech (raw score and proportion) and duration of on-task behavior was

found. Children who displayed more facilitative task-relevant private speech quit later and spent

more time on the task. Facilitative task-relevant private speech was significantly positively

correlated with latency to first quit, but only for the proportion score. Children who displayed

more facilitative task-relevant private speech quit the task later and spent more time on the task.

Contrary to expectations, relations between nonfacilitative task-relevant private speech and task-

irrelevant private speech with latency to first quit and duration of on-task behavior were not

significant.

Unexpected relations between social speech and vocalizations with latency to first quit

and duration of on-task behavior were found. Higher levels of social speech (raw and

proportion) was associated with a shorter latency to quit, and a shorter duration of on-task

behavior. Children who displayed higher levels of social speech also quit the task earlier and

spent less time on the task.

To examine how much of the variance in each private speech category was explained by

both persistence variables, separate regression analyses were conducted for each private speech

variable, which was the dependent variable in each analysis. In all regression analyses, there

were two steps, in which age was entered in the first step as a control variable, and latency to

quit and duration of on-task behavior were entered in the second step.

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The results of the regression analyses are presented in Table 6. After controlling for child age, latency to quit and duration of on-task behavior significantly explained a unique amount of the variance in the proportion score for facilitative task-relevant private speech but not for the raw score. However, neither latency to quit nor duration of on-task behavior significantly predicted facilitative task-relevant private speech. Although unexpected, when child age was controlled, latency to quit and duration of on-task behavior explained a significant amount of the variance in the raw and proportion scores of social speech. Children who had a shorter quit time used higher levels of social speech.

Chapter 4

Discussion

The findings from this study support the idea that children's private speech does occur during an emotion-eliciting frustration task. In addition, the private speech used significantly related to emotions elicited and regulation strategies used. In particular, children who used more social speech exhibited more sadness, quit the task earlier, and spent less time on the task overall. Children who used more vocalizations exhibited more anger and spent more time on the task, although the last finding was only moderately significant. Children who used more nonfacilitative task-relevant private speech exhibited more sadness and more anger. In addition, children who used more inaudible muttering and task-irrelevant private speech also used more self-comforting and distraction. Lastly, children who used more facilitative task-relevant private speech used less distraction, persisted longer at the task, and spent more time on the task. Overall, children's private and social speech were found to be related in meaningful ways to the emotions elicited and the regulation strategies used.

An interesting pattern to highlight is that children's private speech categories were related to either emotions or emotion regulation strategies, but never both. When private speech categories were related to emotion, they appeared to be less beneficial to regulation because they were associated with higher levels of anger and sadness. In contrast, when private speech categories were related to regulation strategies, they appeared to be supporting the effective regulation strategies of self-comforting and distraction. In this case, the private speech may help in understanding how children were using these strategies to regulate their emotions. Because these categories of private speech appeared to be beneficial to the children, they were not related to emotion.

The private speech categories that were related to emotion include social speech, vocalizations, and nonfacilitative task-relevant private speech. As expected, children who used more social speech exhibited more sadness. Children were likely using social speech to request aid from their mothers, however, their mothers were instructed not to help them. This refusal from a caregiver who is normally willing to help could have heightened children's sadness. Social speech was not related to regulation strategies most likely because speaking to their mothers was a regulation strategy in itself, but not a very beneficial one because their mothers' refusal may have increased their sadness. Sadness is linked to giving up while anger is linked to overcoming an obstacle (Campos et al., 1983); children were probably exhibiting sadness and turning to their mothers because they had given up completely rather than focusing on overcoming the obstacle. This is further supported by the relation of higher levels of social speech and less task persistence. Children using social speech were giving up on the task, and therefore, spent less time focusing on the task and were more likely to quit earlier. While it was originally expected that anger and sadness would relate similarly to social speech because children would not be aware that the task was impossible, it appears that what mattered more was how children viewed the task. In this situation, children who used more social speech were experiencing more sadness.

It was unexpected that children who used more vocalizations would have higher levels of anger. The vocalization category was a category created for this task because the children made many different sounds that were not actual words. Because the vocalizations were associated with more anger, it is likely these vocalizations were used by children to release some of their frustration. There was also an unexpected marginally significant relation of children using more vocalizations also spending more time on the task. If vocalizations were a release of emotion

that was being used by children as a strategy to deal with their frustration, the children's release

of anger might have allowed them to continue with the task for a longer period. Therefore,

vocalizations were used alongside more anger, and because vocalizations was not related to

distraction and self-comforting, using vocalizations appeared to be a method of regulation,

although the effectiveness of the strategy is unknown.

As expected, children who used more nonfacilitative task-relevant private speech were

more likely to exhibit anger and sadness. Despite the motivational function of emotions

(Campos et al., 1983), children who used nonfacilitative task-relevant private speech may have

not differentiated that the task was impossible. Therefore, some children resorted to

nonfacilitative private speech because they focused on the task difficulty and the obstacle that

hindered them from reaching their goal of playing with the toys, while others just gave up, or the

children may have fluctuated between the two goals and thus displayed both emotions. These

children then probably became more frustrated or sad when their emotions overtook them. It

was probably a reciprocal relation because children speaking of the difficulty of the task would

be increasing their own emotions.

Relations that were not supported for nonfacilitative task-relevant private speech included

positive relations with self-comforting and distraction. Children who used nonfacilitative task-

relevant private speech were focusing their attention on the task difficulty and speaking to

themselves negatively. These children may have been so disorganized and overwhelmed with

their anger and sadness that they were unable to use regulation strategies efficiently or display

more or less task persistence as a group. Therefore, social speech, vocalizations, and

nonfacilitative task-relevant private speech appear to be less beneficial forms of private speech

that were utilized as regulation strategies and may have increased emotion rather than decreased it.

In contrast to the private speech categories that were only related to emotions, inaudible muttering, task-irrelevant private speech, and facilitative task-relevant private speech were related to regulation strategies but not emotions. It was unexpected that children who used more inaudible muttering would also use more self-comforting and distraction. Inaudible muttering is believed to be actual words that are spoken so quietly that they are hard to understand (Krafft & Berk, 1988). This category may reflect speech that is in the process of being internalized. Children who used many of these mutterings may have been more advanced cognitively, as demonstrated by increased internalization. These children may be utilizing inaudible muttering as a regulation strategy alongside other known regulation strategies during this frustration task, and their advanced development may be reflected by their partially-internalized private speech during this difficult task.

The hypothesis that children who used more task-irrelevant private speech would also use more distraction was supported. In addition, an unforeseen relation with children using more task-irrelevant private speech and more self-comforting was also found. Task-irrelevant private speech is speech unrelated to the task at hand and may have been reflecting children's behavioral distraction. Task-irrelevant private speech may have been used as another regulation strategy that supported their behavioral distraction and was used alongside self-comforting along with inaudible muttering. Many expected relations for task-irrelevant private speech and emotions were not supported. Specifically, it was expected that task-irrelevant private speech would have a positive relation with anger and sadness and a negative relation with persistence. The lack of relations with emotions elicited may be explained by the finding that children who used more

task-irrelevant private speech also used more self-comforting and distraction. These children may have been able to regulate their emotions by using emotion regulation strategies and their task-irrelevant private speech would have been mirroring their behavioral distraction. Task-irrelevant private speech was not related to persistence, which may have been because task-irrelevant private speech was coded regardless of what children were focused on. Differentiating task-irrelevant private speech that occurred when children were looking away from the task and task-irrelevant private speech that occurred when children were focusing on the task may provide more information on this relation.

Another unexpected relation was that children who used more facilitative task-relevant private speech used less distraction. These children were not distracting themselves from the task but instead appeared to be utilizing private speech that was related to the task in a beneficial way. This suggests that children's private speech might be reflective of their regulatory strategies, and it is possible that their private speech is another means for them to be regulating themselves so that they can stay focused. This conjecture is supported by the finding that children who used a greater proportion of facilitative task-relevant private speech would persist longer (i.e., took a longer time to quit the task) and spent longer on the task. These relations may have been because children were able to focus their attention on the task, keep calm, and talked themselves through it without become overwhelmed by their emotions. The expected negative relations between facilitative task-relevant private speech and anger and sadness were not found in this study. This may have been because children who used more facilitative task-relevant private speech used their speech to focus their attention on overcoming the obstacle in the task rather than to focus on the difficulty of the task. Children who were able to use facilitative task-relevant private speech may have been able to self-regulate without utilizing overt regulation

strategies and, thus, did not have high levels of emotion. Therefore, it appears that inaudible muttering, task-irrelevant private speech, and facilitative task-relevant private speech may be used as regulation strategies and that they might reflect greater regulatory abilities.

Because private speech occurred alongside emotions and regulation strategies during the frustration task, children's private speech appeared to have a regulatory effect in this task. By analyzing private speech, the idea that private speech added more details to create a more holistic picture of children's regulation and their emotions was supported. By including private speech in future research, the importance of speech as a regulatory mechanism may be more evident. This study is a step toward understanding how transcribing and analyzing speech during an emotion-eliciting task may better explain children's emotions and regulatory abilities.

From these findings, it appears that when private speech categories were related to regulation strategies, they better explained and enhanced the regulation strategies they occurred alongside. However, when the private speech categories were related only to emotion, the private speech acted as less beneficial regulation strategies that were related to higher levels of emotion. Therefore, the private speech categories of social speech, vocalizations, and nonfacilitative task-relevant private speech appear to be less beneficial for supporting emotion regulation than the categories of inaudible muttering, task-irrelevant private speech, and facilitative task-relevant private speech. Speech appeared to be utilized as a regulation strategy itself during this task and should be included in future studies of regulation. Including speech categories in future research will help better explain children's emotions and their regulation strategies during an emotion-eliciting task.

If more research examines relations between private speech and emotion regulation and findings from this study are replicated, it may indicate that private speech is a useful tool during

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emotionally taxing situations. When children are upset, parents may be able to encourage their children to talk through their feelings and to verbally distract themselves instead of focusing on the upsetting situation. In addition, interventions could be created to help children who are emotionally dysregulated so that they can verbally calm themselves and regulate their emotions through private speech that can become internalized later on.

There were some notable limitations to this research, in particular the data was not originally collected for the purpose of analyzing private speech data. If children were told explicitly that they could talk aloud, as has been recommended (Frauenglass & Diaz, 1985), there may have been more private and social speech. In addition, children did not complete a cognitive task similar to those used in previous literature (e.g., Bivens & Berk, 1990; Manfra & Winsler, 2006; Winsler & Naglieri, 2003). Completing a cognitive task at the same time would be beneficial in order to compare the private speech that occurred during the emotion task to a task that is usually utilized within the private speech literature. In addition, the types of private speech elicited during the two tasks could have also been compared. Lastly, the children came from a rather homogenous middle-class sample and were close in age. Different relations may be found when children are from less supportive households, experience more stress, or are younger. Longitudinal studies along with a more diverse sample are needed in the future.

Another limitation was the small amount of variance explained by the emotions exhibited, the regulation strategies, and persistence variables (see Tables 4, 5, and 6). It appears that there were other variables that explained the variance in children's private speech beyond emotions and regulation strategies that were left out of the analyses. It is necessary to explain more of the variance in private speech by including more variables in order to find more of the reason behind children's private speech during a frustration task.

Regardless of the limitations of this study, there are also many things that have been learned. Previous research has not investigated the private speech elicited during an emotion regulation task or how it relates to elicited emotions or regulation strategies. This research builds upon research that investigated emotional expressions and regulation strategies (e.g., Dennis et al., 2009; Diener & Mangelsdorf, 1999; Grolnick et al., 1996; Stifter & Braungart, 1995) by analyzing the private speech that occurred at the same time. This study extends previous research by investigating the social and private speech that occurred during the frustration task. Children spoke up to 55 private speech utterances during a 4-min task (see Table 1), which is a large amount of speech that had not been considered prior to this study.

In the current study, children's private speech was found to occur during emotion regulation tasks, when previous researchers only focused on private speech in cognitive tasks because researchers believed private speech was primarily a cognitive ability (e.g., Berk & Spuhl, 1995; Duncan & Pratt, 1997; Fernyhough & Fradley, 2005; Patrick & Abravanel, 2000). Private speech appeared to have a regulatory function during the frustration task with certain categories of private speech occurring alongside either regulation strategies or emotions. However, the exact nature of private speech during an emotion-eliciting task cannot be fully uncovered with only one study and more studies need to investigate private speech during tasks that are not cognitive and success-based.

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Table 1

Descriptive Statistics of Private Speech Categories

	Mean	SD	Minimum	Maximum
Social speech				
Raw	11.20	7.80	0	44.00
Proportion	0.41	0.22	0	0.94
Vocalizations				
Raw	7.57	5.59	0	30.00
Proportion	0.29	0.20	0	1.00
Inaudible muttering				
Raw	0.56	1.14	0	6.00
Proportion	0.02	0.05	0	0.31
Task-irrelevant				
Raw	0.11	0.94	0	10.00
Proportion	0.00	0.03	0	0.29
Nonfacilitative task-relevant				
Raw	1.08	1.48	0	7.00
Proportion	0.04	0.05	0	0.20
Facilitative task-relevant				
Raw	8.16	8.38	0	42.00
Proportion	0.24	0.18	0	0.69
Total private speech				
Raw	17.48	12.19	0	55.00

Table 2

Descriptive Statistics of Emotions, Emotion Regulation Strategies, and Persistence

Variable	Mean	SD	Minimum	Maximum
Sadness	0.62	0.39	0.00	1.94
Anger	0.98	0.34	0.17	1.71
Self-comfort	0.13	0.13	0.00	0.58
Distraction	0.12	0.16	0.00	0.96
Latency to first quit (sec)	41.79	35.45	0.00	182.00
Duration on-task (sec)	137.53	44.85	0.00	137.53

Table 3

Pearson Correlations of Private Speech with Emotions, Emotion Regulation Strategies, and Persistence Controlling for Age

Private speech category	Emotion		Regulation strategy		Persistence	
	Sadness	Anger	Self-comfort	Distraction	Latency to first quit	Duration on-task
Social speech						
Raw score	.24*	-	-	-	-.25*	-.20*
Proportion	.22*	-	-	-	-.29*	-.21*
Vocalizations						
Raw score	-	.26*	-	-	-	.16^{+}
Proportion	-	.02	-	-	-	.08
Inaudible muttering						
Raw score	-	-	.32**	.27*	-	-
Proportion	-	-	.28*	.38**	-	-
Task-irrelevant						
Raw score	-	-	.32**	.22*	-	-
Proportion	-	-	.32**	.23*	-	-
Nonfacilitative task-relevant						
Raw score	.23*	.21*	-	-	-	-
Proportion	.15	.13	-	-	-	-
Facilitative task-relevant						
Raw score	-	-	-	-.19*	.09	.16^{+}
Proportion	-	-	-	-.19*	.22*	.21*

Note. Only significant findings are presented in this table. $^{+}$ *p* < .10, * *p* < .05, ** *p* ≤ .001.

Table 4

Regression Analyses Predicting Private Speech from Emotions Controlling for Age

	Beta	R^2	R^2 change	F for step
	Social Speech (Raw)			
1. Child age	-.17[+]	.02	.02	1.70
2. Sadness	.24*	.08	.06*	3.02*
Anger	.04			
	Social Speech (Proportion)			
1. Child age	-.28*	.06	.06*	6.67*
2. Sadness	.22*	.10	.05[+]	4.22*
Anger	-.01			
	Vocalizations (Raw)			
1. Child age	.23*	.05	.05*	6.51*
2. Sadness	.03	.12	.06*	4.91*
Anger	.24*			
	Vocalizations (Proportion)			
1. Child age	.10	.01	.01	.53
2. Sadness	-.14	.03	.02	.94
Anger	.04			
	Inaudible Muttering (Raw)			
1. Child age	-.02	.00	.00	.08
2. Sadness	-.04	.01	.01	.24
Anger	-.06			
	Inaudible Muttering (Proportion)			
1. Child age	-.05	.00	.00	.50
2. Sadness	-.10	.03	.03	1.25
Anger	-1.24			

	Task-irrelevant Private Speech (Raw)			
1. Child age	-.10	.01	.01	.94
2. Sadness	.02	.01	.00	.38
Anger	-.04			

	Task-irrelevant Private Speech (Proportion)			
1. Child age	-.10	.01	.01	1.02
2. Sadness	.03	.01	.00	.39
Anger	-.03			

	Nonfacilitative Task-Relevant Private Speech (Raw)			
1. Child age	-.04	.00	.00	.00
2. Sadness	.21*	.09	.09*	3.53*
Anger	.18*			

	Nonfacilitative Task-Relevant Private Speech (Proportion)			
1. Child age	-.08	.00	.00	.31
2. Sadness	.14	.04	.03	1.41
Anger	.11			

	Facilitative Task-Relevant Private Speech (Raw)			
1. Child age	.24*	.05	.05*	6.47*
2. Sadness	-.01	.06	.00	2.25$^+$
Anger	.06			

	Facilitative Task-Relevant Private Speech (Proportion)			
1. Child age	.29*	.07	.07*	8.51*
2. Sadness	-.13	.09	.02	3.53*
Anger	-.02			

Notes. $^+p < .10$, * $p < .05$. The betas reported are the standardized betas from the last step.

Table 5

Regression Analyses Predicting Private Speech from Emotion Regulation Strategies Controlling for Age

	Beta	R^2	R^2 change	*F* for step
Social Speech (Raw)				
1. Child age	-.13	.02	.02	1.70
2. Self-comfort	-.11	.03	.01	.96
Distraction	.01			
Social Speech (Proportion)				
1. Child age	-.24*	.06	.06*	6.67*
2. Self-comfort	-.17[+]	.08	.03	3.35*
Distraction	.08			
Vocalizations (Raw)				
1. Child age	.23*	.05	.05*	6.51*
2. Self-comfort	.17[+]	.10	.04[+]	4.02*
Distraction	-.18[+]			
Vocalizations (Proportion)				
1. Child age	.08	.01	.01	.53
2. Self-comfort	.13	.02	.02	.80
Distraction	-.01			
Inaudible Muttering (Raw)				
1. Child age	.03	.00	.00	.08
2. Self-comfort	.26*	.14	.14**	5.98**
Distraction	.20*			
Inaudible Muttering (Proportion)				
1. Child age	.00	.00	.00	.49
2. Self-comfort	.19*	.18	.17**	7.94**
Distraction	.32**			

	Task-irrelevant Private Speech (Raw)			
1. Child age	-.04	.01	.01	.94
2. Self-comfort	.28**	.13	.12**	5.54**
Distraction	.14			

	Task-irrelevant Private Speech (Proportion)			
1. Child age	-.04	.01	.01	1.02
2. Self-comfort	.28*	.13	.12**	5.62**
Distraction	.15			

	Nonfacilitative Task-Relevant Private Speech (Raw)			
1. Child age	-.02	.00	.00	.00
2. Self-comfort	.03	.01	.01	.34
Distraction	-.10			

	Nonfacilitative Task-Relevant Private Speech (Proportion)			
1. Child age	-.06	.00	.00	.31
2. Self-comfort	.01	.01	.01	.29
Distraction	-.07			

	Facilitative Task-Relevant Private Speech (Raw)			
1. Child age	.21*	.05	.05*	6.47*
2. Self-comfort	.00	.09	.03	3.51*
	-.18$^+$			

	Facilitative Task-Relevant Private Speech (Proportion)			
1. Child age	.24*	.07	.07$^+$	8.51*
2. Self-comfort	-.03	.10	.03	4.26*
Distraction	-.17$^+$			

Notes. $^+p < .10$, $* p < .05$, $**p \le .001$. The betas reported are the standardized betas from the last step.

Table 6

Regression Analyses Predicting Private Speech from Persistence

	Beta	R^2	R^2 change	F for step
	Social Speech (Raw)			
1. Child age	-.10	.02	.02	1.70
2. Latency	-.20*	.09	.07*	3.47*
Duration	-.11			
	Social Speech (Proportion)			
1. Child age	-.22*	.06	.06*	6.67*
2. Latency	-.24*	.14	.09*	6.19*
Duration	-.10			
	Vocalizations (Raw)			
1. Child age	.22*	.05	.05*	6.51*
2. Latency	-.04	.08	.03	3.24*
Duration	.17[+]			
	Vocalizations (Proportion)			
1. Child age	.06	.01	.01	.53
2. Latency	.10	.02	.01	.72
Duration	.03			
	Inaudible Muttering (Raw)			
1. Child age	-.02	.00	.00	.08
2. Latency	-.00	.01	.01	.32
Duration	-.09			
	Inaudible Muttering (Proportion)			
1. Child age	-.05	.00	.00	.49
2. Latency	.04	.02	.02	.90
Duration	-.15			

	Task-irrelevant Private Speech (Raw)			
1. Child age	-.08	.01	.01	.94
2. Latency	-.02	.03	.02	1.15
Duration	-.14			

	Task-irrelevant Private Speech (Proportion)			
1. Child age	-.08	.01	.01	1.02
2. Latency	-.00	.03	.02	1.16
Duration	-.15			

	Nonfacilitative Task-Relevant Private Speech (Raw)			
1. Child age	-.01	.00	.00	.00
2. Latency	-.01	.01	.01	.24
Duration	.08			

	Nonfacilitative Task-Relevant Private Speech (Proportion)			
1. Child age	-.06	.00	.00	.31
2. Latency	.09	.02	.01	.63
Duration	.05			

	Facilitative Task-Relevant Private Speech (Raw)			
1. Child age	.22*	.05	.05*	6.47*
2. Latency	.02	.08	.02	3.16*
Duration	.15			

	Facilitative Task-Relevant Private Speech (Proportion)			
1. Child age	.25*	.07	.07*	8.51*
2. Latency	.16	.13	.06*	5.49*
Duration	.13			

Notes. $^{+}p < .10$, * $p < .05$. The betas reported are the standardized betas from the last step.