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ABSTRACT

Metacognition is a theoretical construct used to describe individuals' perceptions of their thinking processes and their own control over their thinking processes. This study examined the protocols of 78 undergraduates who responded to 3 questions from the Swanson Metacognitive Questionnaire: (1) What makes someone really smart? (2) How do children figure things out, like how to do something? and (3) Is there any reason why adults are smarter than children? Why? Two researchers examined the protocols independently and identified some themes. "Smartness" was largely described as having academic knowledge and common sense, with a genetic component. The dominant themes about children's intelligence were that they learn by observation, through asking questions, and by trial and error. Respondents indicated that adults had more life experiences and a larger knowledge base than children. These findings support suggestions in current psychological literature about differences in the thinking processes of children and adults. (Contains 3 tables and 11 references.) (Author/SLD)

Running Head: SMARTNESS

# Metacognitive Protocols: A Qualitative Study of Perceptions of "Smartness" of Adults and Children

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Paper presented at the annual meeting of the Mid-South Educational Research Association, November 15, 2000, Bowling Green, Kentucky.

Abstract

Metacognition is a theoretical construct used to describe individuals' perceptions of their thinking processes and their own control over their thinking processes. Despite its popularity recently, very little is known about how to assess metacognition, and there are few studies that look at qualitative analyses of what individuals report as their beliefs regarding metacognition. This study examined the protocols of 78 undergraduates who responded to three of the questions from the *Swanson Metacognitive Questionnaire* which were as follows: (a) What makes someone really smart?; (b) How do children figure out things, like how to do something? and (c) Is there any reason why adults are smarter than children? Why? Two researchers independently examined the protocols and identified the following themes. Smartness was largely described as having academic knowledge, common sense and having a genetic component. The dominant themes regarding children's intelligence was that they learn by (a) observation, (b) through asking questions, and (c) by trial and error. For the last question, respondents indicated that adults had more life experiences and a larger knowledge base than children. These findings support what current psychological literature suggests about differences in thinking processes of children and adults.

Metacognition is a theoretical construct used to describe individuals' perceptions of their thinking processes and their own control over their thinking processes (Swanson, 1990; Nelson, 1992; Forrest-Pressley, Mackinnon, & Waller, 1985). Largely derived from information-processing literature, metacognition plays a large role in how information is transformed and controlled as it is being learned. Despite its tremendous popularity in recent years, very little is known about how to assess metacognition, and there are few, if any, studies which look at qualitative analyses of what individuals report regarding various aspects of metacognitive awareness or beliefs. The present study examines protocols from a metacognitive assessment instrument and examines what themes or ideas emerge regarding individuals' beliefs regarding what "smartness" means. Secondly, this qualitative investigation will also view how adults view children's ways of knowing, and how adult competence in smartness or problem solving is different from children's.

Although a fair amount of research has investigated children's metacognitive processes (Sinkavich, 1995; Brown, Bransford, Ferrara, & Campione, 1983), there are fewer studies that investigate adult metacognitive awareness (Schraw & Dennison, 1994). In a recent study by Romainville (1994) in which he used structured interviews of adults regarding their awareness of their metacognition and their performance, he noted the *inter*relationship between the knowledge we have and our control over it. These processes must be interrelated and a source of influence over both. Thus, if we assume, as Swanson (1990) has, that how one feels about what it is to be smart must be related to effective problem solving, then one's conceptualization of what "smartness" is would provide some unique insights into what individuals thought were important in the

problem solving process. Such insights would also lend support to newer conceptions of intelligence such as has been proposed by Sternberg (1996).

Specifically, the research question investigated in this paper was as follows: Using a qualitative analysis of protocols, how would adults describe (a) smartness, (b) children's ways of knowing; and (c) the differences between adults and children's ways of knowing?

## Method

### Participants

Participants were 78 volunteer students enrolled in undergraduate courses in educational psychology at a medium-sized southern university. The mean age was 21.1 years (SD = 2.6). Most (87%) were female and classified as junior or senior level (62%). Sixteen were African-American (20%), 77% were Caucasian, and two represented other ethnic backgrounds. Of declared majors, elementary education (33%) and educational psychology (49%) were most frequently represented. Participants' self-report of current grade point average yielded a mean of 3.0 (SD = 0.5) on a scale from 4 (A) to 0 (F). By self-report, composite ACT scores of the participants at entry into college were close to the national norm (M = 20.8, SD = 3.6).

### Instrument

The Swanson Metacognitive Questionnaire (SMQ) (Swanson, 1990) is a 17-item, instrument used to assess metacognition within a general framework or domain of problem solving. Modified by Swanson from the work of Kretzer, Leonard, and Flavell (1975) and also Myers and Paris (1978), the SMQ was originally developed for children in which the questions were read and the child's answers were recorded. From

Swanson's original pilot study, an internal consistency estimate was reported as .87. Each question is designed to be scored in a response category from 1 to 5 depending on the strength of the metacognitive awareness. The total score is a summation of each of the scores of metacognitive strength from the seventeen items. In the present study, the SMQ was presented in paper and pencil form and the respondents answered each question in writing which is the adult experimental form of the SMQ that Swanson is now using (personal communication, March, 2000). The entire battery took an average of 22 minutes to complete. For the present study, only 3 of the seventeen items were chosen for detailed analysis of the participants' protocols. Two of the three questions focus on what Swanson refers to as person variables with one question (#2 below) focusing on problem-solving strategy (1990). These three questions were:

1. What makes someone really smart?
2. How do children figure out things, like how to do something?
3. Is there any reason why adults are smarter than children? Why?

Procedure

Volunteer participants were given the paper and pencil form of the entire SMQ with the directions to answer the questions as completely as possible. No time limits were imposed, although all subjects completed the entire instrument within 30 minutes. After the data was collected, the above three questions were chosen for detailed analyses because of the counterpoints they present in how people describe adult-child differences. Two researchers independently were asked to code each of the protocols for dominant themes. Each researcher read and evaluated each protocol and then assigned it to a theme of their own definition. After each protocol had been independently analyzed and coded,

two researchers compared their respective lists and compiled the data as presented in Tables 1-3. On the most dominant themes, the researchers were in perfect agreement regarding classification. On the less dominant themes, there was some slight differences in agreement mostly due to connotative differences in wording. However, inter-rater agreement was above 85% for all of the major themes.

## Results and Discussion

When analyzing the responses of the participants, several common themes emerged with regard to the questions of interest. When asked their opinions of 'smartness', most people believed that the concept was composed of several factors. The most common response was that knowledge, such as 'book knowledge' or 'academic knowledge' was one of the components that made someone smart. Other people specifically denied that 'book knowledge' made people smart; really smart people had 'street smarts' or common sense. One respondent asserted "...Smartness also isn't involved in being 'book smart'. One can be smart and not make good grades...". Supportive environments and enriching experiences could lead to someone becoming smart. Effortful productive learning, such as studying hard or learning a variety of materials, could make someone smart. Other frequently mentioned topics included genetic factors, social factors, problem solving, logical thinking and other abilities. One of the main findings of the study, however, is that being smart is not determined by solely one factor. A variety of causes contribute to an individual being considered smart. For one of the participants, the response given could be categorized into several of the thematic categories:

> "I believe there are two kinds of smartness which are book smart and common sense smart. When a person is book smart, then they have the capability to memorize, audio learner and is biologically enhanced. Also, it is not difficult for someone to take a test without studying. Common sense smart is a combination of making quick decisions and to use their past experiences in the future."

This student's response covers academic knowledge, common sense, genetics, test-taking ability, life experience, problem solving/decision making and ability to learn/understand. What this and many other respondents answers showed were that there was no one factor that could alone account for all 'smartness'. Of those responding 'book smart' or 'street smart', 20 participants listed both as factors of intelligence. Of the 76 responses to the question, over three-fourths could be categorized by more than one theme. Arguably, the themes that emerged can be further grouped into categories such as external factors (genetics, environment/experience), cognitive abilities (ability to learn, problem solving, ability to think logically), academic factors (academic knowledge, test-taking abilities) and personal factors (common sense, effort, social abilities, interest, desire). In examining these categorizations of responses, one can conclude that the participants believed that it was possible to be smart in different ways, as even these broad categories were mentioned multiply within many of the answers given. These findings support many of the views of intelligence that feel it is multiply determined. Sternberg (1996) asserted that there was more to intelligence than a score on an IQ test. He focused more on what he called *successful intelligence*. The respondents to the questionnaire would undoubtedly agree with him, since only one of the 76 made any mention of an IQ test, and test taking ability was one of the least mentioned themes. Their definitions of 'smartness', while including mentions of static knowledge, or what Sternberg would call *inert intelligence*, were rife with examples of creative and practical intelligence. Woolfolk (1998) described Howard Gardner's theory of multiple intelligences which included separate categories of intelligence. Some of these categories, such as the interpersonal intelligence and the logical-mathematical intelligence, were reproduced in the responses of the participants.

The responses for the other two questions examined regarding children's learning and the comparison of children to adults were more centered, with most answers being represented by one or two major themes. With regard to children's learning how to do something, the most responses echoed the idea held by most developmental theorists that children learn by doing, experimenting, actively interacting with the environment. This was consistent with Bjorkland's (2000) interpretation of Piaget's theory that children are intrinsically active and only through direct interaction with the environment does development occur. Bjorkland also reviewed the work of Vygotsky, which defined the sociocultural perspective that development takes place through the social interactions that take place. This perspective was modeled through the frequent responses that children learn through observation and modeling, or through the direct social interaction of asking another. The question of adults being smarter than children in some ways, but not others, supported the original responses to the question of what makes someone smart. The themes of more knowledge and learning from experience were some of the themes repeated from the ideas of what made someone smart. Other ideas that were not previously mentioned were ideas about maturation and accumulated wisdom.

In general, the findings were that the participants' ideas echoed the ideas of many theories that are seen in psychological studies. The theories of multiply determined intelligence or multiple types of intelligence were supported by the respondents. Many of the respondents repeated their beliefs about what makes someone smart when asserting reasons why adults may be smarter than children are. Also, the ideas that children learn by acting and experimenting on the environment, or that cognitive development takes place in social situations, are old and well developed theories by renowned psychologists.

One could then conclude that the theorists were 'smart', because based on the responses of the participants, their ideas were common sense.

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Table 1
*Dominant themes for question 1: What makes someone really smart?*

| Dominant themes | Percentage of Respondents Mentioning Theme | Example Comment |
|---|---|---|
| Knowledge: Book sense/ Academic knowledge | 50% | "Someone can be book smart which is when they are able to remember or learn knowledge from books".<br><br>"If they have a lot of knowledge about a lot of things." |
| Street smarts/ common sense | 37% | "...I also think that really smart people should have common sense as well."<br><br>"A person may have street smarts which means this person can deal with everyday happenings around them." |
| Experience/ Environment | 17% | "...the way they are raised at home and how much their parents helped them along with the teaching and dedication to their school work."<br><br>"Lots of experience and interaction with their surroundings." |
| Effort/ Productive Learning | 16% | "Being alert at all times while in class, having better understanding of what is being taught and taking out enough time to study and prepare."<br><br>"...by studying hard and understanding the material they study." |
| Problem solving/ Decision making | 16% | "Their ability to problem solve, to think differently or the same, to keep order and to see issues from all sides without judgment."<br><br>"...or simply making the right decision about something." |

| | | |
|---|---|---|
| Application of knowledge | 16% | "What they have learned and the way they apply it." |
| | | "When they have knowledge and use it in an intelligent way." |
| Genetics | 14% | "Sometimes, it can be inherited..." |
| | | "...They may have smart parents." |
| Social/interpersonal | 13% | "If a person knows how others think and can get along with other people." |
| | | "A really smart person is one who listens when talked to, gives advice when needed and knows when to be quiet..." |
| Ability to learn/understand | 12% | "The way a person has the ability to really learn from their mistakes rather than repeating the same ones." |
| | | "...Understanding of a given complex problem or situation." |
| Logical thinking | 11% | "A smart person is someone that can think logically and not always look to a book to find the correct answer. I believe that making good grades does not necessarily make you smart. I think there are a lot of factors that make up one's 'smartness'." |
| | | "He/She is able to think logically in any situation." |
| Interest/desire | 9% | "...One who believes in their dreams." |
| | | "...whereas pure will and desire to achieve makes a person smart." |
| | | "...If you are interested in that subject and you want to do that, it makes you smart..." |
| Test taking ability | 5% | "...You necessarily have to score a 36 on the ACT to be smart, too." |

| | | |
|---|---|---|
| | | "…They usually make good grades and score exceptionally high on standardized tests…" |
| Open mind | 4% | "A combination of common sense, life experience and an open mind." |
| | | "Someone who is open to know things and learn from experiencing." |
| Creativity | 4% | "…Being able to be creative in different situations." |

Table 2

*Dominant themes for question 2: How do children figure out things, like how to do something?*

| Dominant themes | Percentage of Respondents Mentioning Theme | Example Comment |
|---|---|---|
| Trial and error<br>Hands-on, experimenting<br>Practice | 67% | "They experiment for themselves hands on."<br><br>"By trying over and over again." |
| Modeling/observation | 42% | "They watch other people do things and they imitate the others."<br><br>"They rely a great deal on their environment such as modeling. They watch those around them." |
| Asking an adult/peer | 24% | "By asking other people around them."<br><br>"By someone giving them instructions or directions." |
| Reasoning/cognitive skills, common sense | 11% | "Use their brain to think."<br><br>"By thinking logically about the problem itself." |

Table 3
*Dominant themes for question 3: Is there a reason why adults are smarter than children? Why?*

| Dominant Themes | Percentage of Respondents Mentioning Theme | Example Comment |
|---|---|---|
| Past experience (Age)/ Learning from mistakes | 82% | "Adults are more experienced in different situations, and they have Learned more ways of handling situations." |
| | | "We have experienced more and hopefully learned from our mistakes." |
| More common knowledge | 25% | "Yes, because they have more prior knowledge to connect ideas to." |
| | | "Yes, because adults have lived longer and have accumulated more knowledge just by living." |
| | | "We have been taught more." |
| Brain maturation | 15% | "Adults are smarter than children because an adult's mind has developed more than a child's." |
| | | "Yes, we have more experience and our brains are more mature." |
| Wisdom | 5% | "Adults simply have more wisdom." |
| | | "Wisdom and experience are two main factors, but how they use what they know may determine how smart they are." |
| | | "Adults are not smarter than children, just wiser and more experienced." |

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