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Metacognitive Private Speech: Links with Parent Language and Achievement Orientation, Reciprocal Socialization, and Socioeconomic Status

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METACOGNITIVE PRIVATE SPEECH: LINKS WITH PARENT LANGUAGE AND ACHIEVEMENT ORIENTATION, RECIPROCAL SOCIALIZATION, AND SOCIOECONOMIC STATUS

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Introduction

This thesis explores links between contemporary intelligence theories, parent language, socioeconomic status, and metacognitive private speech. It addresses these connections through a literature review of published studies, and an empirical study conducted with local early childhood education centers.

This study began as an exploration of how children perceive intelligence, but upon diving into the research, it became clear that there were many layers to intelligence and learning about how children understand it; and so the thesis developed, based on multiple theories and studies. The following section explains the theories and concepts used to drive the research, methods, and overall direction of the study. Because intelligence cannot be defined in one singular way, there are other concepts that need to be understood to make conclusions or inferences about the data that is being presented.

Intelligence Theories

There are two major camps when it comes to intelligence theories - these are known as *incremental* and *entity* theorists; they can be found in both scholarly literature and every day, lay-persons' belief system. *Incremental* theorists believe that human attributes or traits like intelligence are changeable through hard work. *Entity* theorists, on the other hand, believe that attributes are fixed and cannot be changed (Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2013; Haimovitz, Wormington, & Corpus, 2011). Incremental and entity theorists are terms used to describe lay-people's beliefs and characteristics of themselves. *Incremental* theorists are found to be more mastery oriented, meaning they focus on mastering something challenging, whereas *entity* theorists are more helpless oriented, and may give into failures or give up on a challenging

task (Burnette et al., 2013). Haimovitz and Dweck (2016) defined the same concepts as performance and learning orientations, where performance oriented parents see failure as debilitating and learning oriented parents have a focus on how to improve and learn from failure.

Socioeconomic Status

Socioeconomic status (SES) is a variable measured by education, occupation, and income (Hanscombe et al., 2012; Thompson & Foster, 2013). But it is important to note that socioeconomic status is a complex variable, and sources outside of the three measurements can have an influence on how a child is affected. Hanscombe et al. (2012) studied a large population-based UK twin sample where they looked at IQ from infancy to adolescence. It was found that the total IQ variance was found to be greater in lower SES families. Hanscombe et al. (2012) was looking for the gene-environment interaction in IQ, and instead found an environment-environment interaction, especially when it came to children with lower SES backgrounds. The genetic influence on IQ is the same across the board, but shared environmental influence is greater in more disadvantaged backgrounds and explains more of the variance when it comes to IQ testing performance. Thompson and Foster (2013) found that parent education levels are correlated with occupation levels, as one might expect; but that socialization of advanced reasoning language was primarily linked to low occupational status and associated parenting stress levels. It was also found that children from lower SES backgrounds are often exposed to less intellectual discussion and questions that would bring awareness to the child's own knowledge. Home language environment and parent/child dynamics were found to be linked to children's metacognitive reasoning.

Metacognitive private speech

Manning et al. (1994) defines metacognitive private speech as overt self-talk that reflects children's awareness and regulation of their own thinking. Children may utter things such as 'I can do it' or 'try again' when it is metacognitive private speech. It is considered to be a higher level of speech and is often helpful when a child is facing difficulty because it is more motivational than other forms of speech. It can involve correcting, reinforcing, solving, and coping, all of which are helpful when it comes to facing a difficult task or challenge (Chiu & Alexander, 2000). Metacognitive private speech is different from other types of private speech. For example, nonfacilitative private speech can inhibit or stop the effort being put into a task because the child may give up or question why they are doing the task. Cognitive private speech is speech that is directed toward the task at hand, which can include questions, descriptions, or focus words (Chiu & Alexander, 2000). Sawyer (2017) discusses the importance of studying private speech during the preschool years, when it's at its peak during the preschool age, and once the child advances past five or six years old. With time, typically post-kindergarten private speech happens less frequently and starts to become more internalized before it ultimately disappears altogether.

In the tasks involved in Sawyer's (2017) study, the researchers found that children's performance was positively correlated with the frequency and proportion of their metacognitive private speech, suggesting a self-regulatory function. They also found that children's performance was negatively correlated with the proportion of motivational private speech. Sawyer (2017) distinguished between motivational private speech and metacognitive private speech, with motivational including self-encouragement or evaluation, and metacognitive including finding solutions, monitoring errors, and/or reflecting upon the goal-oriented task process. Chiu and Alexander (2000) found that metacognitive private speech was correlated with

mastery behavior, possibly due to the fact that metacognitive private speech can be motivational, and because mastery motivation may cause expression of "self-reinforcing private speech."

Mastery motivation

According to Chiu and Alexander (2000), mastery motivation is "operationalized as children's persistence or desire for independence in completing challenging tasks" (p. 138). The emphasis of the definition is on effort, not outcome. A child who tries hard has mastery motivation, whether they succeed at the task or not. Although the child likely wants to succeed, success does not define mastery motivation. Most mastery motivation research is done with infants or toddlers, so self-talk and mastery motivation are not usually studied together (Chiu & Alexander, 2000). So, there may be an interaction between self-talk and persistence that has not yet been linked. Mastery motivation can be viewed as a combination between persistence and the desire to accomplish a task, specifically without adult help. Mastery motivation was "mirrored in the proportion of verbal self-monitoring and self-encouragement" (Chiu & Alexander, 2000, p. 150), which may be linked to metacognitive private speech since it is often motivational and correcting.

The mastery-approach is focused on attaining competence for a particular task (Cury, Elliot, Da Fonseca, & Moller, 2006). Mastery-oriented children are "not easily discouraged by difficult achievement problems" (Hokoda & Fincham, 1995, p. 375), and may have learning goals that cause self-monitoring statements, rather than attributional ones. These children also tend to make self-monitoring statements that are task-related when faced with failure, as well as making more positive statements and maintaining high expectations for future success (Hokoda & Fincham, 1995).

Sawyer (2017) conceptually related mastery motivation in preschool-aged children with the construct of mastery orientation in school-aged children and adults. Children who have a mastery orientation have goals of learning new skills and are often driven by intrinsic motivation. Children who have a performance orientation are driven by extrinsic motivation and may be more concerned with rewards or positive statements about the work they did. This relates back to the intelligence theories: *incremental* theorists are thought to be more mastery oriented, whereas *entity* theorists are thought to be more performance oriented. The researchers positively linked mastery-approach goals (attaining task-based competence; ex: "I want to learn as much as possible") and mastery-avoidance goals (avoiding task-based incompetence; ex: "I want to avoid learning less than I could") to *incremental* theory, and performance-approach (attaining normative competence; ex: "I want to do better than other students") and performance-avoidance goals (avoiding normative incompetence; "I want to avoid doing worse than other students") to *entity* theory (Cury, Elliot, Da Fonseca, & Moller, 2006). But these theories are linked to older children and adults, not preschool children. Sawyer (2017) found that preschool children that ranked highly in their frequency of playful private speech also ranked highly in mastery motivation, and that their proportion of partially internalized private speech was also correlated positively with mastery motivation.

Concepts of ability

Studies show that children younger than five have some understanding of relationships between traits and mental states, though often with age-typical confusions. For example, younger children consider prosocial behavior when defining the terms "smart," whereas elementary school children and older focus on knowledge and academic abilities (Heyman, Gee, & Giles, 2003). "Children tended to infer that someone who found a task easy to do is smarter than

someone who found the task difficult." (Heyman, Gee, & Giles, 2003, p. 522). They also found that children's awareness of high effort and positive outcomes are related, and that children are more likely to expect that intellectual ability matches with social traits in valence; but they are aware of, or will agree with the idea that an individual can be smart and mean, etc. Thompson and Thornton (2006, 2014) found that preschoolers with high theory of mind scores tended to reduce effort on a collaborative task (balloon inflation game) when they could reason that others were ignorant of each others' contribution. Younger preschoolers without this ability behaved as if everyone was working as hard as possible. Young children tend to assume that someone will put in their best effort, but they do not also assume that this effort will result in success. Heyman, Gee, and Giles (2003) discussed the concept of a dual schema hypothesis, where the effort schema assumes that high effort, positive outcomes, and high ability are strongly related, and where the perceived difficulty schema assumes that someone who perceives a task as more difficult than others lacks the competence to easily complete the task. These two schemas can be activated at different times, depending on the current situation. Muenks, Wigfield, and Eccles (2018) discussed calibration, the difference between students' expected and actual performance. Students who are "well-calibrated" have more accurate expectations of their performance, and poorly calibrated students tend to over- or under-estimate their performance. Calibration is often viewed as a central component of self-regulation and metacognition, since the level of a student's calibration can influence their motivation, study behaviors, and achievement. They also found that calibration accuracy gets better over time.

Parent Influence

Haimovitz and Dweck (2016) found that parents' intelligence mindsets were not significantly related to their children's mindsets about intelligence, but instead the parent failure

mindsets were linked to the children's intelligence mindsets. Parents with "failure-is-debilitating mind-set" were more likely to have children that believed intelligence is fixed, with an emphasis on performance rather than learning. The pattern was found to exist even when controlling for parents' perceptions of the children's competence. Haimovitz and Dweck (2016) also found that children's perceptions of their parents' failure mindsets were significantly related to the children's failure mindset. But, this pattern did not follow for intelligence mindsets, only for failure mindsets.

Hokoda and Fincham (1995) found that mothers of mastery children may be more sensitive to their children's ability or self-worth beliefs. They were found to make more attributions to their children's high ability than mothers of helpless children. "In the face of failures, mothers of helpless children showed less positive affect and failed to increase mastery or task-focused teaching statements" (Hokoda & Fincham, 1995, p. 382). Without their mothers present, "helpless" children showed an increase in negative affect as well as performance deterioration. On the other hand, mothers of mastery children showed an increase in task-oriented behaviors and maintained high positive affect throughout the "impossible puzzle" task that they were given. Without the mothers present, mastery children showed positive affect and persistence, the opposite of the helpless children. The researchers found that mothers of mastery children reassured their children of their high ability when the children expressed low-ability statements, and often also provided a task-oriented or teaching statement. In contrast, when helpless children made low-ability statements, mothers tended to suggest the child quit or move on to the next task. But, there was no difference between the amount of statements related to performance and learning goals between mothers of helpless and mastery children. Hokoda and Fincham (1995) found that mothers of mastery children increased their teaching during

insolvable puzzles, whereas helpless mothers did not adapt their teaching behaviors based on the difficulty of the task. Mothers of helpless children were more likely to not respond with feedback when the child asked for help, displaying helpless behavior.

Reciprocal Socialization

The concept of reciprocal socialization is the idea that parents' behavior is often affected by children's emergent behavior as they cognitively advance, as much as children's development is affected by their parents' behavior. Reciprocal socialization variables may stem from the child's intellectual development, particularly language ability (Thompson & Foster, 2013). The Thompson and Foster (2013) study looked at children's productive and receptive language development, as we did with the *Test of Early Language Development* (TELD), as well as their age, as variables that would partially predict the intellectual complexity of parents' scaffolding language. Similarly, for our study, productive and receptive language may be connected to parents' questions and statements as well as the "type" (*incremental/entity*) of language they produce.

Other reciprocal models (e.g., Barry et al. 2005) help illustrate the links between poverty, child characteristics, and parenting stress. Parenting stress is predicted by educational attainment, which has been known to covary with occupational status and income (Thompson and Williams, 2006). Reciprocal socialization within the parent–child relationship may be shaped by low education per se, and resulting disadvantages. Recent studies have shown that home language environment and parent-child dynamics are linked to children's metacognitive reasoning (Hughes and Ensor, 2006).

Methodological Design and Logic

Developmental research in psychology often involves direct interaction with children and other participants. While it may be simple to hand parents a questionnaire or two to find out what they are thinking or how they act, it is not the same procedure when it comes to children. Because we are dealing with children in the preschool age category, it is much more challenging to directly ask questions. Of course, we did directly ask some questions to see their overall understanding, but children tend to show more through unprompted language during activities. A lot of child research is based on tasks and games that children will feel comfortable doing, and this type of research is rarely done in a lab, in order to preserve ecological validity. We devised a game based on previous research that would hopefully elicit language from the children that could be used for data analysis. Because children vary so much in terms of language ability, knowledge, and expression, there is rarely a uniform response to a task. This is also why it is important to create a baseline - for example, in our study, we conducted a baseline language assessment before the task was created.

Based on the current literature, we came to the conclusion that if socioeconomic status can influence how parents interact with their children and the language environment that they provide for their children, that differences in socioeconomic status may also be linked to a child's metacognitive language during a task. We wanted to compare language related to ability and achievement between parents and their children, and also between levels of socioeconomic status. We also developed a self-report instrument for parents designed to reveal what they were aware of in terms of their children's own abilities.

Participant Recruitment

Participants were recruited from two preschools in the Southern Maine area. Recruitment flyers were placed in the classrooms with teacher permission, and participant packets were either placed in parent mailboxes or handed to parents. All parents were told that the study was completely voluntary and were given the choice whether or not to return the forms. All materials used for recruitment and data collection were approved by the USM IRB board and can be found in the Appendix A, along with the IRB research approval letter. Once parent consent was given, child assent was sought prior to beginning any activities. On the day that the child was going to be participating, the child was specifically asked if they wanted to go with the researcher to participate. It was also made clear that if they wanted to stop the task, they may.

Subject Pool

Nine children from the high SES school (M age = 4.94, SD = 1.47 , range = 4.4 - 5.1; 3 female, 6 male) and their parents (M age = 41.12, SD = 3.17, range = 37.44 - 45.45; all female). We also collected parent data from the low SES school (N = 7; M age = 41.12, SD = 2.28, range = 35.47 - 41.15; 6 female, 1 male).

Measure of Socioeconomic Status

Parents were asked to fill out a version of the Barratt (2006) measure for SES, which was modified to fit our study. The questions included information about both the parents of the children in the study and their grandparents. The data collected included marital status, level of schooling, and family work information. The full measure is in the Appendix B1. This information was used to measure the socioeconomic status of each family.

We also know that categorically, one school was high SES and the other was low. In order to qualify for Head Start, there are specific criteria one must meet, which include whether

the family qualifies for free or reduced lunch, and the income of the family. So, without knowing the specifics of each family, we know on a general basis that there is a distinction between the two schools and data sets.

Parent Achievement Scenario Questionnaire

The open-ended task achievement scenario questions were used to assess parent language when it came to their perceptions of their child's success/failure and effort. The instructions told parents to imagine they are with their child in the situations described, and to include brief descriptive phrases of how they would respond. This questionnaire included questions like "Imagine your child is playing with blocks and attempting to build something quite difficult (e.g. a tall building). What do you say to encourage or motivate them?" This questionnaire was used to code for *Incremental/Entity* responses and to collect data on questions and statements in their language. These questions were based on other assessments, and the researchers' projections of what questions would reflect *Incremental* and *Entity* responses. The full questionnaire is in the Appendix B2.

Parent Achievement Orientation Scales

Based on published efficacy and achievement studies (e.g. Haimovitz & Dweck, 2016; Blackwell, Tresniewski, & Dweck, 2007; Burnette, et al., 2013; Cury, et al., 2006; Frome & Eccles, 1998), we developed the *Parent Achievement Orientation Scales* with Likert scale questions that ranged from 1 to 5, with 1 being "never/very rarely" and 5 being "very often/always." This questionnaire included questions and statements, and parents had to indicate how likely they would be to say the statement or something similar during a task, like putting together a puzzle or building a block tower. Questions included "You are really good at this

(when the results ARE NOT very successful)" and "You are really good at this (when the results ARE very successful)." The full questionnaire is in the Appendix B3. These questions, like the open-ended questions, were created on the basis of prior research relevant to the constructs of *Incremental* and *Entity* mindsets in parents. This questionnaire was coded for *Incremental/Entity* responses to create a total score for the parents.

TELD-3

The TELD-3, or the *Test of Early Language Development,* (Hresko, Reid & Hammill, 1999) broadly assesses a child's language development. The two sections are Expressive (i.e. productive language) and Receptive Language (i.e. comprehension), and the scores from these sections are computed to give composite scores, percentile rankings, and age-norm scores. This assessment was used as a baseline measure for overall language so that we could account for variation in language ability when analyzing metacognitive private speech frequency during the Fishing Task.

Fishing Task

The fishing task was based on the Sawyer Fishing Task (2017), which included a toy fishing rod with a magnet for a "lure" and magnetic plastic fish. Some were easy, some were moderately hard, and one was impossible to catch due to weight distribution, relative to the magnet. Sawyer (2017) measured persistence by looking at the time the child spent trying to catch the impossible fish.

Our version of the task used six wooden fish with magnets on the bottom. They were color coded, so the easy were green, the red were of medium difficulty, and the yellow were impossible. The easy fish had the largest magnet, and the medium fish had a smaller magnet. Our

"impossible" fish did not have a magnet at all. Children used a fishing pole with a magnet on the end to catch the fish. The fish were placed randomly in a small space, with the colors spread out. An example of what the setup would look like can be seen in the visual below.
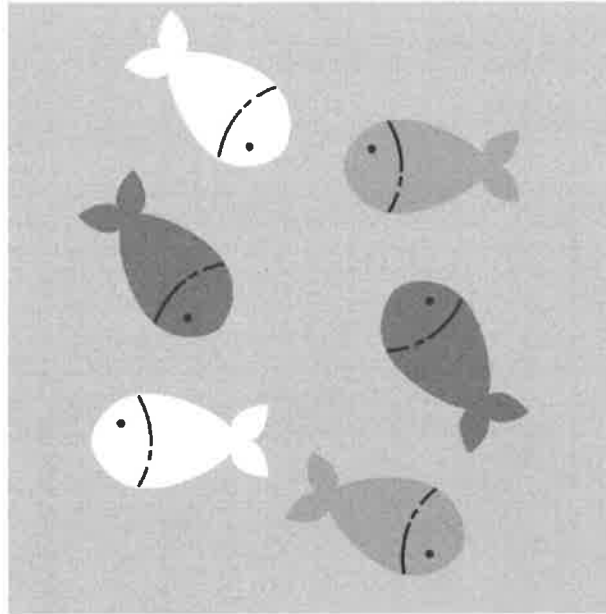
Chiu and Alexander (2000) used a similar fishing task, looking at the persistence on the task overall, and the total utterances during the task. They found that total utterances may be influenced by motivation to complete the task, time spent on the task, or their tendency for private speech.

We used the fishing task to test for metacognitive private speech, as the primary type of private speech. Children were given instructions on the task by the researcher, and told they had five minutes to play the fishing game. Transcripts from the task were recorded so that private speech could be coded for on or off task language. On task language was coded as metacognitive, and then was broken down further into categories. This is explained in the section

on coding child language. The goal was to see how often the children talked, and how they talked about the task. The researcher did their best not to engage during the task, and only to respond to the child when directly addressed.

Child Task Reflection Questions

The researcher established a set of questions, posed to each child after finishing the fishing task to see how the child viewed their own success/failure and to ask broader questions related to their own perceptions of ability and intelligence. This allowed us to see how the child felt about the task and their achievements, to see how they felt about others' abilities, and to collect data on their metacognitive reasoning about what ability and what "being smart" means. The full list of questions can be found in the Appendix.

Coding Parent Language

Parent language was coded using two data collection instruments developed for this project: the *Parent Achievement Scenario Questionnaire* (PASQ) and the *Parent Achievement Orientation Scales* (PAOS). The open-ended questionnaire responses were coded for being interrogative in structure (questions) versus declarative structures (statements). Those questions and statements were then categorized as either having an *Incremental* orientation or *Entity* orientation, and whether they were positive or negative in overall tone.

The Likert questionnaire items of the PAOS were designed to elicit either *Incremental* or *Entity* orientations responses, and then configured so that low responses (1 or 2) were recorded as "*Entity*" and high responses (4 or 5) were recorded as "*Incremental.*" Responses of "3" were classified as neutral. The scores from each question were added together, creating a minimum score of 6 (strongly leaning towards "*Entity*") and a maximum score of 30 (strongly leaning

towards "*Incremental*"). Low scores predicted *Entity* mindset oriented parents, and high scores predicted *Incremental* minded parents.

Coding Child Language

All children's language during the task was transcribed, and the transcriptions were used to code individual utterances. The total number of utterances was collected, and then a proportional score was created for the amount of language that was on task. On task language was coded into "*prompted*" or "*unprompted*" language, with unprompted language being coded as metacognitive private speech. All on task language was coded in four categories: *prompted/unprompted, question/statement, internal/external,* and *positive/negative.*

Statistical Analyses

All parent and child utterances for the analyses were computed as a proportion of total language production. Proportional scores are typically used in behavioral and linguistic coding research in order to control for individual differences in children's language ability, verbosity, and, for parents, differences in length of response in the parent questionnaires. All recorded data were uploaded into SPSS for statistical analysis. The primary analyses consisted of bivariate Pearson correlations among child language data, parent questionnaire language and achievement orientation scale scores, controlling for age and language ability. Other analyses explored group differences between high and low SES family data.

Results

Child Data

 TELD Scores

As seen in Table 1, there was an overall pattern of high language ability within our sample of high SES children. This includes expressive language (M = 102.56, range = 94 - 130, SD = 43.33), and receptive scores (M = 115, range = 83 - 128, SD = 38.67), and an overall spoken language quotient score (M = 110.78, range = 88 - 128, SD = 11.43). We see high scores in all three categories, highlighting the high language ability in our high SES group. The receptive score averaged higher than the expressive score, showing that this subject pool had a slightly higher ability in comprehension than in production of language, which is typical of this age group.

Total Utterances vs Metacognitive Utterances

The total utterances, which would be the amount of times a child spoke throughout the language task, averaged at 40.11 (SD = 20.95, range = 13 - 73). Total on-task language had an average of 20.89 (SD = 14.74, range = 6 - 47). Total prompted speech averaged at 0.49 (SD = 7.65, range = 6 - 28) and total unprompted speech had an average of 7.33 (SD = 8.5, range = 0 - 22).

The on-task utterances were further broken down into different categories. These data were also converted into proportional data, meaning how much of the category of on-task language was a proportion of the total on-task language said throughout the task. The average proportional number of *internal* utterances (those indicative of an incrementalist perspective) was 0.73 (i.e. 73%). The average proportional number of *external* utterances was 0.27 (27%). The average proportional number of questions was .07, and the average number of statements was .92. The most common type of utterance was a prompted statement that was positive and internal. This was the most frequent among 8 of the 9 children. The one outlier was

a child that had their most frequent category of utterance as an unprompted statement that was positive and internal. A more in-depth view of this data can be seen in Table 2.

Parent Data

Comparison of Low/High SES

When it came to the Parent Achievement Scenario Questionnaire, we computed the mean frequency of the responses coded as "ability" vs. "effort" for each question and calculated the magnitude of difference between the scenarios framed as "successful" versus "not successful." For the responses coded as "ability", the magnitude of difference for the low SES was 2.57 (successful M = 4.86, SD = .38; unsuccessful M = 2.29, SD = .76) and the high SES magnitude of difference was 0.78 (successful M = 4.11, SD = .78; unsuccessful M = 3.33, SD = 1.22).

For the responses coded as "effort" questions, the low SES had a magnitude of difference of 0.00 (successful M = 4.14, SD = 1.46; unsuccessful M = 4.14, SD = .69), indicating no difference, though high variability. The high SES group had a difference of 0.11 (successful M = 4.33, SD = .71; unsuccessful M = 4.44, SD = .53). When it came to parents' causal explanations for the type types of results ("successful/unsuccessful"), the magnitude of difference for the low SES group was, again, 0.00 (successful M = 3.29, SD = .76; unsuccessful M = 3.29, SD = .76).he high SES group had a difference of 0.25 (successful M = 3.25, SD = 1.28; unsuccessful M = 3.00, SD = 1.32).

Parent Questionnaire Scores
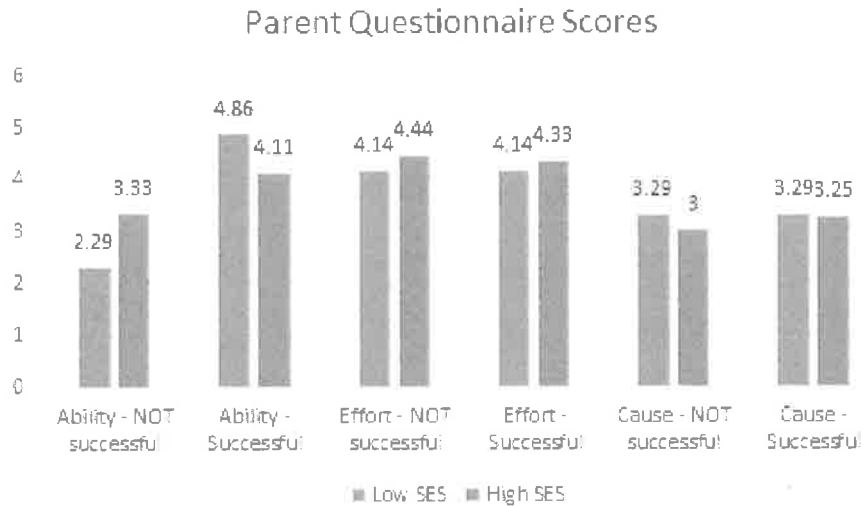
Interactions within High SES group: Parent/Child Interactions

When computing correlations among our independent and dependent data, it was found that parent questions are predictive of children's metacognitive language ($r = .704$, $p < .05$, percentage of explained variance = .496). Parent statements were not found to be predictive of children's metacognitive language ($r = .249$, $p < .26$). It was also found that parent questions predict patterns in their children's own questions ($r = .588$, $p < .05$, $R^2 = .346$) and negatively, though none significantly predict their statements ($r = -.427$, $p < .13$). Parent statements were not found to be correlated with children's own statements ($r = -.300$, $p < .22$). Parents' use of questions were also correlated with children's language ability (TELD total quotient, $r = .694$, $p < .05$, percentage of explained variance = .482; TELD spoken quotient $r = .676$, $p < .05$, $R^2 = .457$). Parent questions also correlated with the children's use of *External/Internal* coded language (*External*, $r = .781$, $p < .01$, $R^2 = .609$; *Internal* $r = -.824$, $p < .01$, $R^2 = .679$). The inverse set of correlations may be due to the fact that more of one type of coded language would lead to less of the other (as in a zero-sum relationship). It was also found that parents'

proportional talk that was coded as *Entity* was predictive of children's metacognitive language ($r = .653$, $p < .05$, $R^2 = .426$).

Qualitative Results from the Child Task Reflection Questions

The list of questions can be found in Appendix C, and the verbatim questions and responses can be found in Table 3. When asked if it was a hard game, six of the nine children said "yes," and the other three said "no." When asked why or why not the game was hard, three had *internal* responses, four had *external* responses, and two did not answer, or the question was omitted. When asked if they tried hard, seven of the nine said "yes," one said "not really," and the last child was not asked this question. Then they were asked if they did a good job, to which all nine said "yes." When asked why, six had *internal* responses, one had an *external* response, and two replied that they didn't know.

The final two questions were open-ended, the first being what it means to do a good job and the second being what it means to be smart. The children's answers can be found in the table. The answers ranged drastically, so each individual response has been provided.

Discussion

Qualitative Data

Because the qualitative data have a low N, the responses have a lot of variability. Because the questions are linked as a function of child responses, it is challenging to make any firm conclusions or analyses from these questions. But they are telling just the same, and provide some very interesting preliminary data for further exploration in future planned research. Despite the fact that six of the nine children believed that the game was difficult, they all believed that they did a good job, and all but two felt that they tried really hard. So, despite the fact that it was

challenging, they still felt that they did well on the task; and out of those who answered the question about why they did a good job, six of the seven had *internal* reasons. This shows that the success on the task was not as relevant to what would be considered a good job. Because the task included "*impossible*" fish, it was not possible for any of the children to collect all of the fish, but they were all able to catch at least one, and may have viewed that as success.

When it came to their answers about what it means to do a good job and what it means to be smart, these varied greatly. Some felt that being smart meant doing a good job. Others felt that doing a good job meant to be proud. Thus, among children of this age group these results may reveal only emergent ability to conceptualize cause-and-effect around efficacy and "success."

Some of the answers for what it means to be smart should be mentioned individually. One child said being smart meant that you think of things and remember what they are, tacitly invoking their own metacognitive reasoning. Another said it means to be happy, suggesting a reversal of the adult concept of cause ("success") leading to an affective state (outcome). One child said that "smart" is if you haven't tried something, but you already know what to do --another clear example of emergent advanced metacognition. These responses to me say that children have their own concepts of what success, achievement, and intelligence mean. They might not line up with their parents' or teachers' views, or they might. Because this is such a small sample size and is only a population of high SES students, it is important that more work is done to ask these questions and compare the results. However, as individual cases they provide very powerful prima-facie evidence ("face-validity"), indicating the possibility for advanced mental-state reason abilities.

Parent Data

Due to the low N of parent data, we can only report preliminary trends rather than statistically significant data. However, based on the magnitude of difference analysis, we can see that low SES parents increased their emphasis on *ability*, when their child was successful, much more than high SES parents. We can also see that both sets of parents had little change in emphasis on *effort* from low to high success. High SES parents were, however, more likely to increase their questions about explanations for the outcome when the child succeeded rather than when they did not. This may have important implications for the relationship with metacognitive language between parents and children - this may show preliminary trends with high SES parents wanting their child to think about what led to their success and low SES parents reminding their children of their ability when there is success.

Parent/Child Interactions

The finding that parent questions are predictive of metacognitive language suggests, at least in our High-SES families, reciprocal socialization. Because these are purely correlational data, we are unsure of which direction is causal, and as suggested in the literature described earlier, the causality is likely bidirectional, depending on context. The use of questions may help form children's intellectual and/or linguistic development, and/or children who are bright or precocious may elicit more questions from parents. This is precisely where SES differences may emerge. Thompson and Williams (2014), for example, documented a trend of lower ability to effectively respond to children's emergent private speech and metacognitive questions among low SES families. We see a similar trend when looking at TELD scores (language ability) from the children and parent questions. Strong spoken language abilities in

children may elicit greater use of questions. But at the same time, language ability may be enhanced by language that requires a response.

When looking at parent questions and the child's use of *External* and *Internal* coded language, we see inverse results, although both are highly significant. This may be due to the fact that an increase in one would lead to a decrease in the other (e.g., more *external* language would mean less *internal* language), but there does not seem to be a reason for this pattern. It may be due to something like subject sample size, or it may have to do with the type of language that questions elicit - maybe questions are more likely to lead to *External* language. It is a challenge to make any sort of conclusion from the correlations presented.

In terms of parent *Entity* oriented language, it was found to be a significant predictor of children's metacognitive language. *Entity* theorists believe that intelligence is a fixed trait. So it is interesting to see *Entity* language correlated to metacognitive language. But this pattern may be due to parents believing that their children have natural intelligence and ability, and therefore may not use as much *Incremental* oriented language if they already believe their children possess the abilities that would allow for them to succeed. The children's metacognitive language, that would lead the parents to believe in their natural ability, is shaping the parent language orientation.

Limitations and directions for future research

Due to the fact that much of this study is pilot work, like the fishing game and the tools used to collect parent data, replicating this study could be highly valuable. Also, the coding system was created for this experiment, so therefore it needs to be tested again and validated, as well as being tested for inter-rater reliability. Because of the amount of time that was spent on the conceptual side of the project and the creation of the measures and tasks, the data and subject

pool were smaller than anticipated. A larger subject pool would allow for more in-depth statistical analysis and would fix issues with the all-female high SES parent population and the missing data from the low SES children (due to school closures as a result of COVID-19).

Future directions may include replicating and extending the study, allowing for testing of coding system reliability and validity. Also, due to situations with school closures, etc., we were not able to collect child language data from the low SES school, which would have provided a valuable comparison with the high SES children that were able to complete the fishing task and the questions that followed. It would also be useful to test the measures used again, to provide inter-rater reliability and validity of the measures.

A repeat of the study could allow for further analysis of the patterns that we found so far, and further development of the measures and tasks. It could also prove to be valuable to continue to use some of the *Child Task Reflection Questions* on their own for children in different ages and schools to see how the answers vary, and to provide the possibility of patterns that could not be determined due to the size of our subject pool.

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Table 1 – TELD Data

	N	Min	Max	Mean	SD
Child Age	9	4.4	5.13	4.94	1.47
TELD Spoken Language Quotient	9	88	128	110.78	11.43
TELD Expressive Quotient	9	94	130	102.56	43.33
TELD Receptive Quotient	9	83	128	115	38.67

Table 2 – Fishing Task Data

	N	Min	Max	Mean
Child Age	9	4.4	5.13	4.94
Total Utterances	9	13	73	40.11
On Task Utterances	9	6	47	20.89
Total Prompted	9	6	28	13.67
Proportion Prompted	9	0.38	1	0.75
Total Unprompted	9	0	22	7.33
Proportion Unprompted	9	0	0.47	0.26
Total External	9	0	23	7.67
Proportion External	9	0	0.61	0.27
Total Internal	9	5	28	13.22
Proportion Internal	9	0.39	1	0.73
Total Questions	9	0	7	2.33
Proportion Questions	9	0	0.18	0.07
Total Statements	9	6	42	18.56
Proportion Statements	9	0.82	1.08	0.92

Table 3 – Child Task Reflection Questions

	Did you think this was a hard game?	Why was it hard/not hard?	Did you try really hard?	Did you do a good job?	Why/why not?	How do you think the other kids will do?	Why/why not?	What does it mean to do a good job?	What does it mean to be smart?	
Child 1	yes	couldn't get most of the fish	yes	yes	I got the fish	good	they might get some fish	I did a good job	when you know a lot of things	
Child 2	yes	it was hard to get the fish	yes	yes	I got some of the fish	good	don't know	to be proud	learning	internal
Child 3	no	n/a	yes	yes	I got the fish	good	I know they'll catch a fish	to try	I did good	external
Child 4	yes	couldn't pick up the fish	yes	yes	I picked up all of those, but not all of these	good	don't know	do a good sport	to be proud	
Child 5	yes	the yellow ones weren't working	yes	yes	got two red and two green	good	n/a	you did good	you did a really good job	
Child 6	yes	it's not really hard	not really	yes	don't know	good	we learned a lot of stuff so fast, because we know a lot of stuff	being good	to be happy	
Child 7	yes	fishing line was wiggly	n/a	yes	only got two red and two green but couldn't get the yellow ones because they didn't have magnets	good	don't know	you're proud	don't know	
Child 8	no	I got two	yes	yes	did really great catching two fish	great	it was easy	to do something awesome/ did a good job building	you think of things and remember what they really are	
Child 9	no	n/a	yes	yes	don't know	good	don't know	to do the thing that people ask you to do, like grownups and teachers	when you haven't tried something, you already know what to do	

Appendix A – Approval, Recruitment, and Consent

Appendix A1 – IRB Approval Letter

UNIVERSITY OF
SOUTHERN MAINE
Institutional
Review Board

NOTICE OF IRB REVIEW AND APPROVAL

DATE: September 26, 2019

TO: Cristin McDonough, Psychology
Bruce Thompson, Psychology

FROM: Casey Webster, Human Protections Administrator, Joint IRB

PROTOCOL TITLE: Children's emergent epistemology: Investigating links to parental socioeconomic status and beliefs about intelligence

FUNDING SOURCE: Undergraduate Research Opportunities Program, N/A

PROTOCOL NUMBER: 19-07-1305

APPROVAL PERIOD: Approval Date: September 26, 2019   Expiration Date: September 25, 2020

The project identified above has been reviewed by the University of Southern Maine's Institutional Review Board (IRB) for the Protection of Human Subjects in Research using an expedited review procedure per Title 45 CFR Part 46.110 including additional protections for children involved as subjects in research under 46.405. This approval is based on the assumption that the materials, including changes/clarifications that you submitted to the IRB contain a complete and accurate description of all the ways in which human subjects are involved in your research.

This approval is given with the following terms:

1. You are approved to conduct this research only during the period of approval cited above;
2. You will conduct the research according to the plans and protocol submitted;
3. You will immediately inform the Office of Research Integrity and Outreach (ORIO) of any injuries or adverse research events involving subjects;
4. You will immediately request approval from the IRB of any proposed changes in your research, and you will not initiate any changes until they have been reviewed and approved by the IRB;
5. You will only use the informed consent, informed assent, and/or parental permission documents that have the IRB approval dates marked in the footer;
6. You will give each research subject a copy of the informed consent, informed assent, and/or parental permission documents;
7. As applicable, you will comply with the University of Maine Information Security Policy and Standards and/or the Muskie School of Public Service Securing Protected Information Policies and Procedures and any other applicable USM policies or procedures;
8. If your research is anticipated to continue beyond the IRB approval dates, you must request continuing review at least 60 days prior to the IRB approval expiration date; and
9. You will close the project upon completion (or discontinued).

This project has been granted an Alteration of the Informed Assent Process for the following reasons:

1. The study involves no more than minimal risk to the subjects;
2. The alteration will not adversely affect the rights and welfare of the subjects;
3. The research could not practicably be carried out without the alteration; and
4. Whenever appropriate, the subjects will be provided with additional pertinent information after participation.

This project has been granted a Waiver of Documentation of the Informed Assent Process for the following reason:

Appendix A2 – Recruitment Flyer

UNIVERSITY OF
SOUTHERN MAINE
International
Review Board
USM

1. The research presents no more than minimal risk of harm to subjects and involves no procedure for which written consent is normally required outside of the research context.

The University appreciates your efforts to conduct research in compliance with the federal regulations that have been established to ensure the protection of human subjects in research.

Sincerely,

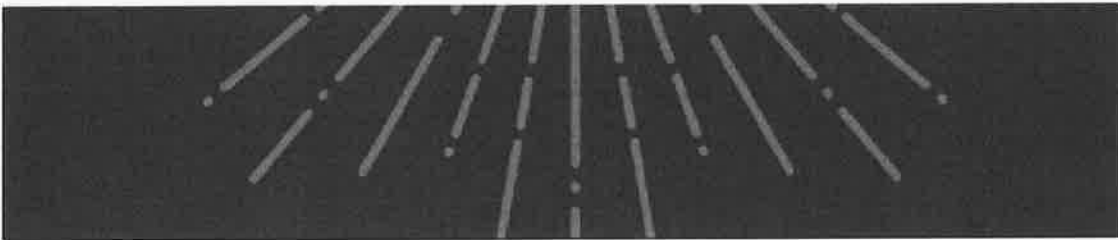Casey Webster

HELLO PARENTS/GUARDIANS!

THERE IS A NEW RESEARCH COLLABORATION HAPPENING AT HEAD START!

Cristin McDonough, one of the volunteers in the Pre-K classroom, received funding to research children's awareness of intelligence and how that reflects parenting backgrounds and ideas about intelligence and related concepts like motivation and success/failure.

This fall, there will be informed consent forms and questionnaires placed in parent mail slots, and children will participate in a picture game and fishing game!
We would be delighted to have you and your child participate in this study!

For more information, please contact:
Cristin McDonough
cristin.mcdonough@maine.edu
(978)-905-0604

Appendix A3 – Informed Consent

University of Southern Maine – Head Start (USM Gorham)
CONSENT FOR PARTICIPATION IN RESEARCH

Project Title: Children's emergent epistemology: Investigating links to parental socioeconomic status and beliefs about intelligence
Principal Investigator(s):
Cristin McDonough, Senior Psychology Student, University of Southern Maine
2. Bruce Thompson, Ph.D. Department of Psychology, University of Southern Maine

Dear Parent or Guardian

We are conducting a research study on how children understand intelligence and how parental views can impact that understanding at *Head Start (USM Gorham,* and want to let you know more about our research.

Introduction:
This study is exploring how parent-child interaction, family background and children's social and intellectual development may affect how children understand intelligence and related concepts such as success/failure, motivation, self-efficacy, achievement, knowledge, and awareness of mental states. We are planning a set of activities and assessments that allow us to see how these aspects are related.

Please read this form. You may also request that the form is read to you. You are encouraged to ask any questions that you may have about this study, now, during or after the project is complete. Your participation is voluntary. We encourage you to share this information with any other adult who has caregiving responsibility for your child.

Why is this study being done?
Current literature has been found to avoid the term "intelligence" when studying young children's awareness, instead focusing on concepts such as self-efficacy, knowledge, and mental state awareness, parent and teacher beliefs about children's intelligence, and children's motivation and achievement. Preliminary research shows that these concepts may be driven by key parental factors, such as socioeconomic status, and beliefs about success, failure, and achievement. We hope to investigate these factors as underlying themes, using naturalistic activities to elicit language and behavior that have been hypothesized to correlate with parenting measures and beliefs. The goal is to highlight the most important factors in determining children's awareness or understanding of their abilities and motivations, and perhaps their conceptions about intelligence.

Who will be in this study?
- All *Head Start* parents with preschool children (age 4 – 6) are invited to participate. We are hoping to have as many children and parents as possible join the study.

What will I, and my child, be asked to do?

- You will be asked to fill out two brief questionnaires (approx. 5 minutes each, attached):
  1. Your family education and work background

2. Scenario-based questions about intelligence and success/failure.

- Each child will have language development assessed using the *Test of Early Language Development.* These take approximately 10 – 15 minutes during normal preschool hours. These will be completed once in the winter/spring

- Each child will be asked a few scripted questions related to the concepts of success/failure, motivation, self-efficacy, achievement, knowledge, and awareness of mental states.

- Sawyer Fishing Game – This is an activity where each child will get a chance to "go fishing" in a game that involves a toy fishing rod and magnetic fish that they will try to catch. This activity will be used to see the language used during the game and whether or not the child believes they have succeeded at the game or not.

What are the possible risks and benefits of taking part in this study?
- The play sessions and child observations are all very fun, and similar to other age appropriate games and activities, and therefore have no more risk than everyday activities. The questionnaires you complete have questions that may cause discomfort. There is no compensation or direct benefit for participating in this study.

How will my privacy be protected?
- We will keep all participants' information confidential to the maximum extent of the law. Only the researchers and members of USM's Office of Research Integrity & Outreach will have access to the information.
- All information we collect will be coded with numbers so that names and personal information will never be together with data. Data will be kept in a secure location in the Psychology Department at the *University of Southern Maine.*
- No names will be used in any presentation or publication.
- A copy of your signed consent form will be maintained by the principal investigator for at least 5 years after the project is completed before it is destroyed. The consent forms will be stored in a secure location that only members of the research team will have access to and will not be affiliated with any data obtained during the project.
- All identifiable data will be destroyed after five years.

What are my rights as a research participant?
- Your participation is voluntary. If you choose not to participate, it will not affect your current or future relations with the USM or *Head Start.*
- You may skip or refuse to answer any question for any reason.
- Only children who express a clear interest in participating will be asked to join the study.
- You and your child are free to withdraw from this research study at any time, for any reason.
- If you choose not to participate there is no penalty to you and you will not lose any benefits that you are otherwise entitled to receive.
- The Institutional Review Board (IRB) for the Protection of Human Subjects at the University of Southern Maine has approved the use of human subjects in this research. This approval is indicated by the IRB date-stamp on this consent form. The IRB is responsible for protecting the rights and welfare of people involved in research.

Participant #_____   Preschool_____

Who may I contact with questions?

- The researcher conducting this study is Cristin McDonough at the University of Southern Maine. For questions or more information concerning this research you may contact her at 978.905.0604 or by email: cristin.mcdonough@maine.edu. You may also contact Robert Bruce Thompson, the faculty advisor, at rbthompson@maine.edu

- If you choose to participate in this research study and believe you may have suffered research related harm, please contact the researcher (above).

- If you have any questions or concerns about your rights as a research subject, you may call the USM Human Protections Administrator at (207) 228-8434 and/or email usmirb@usm.maine.edu."

You will be given a copy of this consent form.

Participant's Statement
I understand the above description of this research and the risks and benefits associated with my participation as a research subject. I agree to take part in the research and give permission for my child to participate.

Child's Name _____   Date of Birth _____

Parent or Guardian signature _____   Today's Date _____

Please Print name _____

Researcher's Statement

The participant named above had sufficient time to consider this information, had an opportunity to ask questions, and voluntarily agreed to be in this study.

Researcher's signature _____   Date _____

Printed name _____

Appendix A4 – Child Assent Script

Child's Assent Script

Researcher:
Hi [child's name] - I have two games to play today. One is a picture game, and the other is a fishing game. I was wondering if you'd like to give it a try?

It's going to take about 15 minutes and then we can come back and join the rest of the class.

Appendix B – Questionnaires

Appendix B1 – SES Measure

This questionnaire is to help me learn about the way parents interact with their children during typical activities around play and problems-solving. Please read the following scenarios and questions, while imagining yourself with your child in the situations described. Brief descriptive phrases are OK.

1. You are with your child while they are coloring, and he/she says something to indicate they made a "mistake." What would be your usual response (words/short phrases are OK).

2. At pick-up time on a typical day, what do you talk about with your child (word/short phrases describing questions, greetings, etc.)

3. Imagine your child is playing with blocks and attempting to build something quite difficult (e.g. a tall building). What do you say to encourage or motivate them?

4. In the same scenario, if your child's "building" falls down, how do you typically react?

5. Your child comes home and says that when playing a puzzle game today, other children did "better." How do you respond?

Turn Over – Questions on other side

Appendix B2 – Parent Achievement Scenario Questionnaire

For office use Partic Number_____
Date _____

Family Background Questionnaire to be completed by either parent.

1. Your Sex: Male _____ Female _____ Prefer not to answer _____
2. Your Date of birth _____ (month/day/year)
3. Who is/was the primary household provider when YOU were growing up.
   ____ Mother
   ____ Father
   ____ Equal/both

4. Please provide YOUR parents' marital/partner status when you were growing up (birth – 15)
   ____ Single (never married)
   ____ Married/long term partner
   ____ Divorced (raised by one parent)
   ____ Widow/widower

5. Educational Level of you, your spouse/partner and your parent/guardians:
   (Please check the highest level attained for EACH person

LEVEL OF SCHOOLING	YOUR MOTHER	YOUR FATHER	YOUR SPOUSE/PARTNER	YOU
up to 7ᵗʰ grade				
completed junior high school (Grade 8)				
some high school (Grade 9 – 11)				
high school/GED graduate (Grade 12)				
professional training (e.g. cooking)				
some college				
college or university graduate				
attended or completed graduate school				

FAMILY WORK INFORMATION:

PLEASE DESCRIBE OR NAME EACH PERSON'S PRIMARY JOB
(including work at home) (NO NEED TO NAME PLACE OF WORK)

YOUR MOTHER	
YOUR FATHER	
SPOUSE OR PARTNER	
YOU	

CHILDREN IN THE HOUSEHOLD:

How many children in total are you responsible for? _____

Please list each of their ages (youngest to oldest): _____

Appendix B3 – Parent Achievement Orientation Scales

Below is a series of statements and questions that parents might direct to their children to encourage them when playing or problem-solving (e.g. puzzles, building tasks). Please circle the number from 1 to 5 to indicate how often or how likely you might say these things. (think about the gist or overall meaning rather than exact words)

"You are really good at this." (when the results ARE NOT very successful)

1	2	3	4	5
never/very rarely	rarely	occasionally	fairly often	very often/ always

"I see you tried really hard at this." (when the results ARE NOT very successful)

1	2	3	4	5
never/very rarely	rarely	occasionally	fairly often	very often/ always

"You are really good at this." (when the results ARE very successful)

1	2	3	4	5
never/very rarely	rarely	occasionally	fairly often	very often/ always

"I see you tried really hard at this." (when the results ARE very successful)

1	2	3	4	5
never/very rarely	rarely	occasionally	fairly often	very often/ always

"How/Why did that happen/come out that way? (when the results ARE NOT very successful)

1	2	3	4	5
never/very rarely	rarely	occasionally	fairly often	very often/ always

"How/Why did that happen/come out that way? (when the results ARE very successful)

1	2	3	4	5
never/very rarely	rarely	occasionally	fairly often	very often/ always

Appendix C – Child Task Reflection Questions

Have you ever gone fishing before? Well would you like to try? Here's how the fishing pole works.
You're going to have five minutes to play the game, okay? I'm going to set a timer. Okay?

Things to say during the game:
- You were close to catching one!
- Do you want to keep trying?
- What else can you do?
- How're you feeling about that one?

After:
- Did you have fun?
- What colors did you get?
- Was this a hard game?
  - Why/why not?
- Did you try really hard?
  - What did you do?
  - Why/how?
- Did you do a good job?
  - Why/why not?
- How do you think other kids did/will do?
  - Why?
- What do you think it means to do a good job?
  - How do you know if you did a good job?
  - If they do not respond or understand, ask:
    - If I told you, "You did such a good job!" What would that mean?
- What do you think it means to be smart?

Thesis Submitted by   Cristin McDonough

      Psychology   Honors Program

Approved by

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      Department   Department of Psychology

Honors Director   Rebecca Nisetich, Ph.D.

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        Faculty