DO YOUNG CHILDREN ALWAYS SAY YES TO YES-NO QUESTIONS?

A Metadevelopmental Study of the Affirmation Bias

by

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Abstract

The present studies investigated whether a response bias exists in 2- to 5-year-olds when they are asked yes/no questions. In Experiment 1, children were asked both comprehensible and incomprehensible yes/no questions concerning familiar and unfamiliar objects. Comprehensible questions are questions that young children have no problem understanding while incomprehensible questions are questions that contain 'nonsense' words. In Experiment 2, children were asked both comprehensible and incomprehensible questions concerning expected and unexpected actions performed with only familiar objects. Expected actions are actions that are commonly associated with a particular object (e.g. bouncing a ball) while unexpected actions are actions that are rarely if ever performed with a particular object (e.g. kicking a toothbrush). With respect to comprehensible questions, Experiment 1 revealed that 2-year-olds displayed an affirmation bias in response to questions concerning both familiar and unfamiliar objects while 3-year-olds only displayed an affirmation bias in response to those concerning unfamiliar objects. In response to questions concerning familiar objects, 3-year-olds did not demonstrate any response bias at all. Four- and 5-year-olds did not demonstrate any response bias at all in response to comprehensible questions. With respect to the incomprehensible questions, 2-year-olds demonstrated an affirmation bias in response to questions concerning both familiar and unfamiliar objects. Three-year-olds did not demonstrate a bias at all when asked questions concerning unfamiliar objects, but showed a significant disconfirmation bias when asked questions concerning familiar objects. Four- and 5-year-olds displayed a significant disconfirmation bias when answering

incomprehensible questions concerning both types of objects. Experiment 2 revealed that with respect to the comprehensible questions, 2-year-olds demonstrated an affirmation bias while the 3-, 4-, and 5-year-olds did not display any response bias at all. With respect to the incomprehensible questions, 2-year-olds demonstrated an affirmation bias while the 3-, 4-, and 5-year-olds demonstrated a disconfirmation bias. The findings from the present studies have implications for the development of a proper methodology for questioning children and also for obtaining children's testimony in the courtroom.

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Chapter 1

Introduction

Over the past decade, a small but growing number of researchers have begun to focus on the methodologies involved in questioning children. Despite this recent increase in interest, empirical research regarding the impact of questioning on children remains limited. This limitation is due to the fact that the majority of this research has solely examined the impact of questioning on children within forensic interview settings (Bjorklund, Bjorkland, Brown, & Cassel, 1998; Cassidy & DeLoache, 1995; Ceci & Bruck, 1995; Goodman, 1984; Poole & Lamb, 1995). In contrast, little research has been conducted within developmental research settings. Although there are similarities between the forensic setting and the developmental research setting, there are substantial differences between a forensic interview and a developmental research interview. A forensic interview is often unstructured, or at most, semi-structured, because prior to the interview, forensic interviewers do not often know the details of the event about which the child is being interviewed. As a result, interviewers cannot usually venture a guess as to how children will respond to their questions and they must therefore be flexible in their choice of questions and in their ordering of those questions. It is only in this manner that the interviewer will accomplish the primary goal of their interview - to obtain as much information as possible, as accurately as possible.

Alternatively, developmental research often requires a fully structured interview in which all of the child participants are asked the same questions and in which the order of those questions is determined a priori. This is done so that differences found among

children cannot be attributed to the differences in the questions asked. Despite the differences between the two types of interviews, findings from forensic interview studies provide a useful foundation for developmental researchers to develop hypotheses and design procedures for the empirical study of the impact of questioning on children in developmental research settings.

Although methodology figures prominently in the advancement of developmental psychology and empirical methods are essential in research, developmental researchers have neglected to use empirical methods to investigate the way in which children are studied. Despite the fact that theoretical discussions concerning the general implications of the impact that developmental research has on children do exist (Donaldson, 1991; Siegal, 1997), the majority of existing studies concerning methodological issues are limited to a specific developmental area. Few empirical studies have examined whether particular developmental methodologies identified in one area of research can be generalized to those in other areas of research. For example, many researchers have shown that the same children will perform differently on Piaget's conservation tasks depending on the questions that they are asked and the way in which the tasks are presented (see Donaldson, 1982, 1991, for examples). Frequently, the lessons learned from these studies on Piagetian tasks are not generalized empirically to other areas. To date, the only exception is the studies that have been conducted on children's understanding of informed consent (e.g. Abramovitch, Freedman, Thodren, & Nikolich, 1991). Metadevelopmental research, defined as the empirical investigation into how developmental phenomena are studied and whether and how certain common

developmental research procedures impact upon its child participants, has not yet received the attention it deserves.

The present study was conducted to bridge the gap in the literature and to stimulate further metadevelopmental research. Specifically, the present study focused on questioning and how questioning procedures influence young children's responses in a developmental interview. This topic was chosen for two main reasons: First, although a comparatively substantial amount of research has been conducted in the last twenty years to examine the impact of questioning on children in forensic interview settings (Bjorkland, Bjorkland, Brown, & Cassel, 1998; Cassidy & DeLoache, 1995; Ceci & Bruck, 1995; Goodman, 1984; Poole & Lamb, 1995), limited empirical research has been conducted in developmental interview settings. Second, and more importantly, questioning is often the primary method used to obtain information from young children in all contexts (and especially in cognitive development research). Questioning is the most popular means of extracting information from young children because it is convenient and efficient. In fact, in many cases it is difficult to obtain information from children in any other manner.

To support the claim that questioning is the most popular method of obtaining information from preschool children, the 1360 studies published between the years of 1995 and 1998 in Child Development and Developmental Psychology were examined. Of these 1360 studies, 509 (37%) involved children between the ages of 2 and 6 years. Of these 509, 377 (74%) used questioning techniques. This result demonstrates the importance of questioning in developmental research involving young children. Of all

questions asked in these 377 studies, "how" questions represented 13.8% (including "how much" and "how many", which represented 3%), and all forms of "wh" questions, including "what," "where," "when," which," and "why," represented 42.9%. Yes/no questions (yes/no questions) were used the most frequently, representing 43.3% of all questions asked. The importance of the investigation into how yes/no questions impact upon children in developmental interviews is readily apparent.

The present study examined whether young children display a response bias when answering yes/no questions in a developmental research context. There are four main reasons for focusing on yes/no questions. First, as indicated in the above survey, this type of question is the most commonly used in current developmental research involving preschool children. In fact, it also is used widely in applied settings (e.g., child abuse investigations, Warren, Woodall, Hunt, & Perry, 1996). Second, it is well documented that children tend to produce and comprehend yes/no questions before any other type of question - at 2 years of age (Bloom & Lahey, 1978; Brown, 1973; Ervin-Tripp, 1970; Ingram & Tyack, D, 1979; Tyack & Ingram, 1977).

Third, for over half a century, researchers have extensively studied the impact of yes/no questions on participants' responses (for reviews, see Krosnick & Fabrigar, in press; Schwarz, 1999). Despite the fact that this research has almost solely focused on adult participants' responses to questions in questionnaires, such research provides a rich empirical and theoretical foundation for understanding children's response tendencies to yes/no questions in developmental research settings. For example, most adult studies have reliably demonstrated that adults display a clear affirmation bias when asked yes/no

questions. According to Krosnick and Fabrigar (in press), this bias is a form of acquiescence bias manifested in the yes/no question context. An acquiescence bias refers to the endorsement of an assertion in a question, regardless of the content of that assertion. In the case of yes/no questions, this bias is manifested as responding with "yes" regardless of whether the respondent believes the answer should be affirmative. Over the years, a number of factors that contribute to the adult affirmation bias have been documented. These factors include task difficulty, knowledge level, gender, situation, and cognitive skills (Krosnick & Fabrigar, in press; Schwarz, 1999). The knowledge of such factors should be instructive for formulating hypotheses regarding children's responses to yes/no questions. Furthermore, a number of explanations for this bias have been put forward, some of which may also be particularly relevant to the interpretation of children's responses. For example, the social desirability explanation that suggests respondents say "yes" to be polite could be especially applicable to the study of young children's response tendencies.

Fourth and most importantly, as mentioned above, there is a common belief among developmental researchers that asking young children "yes/no" questions in research settings or in applied settings is problematic. Despite the general consensus among researchers that there are problems inherent in yes/no questions, there is little consensus in the literature as to whether these problems take the form of an affirmation bias or a disconfirmation bias. Many researchers have found that young children display an affirmation bias toward yes/no questions (Fay, 1975; Horn & Myers, 1978; Peterson & Biggs, 1997; Peterson, Dowden, & Tobin, 1999; Poole & Lindsay, 1995). Conversely,

others have found that children display a disconfirmation bias toward yes/no questions, for example, Warren, Boyd, and Walker (1992). Still, some researchers have failed to find a bias at all (Brady, Poole, Warren, & Jones, 1999).

Fay (1975) was one of the first researchers to reveal the potentially problematic nature of yes/no questions. He posed "nonsense" questions, for example, "El camino real?", to 3-year-old children and found that accompanying these utterances with a rise in intonation led 62% of the children to respond affirmatively. According to Fivush, Peterson, and Schwarzmueller (in press), it is obvious that "young children have a strong bias to respond to yes/no question intonation, even when they do not understand the question's meaning" (in press).

In 1978, Horn and Myers examined 2- and 3-year-olds' ability to use pictorial cues to help them remember the location of hidden objects. They discovered that the children often resorted to "yes" responses when they did not know where the object was hidden. Similarly, Peterson and her colleagues (Peterson & Biggs, 1997; Peterson, Dowden, & Tobin, 1999) found that young children between the ages of 3 and 5 years were more likely to respond with "yes" rather than "no" to yes/no questions in simulated forensic interviews. Finally, Poole and Lindsay (1995) posed yes/no questions concerning novel and previously viewed science demonstrations to preschoolers and found that the children responded affirmatively to 62% of the questions concerning the novel demonstrations.

In direct contrast to the affirmation bias is what Brady et al. (1999) have labeled a "nay-saying" bias - or the "tendency to say 'no' indiscriminately" (p. 48). Warren, Boyd,

and Walker (1992) discovered that children often answered "no" during sexual abuse interviews to such questions as "Has anyone ever touched you?" According to Brady et al. (1999), "not only are these negative answers unlikely to be strictly true.... but the children indicated by their answers later in the interviews that the correct answers should have been affirmative" (p. 48).

There are several possible reasons for children to display a "nay-saying" bias. First, during these types of interviews, the children may be embarrassed and upset and decide to deny all occurrences. Second, it may be because they have learned that by saying "no" they can terminate the questioning (Peterson & Biggs, 1997). Third, they may have misinterpreted the question, or may have interpreted certain words in the question in a more restrictive manner than adults (Brady et al., 1999). Finally, it could simply be that children prefer to say "no" all of the time (e.g. to show noncompliance).

The widely held notion that young children display a response bias when answering yes/no questions has been disputed altogether by the findings in Brady et al.'s (1999) study. The purpose of this study was twofold: First, it was designed to determine whether an affirmation bias exists in young children's responses to yes/no questions. Second, it set out to determine the factors that possibly contributed to this bias, if it indeed existed. Children were shown a video clip of children playing, with one of the children taking a toy away from a baby. After the video was over, the children were asked varying yes/no questions about the clip. Brady et al. (1999) found that there was no clear response bias evident in either the younger group (37 to 64 months) or the older group (65 to 95 months).

There are several possible reasons for the inconsistencies regarding the affirmation bias in the literature. First, there is the possibility that the subject matter for which children display or do not display an affirmation bias tends to vary from one study to another. Different children may have varying levels of knowledge or familiarity with the issue about which they are being questioned in different studies. Research using adults as participants has shown that the overall difficulty level of a task is closely related not only to the presence or absence of the acquiescence bias, but also to its magnitude (Krosnick & Fabrigar, in press). It has been found that this bias is often suppressed when the difficulty level for the participants is low. In addition, the respondent's level of knowledge concerning the information asked by each yes/no question is closely related to the affirmation bias: an affirmation bias tends to occur when the respondent is not knowledgeable about the information (Krosnick & Fabrigar, in press). Therefore, it is possible that differences in task difficulty lead to discrepancies in the findings in the literature.

A second possibility is that children may have an affirmation bias in their answers to questions regarding one particular issue (e.g., the properties of an object) but not in those to questions regarding a different issue (e.g., children's attitude toward the object). Because the aforementioned studies questioned children on a variety of issues and the issues covered by the questions varied from one study to another, it is possible that an affirmation bias, if one exists, may be suppressed in one study and manifested in another.

A third possible reason for the discrepancies in the literature is that children at different ages may have different response tendencies to yes/no questions. Peterson and

her associates cross-sectionally studied children from 36 to 60 months of age and reported that the children as a group showed an affirmation bias. Brady et al. (1999) studied children between 3 and 7 years of age who were divided into a younger (37-64 months) and an older (65-95 months) group. No systematic response bias was found for either age group. It should be noted that both studies failed to examine whether 3-, 4-, 5-, 6-, and 7-year-olds have different response biases respectively.

The present study was conducted to clarify the inconsistencies in the literature regarding the affirmation bias and to delineate conditions in which this bias may or may not occur. Children between 24 and 72 months of age were recruited and divided into four age groups: 2-year-olds, 3-year-olds, 4-year-olds, and 5-year-olds, to determine whether the different age groups had different response tendencies. Specifically, the present study focused on whether young children display an affirmation bias when asked yes/no questions concerning the properties of an object and also when asked yes/no questions concerning actions involving familiar objects. The choice of object properties and actions performed with objects as the foci of questioning is motivated by language development literature that suggests that children are familiar with and interested in object names and properties and also actions performed with such objects (e.g., Nelson, 1973). In addition, many cognitive development studies, when involving young children, probe children's understanding of objects, their properties, and the actions performed with them. Moreover, as mentioned above, children may have different response tendencies to questions concerning different entities and their attitude toward them (e.g., objects, actions). Given that limited evidence exists as to whether children have any specific bias

toward any one of the entities, focusing on objects and actions serves as a starting point to the investigation into young children's response tendency in the context of developmental research.

Two experiments were conducted. Experiment 1 examined whether an affirmation bias exists when young children are asked yes/no questions concerning the functions and properties of familiar and unfamiliar objects. Experiment 1 also examined whether this affirmation bias, if it exists, is more pronounced when children are knowledgeable about an object than when they are not. Children were presented with objects that were either familiar or unfamiliar. This study represented a typical cross-sectional developmental study in which children of different age groups are asked questions to assess their knowledge of certain issues. Typically, to obtain a developmental picture, developmental researchers use tasks that can be easily accomplished by children at one age but not at another because the tasks purportedly require the knowledge that the second age group does not possess (e.g., the Piagetian conservation tasks).

In Experiment 1, children were presented with a set of eight objects, four of which were familiar to them and four of which were unfamiliar to them. For each object, children were asked one "yes" question, one "no" question and two "nonsense" questions. "Yes" questions are those for which yes is the correct response, "no" questions are those for which "no" is the correct response, and "nonsense" questions are those that use nonsense words in the question and thus, have no real correct answer. To ensure that all children understood each of the questions, a simple questioning format was used, for example, "Is this X", which all children above 2 years of age are able to understand

(Bloom & Lahey, 1978; Brown, 1973; Ervin-Tripp, 1970; Ingram & Tyack, 1979; Schuman, Bala, & Lee, 1999; Tyack & Ingram, 1977).

Experiment 2 examined whether an affirmation bias exists in young children's responses when they are asked yes/no questions concerning both expected and unexpected actions performed with familiar objects. Experiment 2 also examined whether this bias, if one exists, is more pronounced when children are asked yes/no questions concerning actions that are typically associated with certain objects (i.e. expected actions) than when they are asked questions concerning actions that are not typically associated with those objects (i.e. unexpected actions). Because children's response tendencies may vary according to what they are questioned about, Experiment 2 expanded upon Experiment 1 by focusing on actions performed with particular objects and not solely on the objects themselves.

In Experiment 2, children were shown six action-object pairs, three of which were expected (actions that are typically performed with the objects, e.g. bouncing a ball) while the remaining three were unexpected (actions that are rarely, if ever, performed with the objects, e.g. kicking a toothbrush). For each action-object pair, the children were asked one "yes" question, one "no" question and one "nonsense question". The same simple questioning format that was used in Experiment 1 was also used in Experiment 2.

Chapter 2

Experiment 1

The present study examined whether an affirmation bias is present in young children's responses to yes/no questions concerning familiar and unfamiliar objects. There were three hypotheses for the present experiment. First, it was hypothesized that the children would display a significant affirmation bias. Second, it was hypothesized that this bias would be stronger when children were at a younger age. Finally, it was hypothesized that the affirmation bias would be more pronounced in children's responses to questions concerning unfamiliar objects than in children's responses to those concerning familiar objects.

Method

Participants

Participants were twenty 2-year-olds (12 males and 8 females; mean age = 2;6; age range = 2;1 – 2;11), twenty 3-year-olds (9 males and 11 females; mean age = 3;7; age range = 3;1 – 3;11), twenty 4-year-olds (11 males and 9 females; mean age = 4;5; age range = 4;1 – 4;11) and twenty 5-year-olds (9 males and 11 females; mean age = 5;7; age range = 5;1 – 5;11).

Materials

Materials were 8 objects. Based on pilot testing, four of the objects were designated as "familiar" to children and four as "unfamiliar" to children. The "familiar" objects were a purple toothbrush, a key, a white plastic spoon, and a red ball. The

"unfamiliar" objects were a metal tire pressure gauge, a blue plastic wall anchor, a computer CPU, and a metal clevis.

Procedure

Children were interviewed individually in their schools or day care centers. Each child first took part in a pretest session to determine whether they were familiar with the objects that were designated as "familiar" and unfamiliar with the objects that were designated as "unfamiliar". In the pretest session, the experimenter chose one of the 8 objects listed above and asked children to identify their name and function. When children failed to identify a particular unfamiliar object, the experimenter informed them of its name and function immediately. They were then asked to repeat the name and function of the object. This procedure ensured that the children, while unfamiliar with the object, had at least some knowledge of the unfamiliar object.

After the pretest, children proceeded to the testing session. They were randomly assigned to one of the two orders of questioning. In the first order, the experimenter chose one object from the 4 familiar objects and asked 4 questions about it, which was followed by the experimenter randomly selecting an object from the 4 unfamiliar objects and asking 4 questions about it. The experimenter continued to alternate between the familiar and unfamiliar objects until all questions about the eight objects had been asked. In the second order, the experimenter began with questions about an unfamiliar object, followed by questions about a familiar object, and so on. For each object, the experimenter asked questions concerning its properties and function. One of the questions was a Yes-question (correct answer was yes), one was a No-question (correct answer was

no), and the remaining two were "Nonsense" questions (no correct answer as the question contained a 'nonsense' word). For example, when the ball was selected by the experimenter, the following questions were asked: 1) Is this round? 2) Is this black? 3) Is this for counbing? 4) Is this for making socokie? For the first question, the correct answer is "yes"; for the second question, the correct answer is "no"; for the last two questions, there is no real correct answer. The words used in the Yes- and No- questions were based on the word acquisition literature (Fenson, Dale, Reznick, Bates, Thal, & Pethick, 1994). Most children 2 years of age and older are able to comprehend and even use these particular words in their conversations with others (see Appendix C for all questions asked). For each object, the child was informed that an "I don't know" response was permissible. The experimenter recorded the verbal responses of each child.

Results

For the pretest, a score of "1" was assigned if children correctly named the object, and another score of "1" was assigned if they gave a correct description of its function, prior to feedback. The two scores were summed to obtain a familiarity score for each object with a maximum score of 2 and a minimum score of 0. All of the children were familiar with the objects designated as "familiar". None of the children were able to name or identify the function of the four "unfamiliar" objects with the exception of one five-year-old who correctly identified the function of the CPU.

With regard to the "I don't know" response, none of the children responded with "I don't know" when answering the regular yes/no questions concerning familiar objects. In the unfamiliar object condition, only one five-year-old gave an "I don't know"

response. When responding to the nonsense questions, in the familiar object condition, none of the 2- and 3-year-olds, two 4-year-olds, and six 5-year-olds gave the "I don't know" response to at least one regular word question. In the unfamiliar object condition, none of the 2- and 3-year-olds, one 4-year-old, and seven 5-year-olds responded "I don't know" to at least one nonsense question. In the present experiment, "I don't know" responses accounted for only 3% of all responses.

Table 1 shows the percentage of "Yes" and "No" responses to the Yes and No questions in the regular word condition and to the Nonsense questions in the nonsense word condition. The percentages in Table 1 were obtained in the following manner: For each age group, the number of yes, no, and "I don't know" responses to the Yes and No questions were counted. The resulting number represented the numerator in each percentage. The total number of the Yes and No questions asked in each condition was multiplied by the number of participants in each age group in order to obtain the denominator for each percentage. By dividing the numerator by the denominator and multiplying by 100, the percentage of yes or no responses for each type of question was calculated. For the questions in the nonsense word condition, the numerator of the percentages was the total number of yes or no responses to the nonsense questions for each age group and the denominator was the total number of nonsense questions in each condition multiplied by the number of participants in each age group.

Inspection of the results of the regular word condition in Table 1 suggests that most children tended to respond "yes" to the Yes questions in the familiar object condition. For the No questions, most children responded "no," but 2-year-olds displayed

Table 1.

Percent of "yes" and "no" responses to the Yes, No, Nonsense questions and means (standard deviations) of Response Bias Scores in Experiment 1

Condition	Question Type	Age group			
		2 years	3 years	4 years	5 years
Familiar	Yes-question				
Objects	"Yes"	88.8	92.5	98.8	100.0
	"No"	11.2	7.5	1.2	.0
	No-question				
	"Yes"	50.0	8.8	7.5	0.0
	"No"	50.0	91.2	92.5	100.0
	Response Bias Score I	1.55 (.37)	.05 (.22)	.25 (.14)	.00 (.00)
	Nonsense-question				
	"Yes"	71.9	31.9	27.5	13.8
	"No"	28.1	68.1	71.3	66.2
	Response Bias Score II	1.75 (.45)	-1.45 (.55)	-1.78 (.59)	-3.07 (.51)

Table 1. (Continued)

Condition	Question Type	Age group			
		2 years	3 years	4 years	5 years
Unfamiliar	Yes-question				
Objects	"Yes"	93.8	88.8	96.2	91.2
	"No"	6.2	11.2	3.8	8.8
	No-question				
	"Yes"	71.2	37.5	17.5	10.0
	"No"	28.8	62.5	82.5	87.5
	Response Bias Score I	2.60 (.37)	1.05 (.43)	.55 (.30)	.05 (.20)
	Nonsense-question				
	"Yes"	86.9	45.6	31.2	8.8
	"No"	13.1	54.4	66.9	66.9
	Response Bias Score II	2.95 (.35)	-.35 (.65)	-1.37 (.67)	-3.23 (.32)

a stronger tendency to give "yes" responses than did the 3-, 4- and 5-year-olds. In the unfamiliar object condition, most children gave "yes" responses to the Yes questions. For the No questions, 2-year-olds displayed a stronger tendency to respond "yes" than did the 3-, 4-, and 5-year-olds who tended to respond "no".

For the nonsense word questions, in the familiar object condition, most 2-year-olds responded "yes". In contrast, the majority of 3-, 4-, and 5-year-olds responded "no". In the unfamiliar object condition, the majority of responses from 2-year-olds were affirmative, while the majority of responses from 4- and 5-year-olds were negative. The responses of the three-year-olds were divided: almost half of their responses were "yes" and the other half were "no". Overall, it appeared that younger children had a stronger affirmation bias in response to the Yes and No questions than older children. For the nonsense word questions, younger children had an affirmation bias while older children had a disconfirmation bias. This discrepancy in responses between the age groups appeared to be more pronounced in the unfamiliar object condition than in the familiar object condition.

To confirm the above observation, a Response Bias Score was calculated for each child (referred to henceforth as Response Bias Score I). To do so, a Yes Score and a No Score were first obtained. The Yes Score was obtained by assigning a score of "1" to any yes answer given in response to a Yes question and a score of "0" to any no answer given in response to a Yes question. The maximum Yes Score for each child in both the familiar and unfamiliar object conditions was 4 (there were 4 objects with one Yes

question each), while the minimum Yes Score was zero. The No Score was obtained by assigning a score of "1" to any no answer given in response to a No question and a score of "0" to any yes answer given in response to a No question. The maximum No Score for each child in both the familiar and unfamiliar object conditions was also 4, while the minimum No Score was zero. The No Score was then subtracted from the Yes Score, resulting in a Response Bias Score with a maximum score of 4 and a minimum score of -4 (Table 1). The Response Bias Score for a child failing to demonstrate any bias should be zero. A positive Response Bias Score suggests an affirmation bias, while a negative Response Bias Score suggests a disconfirmation bias or a nay-saying bias.

A different procedure was used to obtain the Response Bias Scores for the nonsense word questions (referred henceforth as Response Bias Score II). A score of "1" was assigned to any yes response to a nonsense word question while a score of "-1" was assigned to any no response to a nonsense word question. The Response Bias Score II was calculated by adding the values together. Therefore, the maximum raw bias score in response to the nonsense questions in each condition was "8" (2 questions for each object with a total of 4 objects in the familiar or unfamiliar object condition), while the minimum bias score was "-8". In order to make the Response Bias Scores II comparable to the Response Bias Scores I, the Response Bias Scores II were divided by 8 and then multiplied by 4. Thus, the maximum raw bias score in response to the nonsense questions in each condition was 4 while the minimum bias score was -4. Again, a score of zero indicates that the child failed to demonstrate any bias, a positive score indicates an affirmation bias, and a negative score indicates a disconfirmation bias. The means and

standard deviations of the Response Bias Scores I and II for each age group in the familiar and unfamiliar object conditions are given in Table 1.

With respect to the Response Bias Scores I, a 4 (age) x 2 (familiarity) mixed-design ANOVA was conducted, with the familiarity factor as the repeated measure. The age effect was significant, $F(3, 75) = 13.24$, $p < .001$. The familiarity effect was also significant, $F(1, 75) = 15.93$, $p < .001$. The mean Response Bias Score I for the familiar condition (.47) was lower than that for the unfamiliar condition (1.08). The interaction between age group and familiarity was also significant, $F(3, 75) = 2.75$, $p < .05$.

A post-hoc test was run in order to determine the differences between the four age groups. A Least Significant Difference test showed that in the familiar condition, the 2-year-olds were significantly different in their response tendencies than all of the other age groups. The 3-, 4-, and 5-year-olds were not significantly different in their response tendencies from one another, but were all significantly different from the 2-year-olds. In the unfamiliar condition, the 2-year-olds' response tendencies were different from those of the 3-, 4-, and 5-year-olds. The 3-year-olds' response tendencies were not significantly different from those of the 4-year-olds, but were significantly different from those of the 2-year-olds and the 5-year-olds. The response tendencies of the 4-year-olds were significantly different from those of the 2-year-olds, but not the 3- and 5-year-olds. Finally, the 5-year-olds' response tendencies were significantly different from those of the 2- and 3-year-olds, but not from those of the 4-year-olds.

To examine the effect of the familiar and unfamiliar object conditions, each age group's Response Bias Scores I were compared between the two conditions with the use

of paired samples t-tests. The condition effect was significant for 2-year-olds with the Response Bias Scores greater in the unfamiliar object condition than in the familiar object condition, $t(19) = -2.67$, $p < .05$. The condition effect was also significant for 3-year-olds, $t(19) = -3.25$, $p < .01$. In contrast, the condition effect was not significant for 4- and 5-year-olds, $t(19) = -1.14$, $p > .05$ and $t(19) = -.27$, $p > .05$, respectively.

To examine whether children had a response bias, one sample t-tests were performed to compare the mean Response Bias Scores I of each age group to a score of zero. Figure 1 shows the mean yes-bias scores for each age group. Because the condition effect was significant for 2- and 3-year-olds, two sets of separate t-tests were conducted for the familiar and unfamiliar object conditions, respectively. Two-year-olds' Response Bias Scores I for the familiar and unfamiliar object conditions were significantly above zero, $t(19) = 4.15$, $p < .001$ and $t(19) = 7.11$, $p < .001$, indicating a strong affirmation bias. Three-year-olds in the present experiment also showed an affirmation bias, but only in the unfamiliar object condition, $t(19) = 2.43$, $p < .05$. Three-year-olds in the familiar object condition showed no significant response bias, $t(19) = .22$, $p > .05$. Because the condition effect was not significant for 4- and 5-year-olds, the Response Bias Scores I for the familiar and unfamiliar conditions were pooled. Four- and 5-year-olds displayed no significant response bias, $t(19) = 2.03$, $p = .057$ and $t(19) = .27$, $p > .05$.

For the nonsense word questions, a 4 (age) x 2 (familiarity) mixed-design ANOVA was performed on the Response Bias Scores II, with familiarity as the repeated measure. The age effect was significant, $F(3, 67) = 20.30$, $p < .001$. As age increased, children's Response Bias Scores II decreased in the familiar object condition. The

familiarity effect was also significant, F (1, 67) = 10.46, $p < .01$. The mean Response Bias Score II for the familiar condition (-1.86) was lower than the mean Response Bias Score II for the unfamiliar condition (-.34). The interaction between age group and familiarity was not significant, F (3, 67) = 1.98, $p > .05$.

A post-hoc analysis was performed to observe the differences between the four age groups. A Least Significant Difference test determined that in the familiar condition, the 2-year-olds' response tendencies to the nonsense questions were significantly different from those of the 3-, 4-, and 5-year-olds. The 3-year-olds' response tendencies were significantly different from the 2- and 5-year-olds, but not the 4-year-olds. The response tendencies of the 4-year-olds were significantly different from the 2-year-olds, but not from the 3- and 5-year-olds. Finally, the response tendencies of the 5-year-olds were significantly different from those of the 2-year-olds and 3-year-olds, but not the 4-year-olds.

In the unfamiliar condition, the 2-year-olds' response tendencies were significantly different from those of the 3-, 4-, and 5-year-olds. The responses of the 3-year-olds were significantly different from those of the 2-year-olds and the 5-year-olds. The 4-year-olds' response tendencies were significantly different from the 2- and 5-year-olds, but not from the 3-year-olds. Finally, the response tendencies of the 5-year-olds were significantly different from those of the 2-, 3-, and 4-year-olds.

To examine whether children had a response bias, one sample t-tests were performed to compare the mean Response Bias Scores II of each age group to a score of zero. In this case, no Response Bias Scores II were pooled because the interaction

between age group and familiarity was found to be non-significant. Two-year-olds displayed a significant affirmation bias for both the familiar and unfamiliar condition, t (19) = 3.92, $p < .01$ and t (19) = 8.39, $p < .001$, respectively. Three-year-olds showed a significant disconfirmation bias in the familiar object condition, t (19) = -2.66, $p < .05$, but no significant bias in the unfamiliar object condition, t (19) = -.54, $p > .05$. Four-year-olds displayed a significant disconfirmation bias in the familiar condition, t (17) = -3.03, $p < .01$, and did not display any type of response bias in the unfamiliar condition, t (18) = -2.08, $p > .05$. Finally, 5-year-olds displayed a significant disconfirmation bias in both the familiar and unfamiliar condition, t (13) = -6.05, $p < .001$ and t (12) = -9.99, $p < .001$, respectively. The mean Response Bias Scores are shown in Figure 1.

Discussion

It was hypothesized that an affirmation bias would be found in children's responses to yes/no questions and that this bias would be more pronounced when the children were unfamiliar with the objects in question and also when they were at a younger age. The present results partially confirmed these hypotheses. With respect to the regular yes/no questions, 2-year-olds displayed a significant affirmation bias, with the bias significantly stronger in the unfamiliar object condition than in the familiar object condition. Three-year-olds also showed a strong affirmation bias, but only in the unfamiliar object condition. They did not show a significant response bias in the familiar object condition. Four- and 5-year-olds showed no significant response bias in either the familiar object condition or unfamiliar object condition.

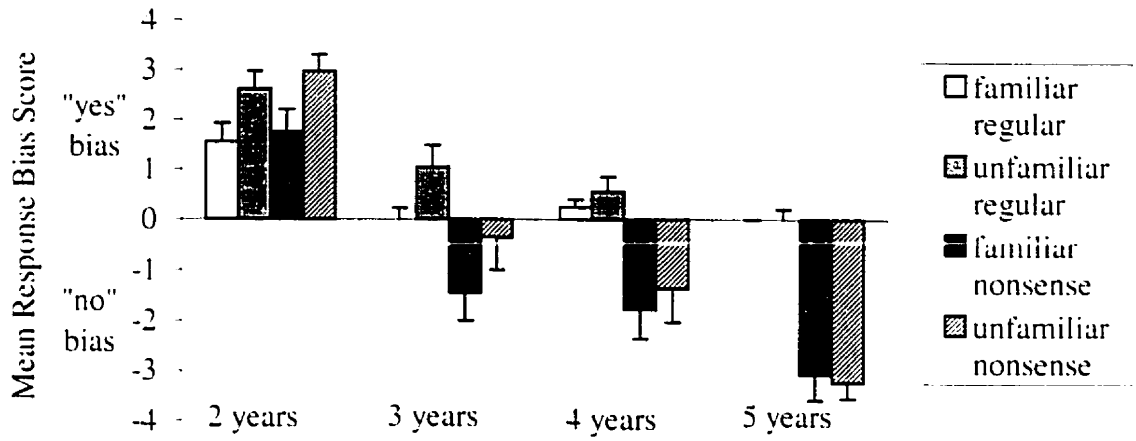

Figure 1. Mean Response Bias Scores for each age group in the four conditions

For the nonsense word questions, 2-year-olds showed a significant affirmation bias in both conditions, while 5-year-olds displayed a strong disconfirmation bias in both conditions. Both the 3- and 4-year-olds displayed a significant disconfirmation bias in the familiar object condition and did not display any bias at all in the unfamiliar object condition.

The results for the 2-year-olds were consistent with the findings of Steffensen (1978) who also reported an affirmation bias in children of the same age. In contrast, the present findings concerning 3-, 4-, and 5-year-olds are not entirely consistent with those of Brady et al. (1999) who reported the lack of a response bias in older children, nor with those of Peterson and Biggs (1997) who reported an affirmation bias in their entire sample of children. The discrepancy between these findings and the findings from the present experiment is perhaps due to the fact that these earlier studies combined 3-, 4-, and 5-year-olds in one large group.

Despite the inconsistencies between the findings from the present experiment and those from other studies concerning the affirmation bias, the present study replicated the findings of work done by Peterson and her colleagues with respect to children's use of the "I don't know" response (Peterson & Biggs, 1997; Peterson, Dowden, & Tobin, 1999; Peterson & Grant, 1999). Children in the present experiment seldom used the "I don't know" response when they were able to comprehend the experimenter's questions. A few of the older children began to respond "I don't know", but only when they could not comprehend the question asked. In fact, the majority of the "I don't know" responses were given by only five children. The rest of the participants regardless of age chose either

"yes" or "no" response even when they were repeatedly instructed that they could give the "I don't know" response.

Based on these data, one may be tempted to conclude that there exists a developmental trend in children's responses to yes/no questions: A strong affirmation bias is present at 2 years of age, continues in some respects through 3 years of age, and disappears before 4 years of age, after which a disconfirmation bias emerges when children are not able to comprehend the question asked. However, this conclusion is premature for two reasons. First, the present study is the first developmental research studies comparing children at different age levels with respect to the affirmation bias. As a result, its findings need to be replicated before accepting the conclusions of the experiment. Second, the present study used only questions concerning the properties and functions of objects. It may be possible that children react differently and have different response tendencies to questions concerning other entities, such as actions performed with objects.

Chapter 3

Experiment 2

Experiment 2 examined whether an affirmation bias would be present in young children when they are asked yes/no questions pertaining to actions. Two different types of actions were used in the present study: 1) Expected actions (actions commonly associated with a particular object); and 2) unexpected actions (actions rarely associated with a particular object) involving familiar objects. Expected and unexpected actions were chosen as a focus of the present study because of their relation to the familiar and unfamiliar objects in Experiment 1. Expected actions are similar to the familiar objects because they are both familiar to the children while unexpected actions are akin to the unfamiliar objects because both are unfamiliar to the children.

The present experiment was also designed to ascertain whether the children's response tendencies from Experiment 1 could be replicated, despite the change in question focus. There were three hypotheses for the present experiment. First, it was hypothesized that the youngest children would display an affirmation bias. Second, it was hypothesized that the older children would not demonstrate any bias in response to the comprehensible yes/no questions, but would switch to a disconfirmation bias in response to the incomprehensible questions. Finally, it was hypothesized that the children would provide very few "I don't know" responses, even though they were repeatedly told that such responses were acceptable.

There are two contrasting hypotheses concerning the expected and unexpected actions. First, because young children have rarely or never seen the unexpected actions

associated with the particular objects that they are being performed with, they do not hold a 'script' for that action-object pair and therefore, they may display the same response tendencies when asked about such an action as they do when questioned about unfamiliar objects. Alternatively, because the unexpected action is a surprise to the children, it may be more memorable and therefore the child may answer the questions in a less biased manner.

Method

Participants

Participants consisted of thirty 2-year-olds (12 males and 18 females; mean age = 2 ; 9; age range = 2 ; 1 - 2 ; 11), thirty 3-year-olds (16 males and 14 females; mean age = 3 ; 7; age range = 3 ; 1 - 3 ; 11), thirty 4-year-olds (16 males and 14 females; mean age = 4 ; 5; age range = 4 ; 1 - 4 ; 11), and thirty 5-year-olds (14 males and 16 females; mean age = 5 ; 4; age range = 5 ; 1 - 5 ; 11). Participants were enrolled in day care programs in Kingston and the Greater Toronto Area.

Materials

Materials consisted of six objects, all of which are familiar to young children. The objects consisted of a red plastic cup, a green plastic apple, a big purple ball, a metal spoon, a colouring book, and a purple toothbrush.

Procedure

After parents completed consent forms, each participant was interviewed individually in their day care. Each participant went through a pre-test session in order to

determine whether they were able to identify the name and function of the pertinent objects.

Each child then participated in the actual experiment. The child was shown either an expected or unexpected action and then asked a set of three questions. The set of three questions contained a "yes" question (for which the correct answer was "yes"), a "no" question (for which the correct answer was "no") and a "nonsense" question (for which there is no real correct answer). For example, the experimenter rolled the ball in front of the child and then asked a "yes" question (did I roll the ball?), a "no" question (did I bounce the ball?), and a "nonsense" question (did I twireno the ball?). After the child answered the three questions concerning the first action, the child was then shown the next action and asked a similar set of three questions. This continued until all actions were demonstrated and all questions were asked. The order of expected and unexpected actions and the order of the questions were randomized using a random numbers table. For each child, there were three expected actions and three unexpected actions. In order to ensure generalization, there were two expected actions for each object, with half of the children experiencing one action and the other half experiencing the other. The same was done for the unexpected actions. After all actions were performed and all questions were asked, the children were asked to replicate all of the actions performed by the experimenter, one at a time. The questions asked in the present study can be found in Appendix E.

Results

In order to determine whether the children were familiar with the objects in the present study, a "familiarity score" identical to that in Experiment 1 was calculated. Results demonstrated that all of the children were familiar with the objects. A "replication score" was also calculated to determine whether the children were able to replicate the experimenter's actions after all of the actions were demonstrated and all of the questions asked. For each correct replication, children received a score of "1". If they were unable to replicate an action, they were assigned a score of "0" for that particular action-object pair. Therefore, the maximum replication score was "6" and the minimum replication score was "0". The mean replication score was divided by 6 in order to obtain a final mean replication score with a maximum of "1" and a minimum of "0". Table 2 shows the means and standard deviations of each age group's replication scores. Almost all of the children could replicate the actions that were performed. In general, the younger children were worse at replicating the actions than were the older children. All of the 5-year-olds were able to replicate all of the actions. In order to determine whether there was a significant difference between children's ability to replicate actions that were expected and their ability to replicate those that were unexpected, a 4 (age) x 2 (expectedness) mixed-design ANOVA was conducted with children's ability to replicate the performed actions as the repeated measure. The scores for the 5-year-olds were excluded because they were able to replicate all actions. There was no significant difference between children's scores to replicate expected actions and their scores to replicate unexpected ones. $F(1, 87) = .46$, $p > .05$. The age effect was not significant, $F(2, 87) = 1.00$,

Table 2.

Means (Standard Deviations) of Replication Scores in Experiment 2 (max. = 1 and min. = 0)

Type of Action	Object	Age group			
		2 years	3 years	4 years	5 years
Expected	Cup	.90 (.31)	.97 (.18)	.97 (.18)	1.00 (.00)
	Book	.93 (.25)	.97 (.18)	.97 (.18)	1.00 (.00)
	Ball	.90 (.31)	.93 (.25)	.90 (.31)	1.00 (.00)
	Mean Replication Score - Expected	.91 (.23)	.96 (.15)	.94 (.15)	1.00 (.00)
Unexpected	Toothbrush	.87 (.35)	.90 (.31)	.97 (.18)	1.00 (.00)
	Apple	.87 (.35)	.97 (.18)	.90 (.31)	1.00 (.00)
	Spoon	.90 (.31)	.93 (.25)	1.00 (.00)	1.00 (.00)
	Mean Replication Score - Unexpected	.88 (.30)	.93 (.18)	.96 (.12)	1.00 (.00)

$p > .05$. In addition, there was no significant interaction between age and replication, $F(2, 87) = .38$, $p > .05$.

With respect to "I don't know" responses, only 1 four-year-old said "I don't know" in response to a regular question in the expected action condition. In the unexpected action condition, no children responded with "I don't know". When responding to the nonsense questions in the expected action condition, no two-year-olds, 1 three-year-old, 3 four-year-olds, and 6 five-year-olds gave the "I don't know" response at least once. In the unexpected action condition, no two- or three-year-olds, 3 four-year-olds, and 9 five-year-olds gave the "I don't know" response to at least one nonsense question. In the present study, "I don't know" responses represented only 2% of all responses.

Table 3 shows the percentage of "Yes" and "No" responses to the Yes and No questions in the regular word condition and to the Nonsense questions in the nonsense word condition. The percentages were obtained using the same procedure as that in Experiment 1. Inspection of the results of the regular word condition in Table 3 suggests that most children tended to respond "yes" to the Yes questions in the expected object condition. For the No questions, the majority of children responded "no", but 2-year-olds displayed a stronger tendency to give "yes" responses than did the 3-, 4-, and 5- year-olds. In the unexpected action condition, most children gave "yes" responses to the Yes questions. For the No questions, 2-year-olds again displayed a stronger tendency to respond "yes" than did the 3-, 4-, and 5-year-olds, who tended to respond "no".

Table 3.

Percent of "yes" and "no" responses to the Yes, No, Nonsense questions and means (standard deviations) of Response Bias Scores in Experiment 2

Condition	Question Type	Age group			
		2 years	3 years	4 years	5 years
Expected	Yes-question				
Actions	"Yes"	94.4	90.0	95.6	96.7
	"No"	5.6	10.0	4.4	3.3
	No-question				
	"Yes"	60.0	18.9	11.1	6.7
	"No"	40.0	81.1	87.3	93.3
	Response Bias Score I	1.63 (1.45)	.27 (1.26)	.22 (.64)	.10 (.66)
	Nonsense-questions				
	"Yes"	76.7	18.9	16.7	7.8
	"No"	23.3	80.0	75.5	82.2
	Response Bias Score II	1.63 (2.24)	-1.83 (1.97)	-1.93 (1.92)	-2.41 (1.45)

Table 3. (Continued)

		2 years	3 years	4 years	5 years
Unexpected	Yes-question				
Actions	"Yes"	98.9	84.4	90.0	94.4
	"No"	11.1	15.6	10.0	5.6
	No-question				
	"Yes"	51.1	12.2	4.4	1.1
	"No"	48.9	87.8	95.6	98.9
	Response Bias Score I	1.50 (1.23)	-.01 (1.32)	-.17 (.59)	-.13 (.43)
	Nonsense-question				
	"Yes"	71.1	22.2	16.7	6.7
	"No"	28.9	77.8	78.9	78 9
	Response Bias Score II	1.27 (2.27)	-1.67 (1.92)	-2.0 (1.95)	-2.55 (1.18)

For the nonsense word questions, in both the expected action condition and unexpected action condition, most 2-year-olds responded "yes". In contrast, the majority of 3-, 4-, and 5-year-olds responded "no". This is in line with the previous findings. Overall, it appeared that younger children had a stronger affirmation bias in response to the Yes and No questions than older children. For the nonsense word questions, only the youngest children had an affirmation bias while the older children had a disconfirmation bias. In general, the bias scores tended to be higher in the expected action condition.

To confirm the above observations, a Response Bias Score I was obtained for each child, using the same procedure as that in Experiment 1. Figure 1 shows the mean yes-bias scores for each age group. Because there were 3 objects in each condition in this experiment, the maximum Yes Score that any participant could obtain in either condition for the Yes questions was 3 and the maximum No Score for the No questions was also 3 (1 Yes or No question for each of the 3 objects). For this reason, the maximum and minimum raw response bias scores were 3 and -3, respectively, differing from Experiment 1. In order to make the results of the present experiment numerically comparable to those of Experiment 1, a linear transformation was performed on the raw bias score (dividing the score by 3 and multiplying the result by 4) to obtain a final Response Bias Score I (max. = 4 and min. = -4). A Response Bias Score II was obtained using a similar procedure to that used in Experiment 1. Because there were only 3 objects used per condition in the present experiment as opposed to the 4 in Experiment 1, the same linear transformation that was performed on the Response Bias Scores I was performed on the Response Bias Scores II. The resultant Response Bias Scores II

therefore had a maximum score of 4 and a minimum score of -4. The Response Bias Score for a child failing to demonstrate any bias would be zero. Children with a positive Response Bias Score would be demonstrating an affirmation bias, while children with a negative Response Bias Score would be demonstrating a disconfirmation bias. The means and standard deviations of the Response Bias Scores I and II for each age group in the expected and unexpected action conditions are shown in Table 3.

With respect to the Response Bias Scores I, a 4 (age) x 2 (expectedness) mixed-design ANOVA was conducted, with the expectedness factor as the repeated measure. The age effect was significant, $F(3, 116) = 22.45$, $p < .001$. The expectedness effect was also significant, $F(1, 116) = 9.38$, $p < .01$. The mean Response Bias Score I for the expected condition (.55) was higher than that for the unexpected condition (.28). The interaction between age group and familiarity was non-significant, $F(3, 116) = .42$, $p > .05$.

A post-hoc test was run in order to determine the differences between the four age groups with respect to the Response Bias Scores I. A Least Significant Difference test showed that in the expected condition, the 2-year-olds were significantly different in their response tendencies than were all of the other age groups. The 3-, 4-, and 5-year-olds were not significantly different in their response tendencies from one another, but were all significantly different from the 2-year-olds. In the unexpected condition, the 2-year-olds' response tendencies were different from those of the 3-, 4-, and 5-year-olds. The 3-, 4-, and 5-year-olds were not significantly different in their response tendencies from one another, but were all significantly different from the 2-year-olds.

To examine whether children had a response bias, one sample t-tests were conducted to compare the mean Response Bias Scores I of each age group to a score of zero. Because the interaction between age group and expectedness was found to be non-significant, none of the Response Bias Scores I were pooled. The Response Bias Score I for the 2-year-olds was significantly greater than zero in both the expected and unexpected conditions, $t(29) = 6.17$, $p < .001$, and $t(29) = 6.71$, $p < .001$, respectively. The Response Bias Score I for the 3-year-olds was not significantly greater than zero in either the expected or unexpected conditions, $t(29) = 1.16$, $p > .05$, and $t(29) = -.41$, $p > .05$. Four-year-olds did not display significant bias in either the expected action or unexpected action condition, $t(29) = 1.86$, $p > .05$, and $t(29) = -1.54$, $p > .05$, respectively. Similar to the 3- and 4-year-olds, 5-year-olds did not display significant bias in either the expected condition or the unexpected condition, $t(29) = .83$, $p > .05$, and $t(29) = -1.68$, $p > .05$, respectively.

For the nonsense word questions, a 4 (age) by 2 (expectedness) mixed-design ANOVA was performed on the Response Bias Scores II, with expectedness as the repeated measure. The age effect was significant, $F(3, 113) = 29.88$, $p < .001$. As age increased, children's Response Bias Scores II decreased in the expected action condition. Neither the expectedness effect nor the interaction between age group and expectedness were significant, $F(1, 113) = .41$, $p > .05$, and $F(3, 113) = .76$, $p > .05$, respectively.

A post-hoc analysis was performed to determine the differences between the four age groups. A Least Significant Difference test revealed that in the expected condition, the 2-year-olds were significantly different in their response tendencies than were all of

the other age groups. The 3-, 4-, and 5-year-olds were not significantly different in their response tendencies from one another, but were all significantly different from the 2-year-olds. In the unexpected condition, the 2-year-olds' response tendencies were significantly different from those of the 3-, 4-, and 5-year-olds. The 3-, 4-, and 5-year-olds' response tendencies were not significantly different from one another, but were all significantly different from the 2-year-olds' response tendencies.

To examine whether children had a response bias, one sample t-tests were performed to compare the mean Response Bias Scores II of each age group to a score of zero. Because the expectedness effect was not significant, the Response Bias Scores II for the expected and unexpected action conditions for all children were pooled. Two-year-olds displayed a significant affirmation bias, $t(29) = 3.79$, $p = .001$, while 3-, 4-, and 5-year-olds displayed a significant disconfirmation bias, $t(29) = -5.59$, $p < .001$; $t(27) = -5.33$, $p < .001$; and $t(28) = -11.39$, $p < .001$, respectively. The mean Response Bias Scores for all four age groups in each condition are shown in Figure 2.

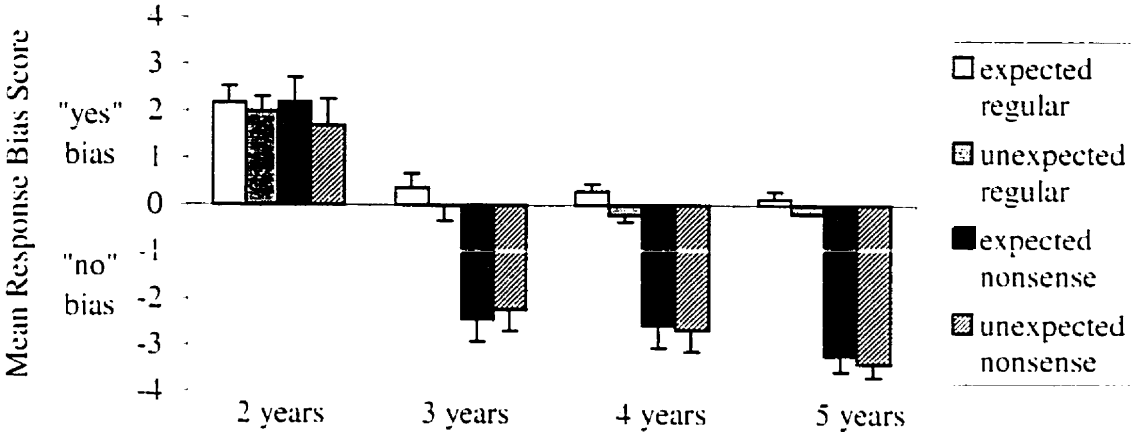

Figure 2. Mean Response Bias Scores for each age group for all four conditions.

Discussion

The purpose of the present experiment was to investigate whether an affirmation bias exists in young children when they are asked yes/no questions concerning both expected and unexpected actions performed with familiar objects. It was hypothesized that 1) the youngest children would display an affirmation bias; 2) while the older children would not demonstrate any bias in response to the comprehensible questions, they would display a disconfirmation bias in response to the questions that were incomprehensible; and finally, 3) the children would provide very few "I don't know" responses, despite the repeated assurances that such responses were acceptable.

The results of the present study showed that there was indeed an affirmation bias present, but as hypothesized, it was only present in the youngest children. Two-year-olds were the only children that displayed a tendency to respond affirmatively in all conditions, replicating the findings of Experiment 1. Although it was hypothesized that 3-year-olds would display an affirmation bias alongside the 2-year-olds, it was found that there was no bias present in their responses to comprehensible questions and that they actually displayed a significant disconfirmation bias in response to the incomprehensible questions. As expected, 4- and 5-year-olds did not display a response bias while answering comprehensible questions and did display a significant disconfirmation bias in response to the incomprehensible questions. Thus, the 3-year-olds had the same pattern of responses as did the older children.

The final hypothesis, that children would rarely provide "I don't know" responses, was supported by the findings in the present experiment. When the questions were

comprehensible, only 1 child gave an "I don't know" response. It was only when the questions were incomprehensible that the older children began providing "I don't know" responses. Even then, "I don't know" answers were only given by approximately 10% of the entire sample. This finding is in line with the findings from numerous recent studies using yes/no questions (Peterson & Biggs, 1997; Peterson & Grant, 1999; Peterson, Dowden, & Tobin, 1999; Brady et al., 1999).

Chapter 4

General Discussion

In the present study, two experiments investigated children's response tendencies toward yes/no questions in a developmental research context. Specifically, the study closely examined age-related changes in children's response tendencies. Another focus of the present study was whether children's familiarity with objects and actions and their comprehension of the question itself had an impact on their answers to yes/no questions.

In Experiment 1, children's response tendencies toward yes/no questions concerning the properties and functions of familiar and unfamiliar objects were examined. In contrast, Experiment 2 examined children's response tendencies toward yes/no questions concerning expected and unexpected actions performed with familiar objects. Despite this major difference, there were five consistent findings between the two experiments. First, there exists a tendency in young children to respond to yes/no questions in a particular manner and this tendency changes with age. Second, and more specifically, 2-year-olds displayed a significant affirmation bias in all conditions. Apparently, 2-year-olds tend to display an affirmation bias in answering yes/no questions regardless of their content.

The third consistent finding between the two experiments was that 3-year-olds did not display a bias of any kind in response to yes/no questions associated with familiar objects as long as the questions were comprehensible. When the questions were incomprehensible, 3-year-olds displayed a significant disconfirmation bias in response to the questions concerning familiar objects and actions. Thus, when the yes/no questions

are comprehensible and the entity about which the children are being questioned is familiar to them, 3-year-olds' responses to these questions can be taken at face value.

Another consistent finding between Experiment 1 and Experiment 2 is that regardless of their familiarity with the object, 4- and 5-year-olds did not display any response bias as long as they could understand the question being asked. If they were not able to understand the question, 4- and 5-year-olds displayed a disconfirmation bias. Therefore, it appears that yes/no questions may be a suitable method of data collection for 4- and 5-year-olds under the condition that they are able to comprehend the questions being asked.

Finally, the results for both experiments within the present study demonstrate that children rarely produce the "I don't know" response, even when they are repeatedly assured that such a response is acceptable. In both experiments, children seldom used this response when they were able to comprehend the experimenter's questions. Only when they failed to understand the questions did several older children begin to respond with "I don't know". Overall, the use of this response was not very common.

The consistencies between the two experiments in the present study supply a relatively stable age pattern of children's response tendencies to yes/no questions. Due to the differences in design and focus between the present study and previous research, this age pattern of children's response tendencies cannot be fully compared with the inconsistent findings from other research. However, some general comparisons can be made. First, with regard to the comprehensible questions, the findings from the 2-year-olds in the present study are in line with those of Steffensen (1978) who also found an

affirmation bias in children of the same age. Second, also with regard to the comprehensible questions, the findings for the 3-, 4-, and 5-year-olds in the familiar condition of the present study were consistent with work done by Brady et al. (1999) and inconsistent with the research conducted by Peterson and her colleagues (Peterson & Biggs, 1997; Peterson, Dowden, & Tobin, 1999). The present study demonstrated that 3-, 4-, and 5-year-olds do not display any type of response bias when answering comprehensible questions concerning objects and actions that are familiar to them. Brady et al. (1999) interviewed children of the same age using comprehensible questions and also failed to reveal any significant response biases. These findings are in direct contrast to those by Peterson and her associates (Peterson & Biggs, 1997; Peterson, Dowden, & Tobin, 1999), who found that children between the ages of 3 and 5 display an affirmation bias when asked comprehensible questions. There is no ready explanation as to why the findings of Peterson et al. are inconsistent with the present findings.

Third, with regard to the incomprehensible questions, the findings from the present study are both partially consistent and partially inconsistent with those from Fay (1995) and Warren et al. (1992). In the present study, 2-year-olds demonstrated a significant affirmation bias in their responses to questions that they could not comprehend, which is consistent with the children interviewed by Fay (1995). He also used incomprehensible questions and found that pairing the nonsensical utterances with a rise in intonation led 62% of the children in his sample to respond affirmatively. In the present study, 3-, 4-, and 5-year-olds tended to display a significant disconfirmation bias in response to the incomprehensible questions, which is inconsistent with the results

found by Fay (1975). Unfortunately, no explanation for this discrepancy can be put forward because very little detail was provided concerning the questions asked in Fay (1975)'s study.

The findings concerning the 3-, 4-, and 5-year-olds in the present study are in line with those from Warren et al. (1992), who interviewed children between the ages of 2 and 13 years and uncovered a "nay-saying" bias. However, it must be noted that the recent comparison is a very general one because Warren et al. (1992) interviewed children about sexual abuse, which is radically different from the issues being asked in questions in the present study. The reason why it can be generally compared to the findings from the present study is that it is possible that the children participating in the abuse interviews did not understand the questions or words used in the interview or were unfamiliar with the sexual issues in question. Thus, they responded in the same way that the children in the present study did to incomprehensible questions - with a "nay saying" bias.

It is likely that the ostensibly contradictory conclusions by Steffensen (1978), Peterson and her colleagues (Peterson & Biggs, 1997; Peterson, Dowden, & Tobin, 1999), Brady et al. (1999), and Warren et al. (1992) are due to the three reasons discussed in the introduction (e.g., task difficulty, issues in question, and age range of participants). Specifically, it may be possible that the interaction between children's knowledge about the issue in question, their understanding of questions, and their developmental level (indicated by their chronological age) lead to the inconsistencies in the literature. To investigate this possibility, the data collected by Peterson and her colleagues (Peterson &

Biggs, 1997; Peterson, Dowden, & Tobin, 1999) and those by Brady et al. (1999) need to be more closely examined. Particularly, it would be a good idea to examine both the age distribution of the child participants and the difficulty level of each item that were involved in the respected studies. In any event, the results from the present study suggest that it is not expedient to aggregate children at different ages into the same group because children's response tendencies to yes/no questions change drastically as they age from 2 years onward. In the present study, it was only when the children were separated into different age groups that a clear pattern of results emerged: A strong affirmation bias exists in 2-year-olds responses to yes/no questions, but disappears as the children get older.

A particular point of interest in the present study is the disconfirmation bias that was found in the 3-, 4-, and 5-year-olds. Various forensic studies have concluded that children in certain situations (e.g., sexual abuse interviews) tend to use the "no" response indiscriminately to yes/no questions (e.g. Brady et al., 1999; Warren, Boyd, & Walker, 1992). As mentioned in the introduction, there are several possible reasons behind the "nay-saying" bias (e.g., embarrassment, emotional upset, termination of questioning, misinterpretation of the question, and noncompliance). These possible explanations for the "nay-saying" bias cannot account for the results obtained in the present study for three reasons. First, 3-, 4-, and 5-year-olds did not display a disconfirmation bias in all situations. The children did not display such a bias when they were able to comprehend the questions. Second, the order in which Yes, No, and Nonsense questions were randomized in both experiments and as a result, the children were often asked a Yes

question after responding "no" to a Nonsense question. The majority of the answers to the Yes questions given by the older children were correct. Thus, they were not attempting to terminate questioning because they were not responding "no" to all of the questions asked. Finally, there was no reason for the children to be embarrassed or emotionally upset when answering the various emotionally neutral questions. In fact, children often enjoyed participating in the study to the degree that they wanted to do it all over again once they were done.

It is highly likely that the reasons behind the disconfirmation bias in the responses of the 3-, 4-, and 5-year-olds in the present study are of a social and/or cognitive nature. Socially, the children, like adults, may not be willing to admit their ignorance and instead, provide a response. Cognitively, they may have realized that they have never heard of such words or have never heard adults using the words to describe the particular objects that were used in the present study. As a result of their inexperience with the particular word, they inferred that the nonsense word was not appropriate for the object in question and decided that a "no" response would therefore be the correct reply. However, this is only a speculation and must be confirmed with more specific studies in the future.

Another finding of importance in the present study is the children's reluctance to use the "I don't know" response. The proportion of "I don't know" responses compared to that of "yes" or "no" responses was relatively small. This finding is consistent with the forensic review literature. It has been well documented that young children rarely claim their ignorance when answering questions (Brady et al., 1999; Fivush, Peterson, & Schwarzmueller, 1999; Hughes & Grieve, 1980; Peterson, Dowden, & Tobin, 1999;

Peterson & Grant, 1999; Poole & Lamb, 1998; Schuman, Bala, Lee, 1999; Walker & Hunt, 1998). Instead, they will often attempt to answer any question that is directed at them. Children's hesitation to admit ignorance has been acknowledged for nearly a century. For example, Piaget (1928) found that young children often responded to his questions with a definitive answer, even when they had no basis to make such a response. In addition, Hughes and Grieve (1980) found that children would even try to answer such bizarre questions as "Is red heavier than yellow?" This reluctance to provide "I don't know" responses has not only been documented in studies involving children, but also in those involving adults. For example, Pratt (1990) discovered that this tendency to give a definitive answer to bizarre questions rather than admitting ignorance existed among the adults in his sample.

Some researchers have claimed that informing children that it is acceptable to say "I don't know" increases the rate of such responses (Brady et al., 1999; Moston, 1987; Mulder & Vrij, 1996; Saywitz & Moan-Hardie, 1994; Walker, Lunning, & Eilts, 1996). However, the findings from the present study question this claim. Despite repeated assurances that "I don't know" responses were acceptable, the proportion of such responses was very small. It is readily apparent that young children are very reluctant to use the "I don't know" response when they are being questioned.

There are at least three possible explanations for young children's reluctance to use the "I don't know" response. First, it is possible that young children may misinterpret the implications of a yes/no question and assume that such a question is in need of a definitive answer. However, because the children were explicitly and frequently told that

"I don't know" responses were acceptable, it is very unlikely that this is the case. A second possible explanation is that children are motivated to supply a definitive answer because they would like to be cooperative conversationalists (they want to "help, not to harm", Sweetser, 1987). Finally, it is possible that young children are not willing to admit their ignorance in front of a stranger who is testing their knowledge (as in the case of the present study) or memory (as in the case of Brady et al., 1999).

The findings of the present study have numerous implications for designing developmental research and for conducting proper forensic interviews with children between the ages of 2 and 5 years. In the past few years, two main standpoints concerning yes/no questions have evolved. The first stance is that yes/no questions are needed in research with children because they elicit information from children for whom other types of questions may be inappropriate or ineffective (e.g. open-ended questions do not usually produce great amounts of detail in younger children's reports). The second standpoint is that yes/no questions should not be used in the questioning of young children because they tend to elicit a response bias. The present study, along with other studies that have examined response biases in young children, (e.g., Brady et al., 1999; Peterson & Biggs, 1997; Peterson et al., 1999; Steffensen, 1978) indicates that the use of yes/no questions is only acceptable when interviewing older children, and only if the questions are clear and comprehensible. As the results of the present study demonstrate, children's failure to comprehend yes/no questions inevitably leads both young and old children to exhibit strong response biases that will in turn distort the empirical data

obtained in the case of developmental research or the hearsay evidence in the case of forensic interviews.

The present study demonstrates the advantages of conducting metadevelopmental studies to answer particular methodological questions in developmental research designs. However, it must be noted that the present study represents only a small step toward the comprehensive understanding of the effect that yes/no questions have on children's responses. The present study focused solely on yes/no questions concerning objects and actions. Future studies need to empirically examine whether young children have specific response tendencies in their answering of yes/no questions concerning different entities (e.g., people, places, or events). In addition, future research should also focus on children's response tendencies toward other common question types, for example, multiple-choice questions choices (e.g., Is it A or B? or Is it A or not A?), specific wh-questions (e.g., which one is x? when did you do x?), and non-specific wh-questions (e.g., why did you do x?).

It is evident from both the present study and previous research that yes/no questions are problematic when it comes to gathering information from young children. The question that now begs an answer is obvious - what methods are *not* problematic methods for collecting data from young children? Due to the lack of metadevelopmental research, there is no ready answer to this question. Many researchers have come to the general consensus that open-ended questions and free recall prompts are the most accurate way to elicit information from children (Dent & Stephenson, 1979; Fivush,

Peterson, & Schwarzmueller, in press; Ornstein et al., 1992; Peterson, Dowden, & Tobin, 1999; Poole & Lindsay, 1995). However, preschool-aged children rarely provide much information in response to such questions and prompts (Ceci & Bruck, 1995; Fivish, Peterson, & Schwarzmueller, in press; Peterson & Biggs, 1997; Peterson & Grant, 1999), and as a result, much more specific questions are usually required to obtain information from children.

Cognitive developmentalists and other researchers frequently interview young children using questions that provide a limited number of choices (e.g., Is it A or B? or Is it A or not A?). Recently, Peterson and Grant (1999) examined the differences in 3- to 5-year-olds' response tendencies when they were asked yes/no questions versus when they were asked multiple-choice questions. It was found that the children as a group did not display a bias toward selecting the first choice or second choice. However, their findings are inconclusive because of the small number of children that participated in the study (only 32 children participated). In addition, the children were not separated into different age categories. As the results of the present study demonstrate, preschool children may show differential response tendencies at different ages. Thus, combining them into one single group does not allow for the discovery of such differential tendencies. Nevertheless, if their findings are confirmed, then it would be advisable to use multiple-choice questions instead of yes/no questions in eliciting information from young children.

Metadevelopmental studies are capable of addressing more than just the issue of questioning. Any methodological issue that is common across various areas of research is worthy of empirical investigation. For example, as mentioned in the introduction, there

has been research conducted on children's understanding of informed consent. Given the fact that this understanding is an essential component of current developmental research, it can and must be studied empirically as has been done successfully by Abramovitch et al. (1991). In addition, the effect of researchers' actions on the outcome of developmental studies is another phenomenon worth empirical attention. For example, the notion that experimenter bias tends to result in findings that favour the experimenter's hypothesis has been at the forefront of methodological issues for a very long time. Despite the popularity of this belief, limited empirical research has been devoted to investigate its validity. Future research should investigate such issues as whether an interviewer who is not blinded to the research hypothesis will tend to elicit responses that are consistent with the hypothesis. In addition, future studies should also investigate whether an interviewers' relationship with child interviewees affects the outcome of the interview, and also whether trained interviewers are better in obtaining accurate information than untrained interviewers (see Fenson et al., 1994, for discussion).

Child developmental psychology as a branch of science has been in existence for over a century. Over this time period, the overwhelming majority of developmental studies have been dedicated to fostering an understanding of children's development. Although this understanding is of irrefutable importance to the field of developmental psychology, it must be recognized that there are other issues that are also of great importance and that need to be recognized. For example, empirical research devoted to the investigation into how developmental phenomena are studied and the manner in which they should be studied is comparatively nonexistent. For validity and reliability's

sake, it is imperative that research focusing on these metadevelopmental issues be conducted. As is evident in the present study, research centering on such issues can both rid of misconceptions concerning developmental research methods and can also inform developmental psychologists of a method's potential problems, which in turn will lead to a better understanding of child development.

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Appendix A

Parental Consent Forms

Consent Form for Experiment 1

Dear Parents/Guardians,

I am a member of a child development research team in the Department of Psychology at Queen's University. We are presently conducting a study at your child's day care and were wondering if you would give your permission for your child to participate.

WHAT IS THE STUDY ALL ABOUT?

The purpose of the study is to determine whether yes/no questions affect children's verbal responses. We are also interested in whether there is a tendency for children to give yes answers regardless of the issue being questioned, under which circumstances this tendency, if it exists, is most pronounced, and finally, whether this tendency, if present, changes with age.

WHAT WOULD MY CHILD HAVE TO DO?

A female researcher will show your child eight objects, of which four have been predetermined to be familiar to children and four have been labeled as unfamiliar to children. Your child will be asked four questions concerning various properties and functions of each and every object.

WHY IS THIS RESEARCH IMPORTANT?

This research is of great importance because it will lay the groundwork for future studies involving the questioning of children. The results obtained from your child, along with those from other children, will help developmental psychologists gain insight into more effective ways of questioning children, that is, ways with the least amount of bias. The practical implications of this study are numerous, with one of the most important being its relevance to children's testimony in the courtroom.

IS THERE ANYTHING ELSE?

The whole session will take place at your child's day care and will take 5 minutes of your child's time. All information regarding each child's performance will be confidential, and your child may withdraw from the study at any time.

Please fill out the bottom portion of this letter, which asks whether or not you would be willing to let your child participate, and return it to your child's teacher. Thank-you very much for your cooperation.

Sincerely,

V. Heather Fritzley

In the event that you have any complaints, concerns or questions about this research, please feel free to contact me, V. Heather Fritzley (613-530-2291) or my supervisor, Dr. Kang Lee, Department of Psychology (613-545-6849). Should this approach not remove your dissatisfaction, you may contact Dr. Rudy Kalin, Head of the Department of Psychology, Queens University, at 613-543-2492.

Yes, I , give permission for my child. _____ to participate in this study (Birthdate: _____) (child's name)

No, I do not give permission for my child. to participate in this study.
(child's name)

SIGNATURE OF PARENT/GUARDIAN_____ DATE_____

Consent Form for Experiment 2

Dear Parents/Guardians,

I am a member of a child development research team in the Department of Psychology at Queen's University. We are presently conducting a study at your child's day care and were wondering if you would give your permission for your child to participate.

WHAT IS THE STUDY ALL ABOUT?

The purpose of the study is to determine whether yes/no questions affect children's verbal responses. We are also interested in whether there is a tendency for children to give yes answers regardless of the issue being questioned, under which circumstances this tendency, if it exists, is most pronounced, and finally, whether this tendency, if present, changes with age.

WHAT WOULD MY CHILD HAVE TO DO?

A female researcher will show your child three expected actions and three unexpected actions involving objects that are familiar to children. Expected actions are actions that are frequently carried out with the object being used. An example of such an action is drinking from a cup. Unexpected actions are actions that are rarely or never carried out with the object being used, for example, putting clothes on an apple. After viewing each action, your child will be asked three questions about each action. In total, your child will be asked 18 questions.

WHY IS THIS RESEARCH IMPORTANT?

The results obtained from your child, along with those from other children, will help child psychologists gain insight into more effective ways of questioning children. As a result of this insight, researchers will be able to determine the true capabilities of young children, which are often underestimated. Results of this study will also be helpful for teachers, social workers, doctors and other professionals working with children to devise best ways to get information from children, which in turn will improve child related services.

IS THERE ANYTHING ELSE?

The whole session will take place at your child's day care and will take 5 minutes of your child's time. All information regarding each child's performance will be confidential, and your child may withdraw from the study at any time.

Please fill out the bottom portion of this letter, which asks whether or not you would be willing to let your child participate, and return it to your child's teacher. Thank-you very much for your cooperation.

Sincerely,

V. Heather Fritzley

In the event that you have any complaints, concerns or questions about this research, please feel free to contact me, V. Heather Fritzley (613-530-2291) or my supervisor, Dr. Kang Lee, Department of Psychology (613-545-6849). Should this approach not remove your dissatisfaction, you may contact Dr. Rudy Kalin, Head of the Department of Psychology, Queens University, at 613-543-2492.

Yes, I . give permission for my child. _____ to participate in this study (Birthdate: _____) (child's name)

No, I do not give permission for my child, to participate in this study.
(child's name)

SIGNATURE OF PARENT/GUARDIAN_____ DATE_____

Appendix B

Source Tables for Experiment 1

REGULAR QUESTIONS - Tests of Within-Subjects Contrasts

Source	df	Sum of Squares	Mean Square	F Ratio	Sig.
Familiarity	1	14.24	14.24	15.93	.000
Familiarity x Age Group	3	7.37	2.47	2.75	.049
Error	75	67.05	.89		
Total	79	88.66			

REGULAR QUESTIONS - Tests of Between-Subjects Effects

Source	df	Sum of Squares	Mean Square	F Ratio	Sig
Intercept	1	91.90	91.90	37.82	.000
Age Group	3	96.55	32.18	13.24	.000
Error	75	182.25	2.43		
Total	79	370.70			

NONSENSE QUESTIONS - Tests of Within-Subjects Contrasts

Source	df	Sum of Squares	Mean Square	F Ratio	Sig.
Familiarity	1	62.80	62.80	10.46	.002
Familiarity x Age Group	3	35.59	11.86	1.98	.126
Error	67	402.27	6.00		
Total	71	500.66			

NONSENSE QUESTIONS - Tests of Between-Subjects Effects

Source	df	Sum of Squares	Mean Square	F Ratio	Sig
Intercept	1	353.22	353.22	9.78	.003
Age Group	3	2200.28	32.18	13.24	.000
Error	67	182.25	2.43		
Total	71	2735.75			

Appendix C

Questions asked in Experiment 1

Test questions asked in Experiment 1

FAMILIAR OBJECTS

Object	Questions
toothbrush	Is this for brushing your teeth?
	Is this lepurp?
	Is this made of glass?
	Is this for cleaning your house?
key	Is this for opening scolk?
	Is this small?
	Is this for drinking?
	Is this kenorb?
plastic spoon	Is this made of stalpic?
	Is this for eating?
	Is this ridty?
	Is this green?
ball	Is this round?
	Is this for counbing?
	Is this black?
	Is this for making socokie?

UNFAMILIAR OBJECTS

Object	Questions
pressure gauge	Is this for tires?
	Is this made of letam?
	Is this made of plastic?
	Is this welloy?
anchor	Is this ulbe?
	Is this for shelves?
	Is this urdon?
	Is this for cleaning?
CPU	Is this found in sterupmoc?
	Is this square?
	Is this made of wood?
	Is this gehu?
clevis	Is this for towing cars?
	Is this vehay?
	Is this for grawind?
	Is this made of paper?

Appendix D

Source Tables for Experiment 2

REGULAR QUESTIONS - Tests of Within-Subjects Contrasts

Source	df	Sum of Squares	Mean Square	F Ratio	Sig.
Expectedness	1	4.68	4.68	9.38	.003
Expectedness x Age Group	3	.63	.21	.42	.739
Error	116	57.82	.49		
Total	120	63.11			

REGULAR QUESTIONS - Tests of Between-Subjects Effects

Source	df	Sum of Squares	Mean Square	F Ratio	Sig
Intercept	1	41.25	41.25	26.09	.000
Age Group	3	106.49	35.50	22.45	.000
Error	116	182.25	2.43		
Total	120	329.99			

NONSENSE QUESTIONS - Tests of Within-Subjects Contrasts

Source	df	Sum of Squares	Mean Square	F Ratio	Sig.
Expectedness	1	.42	.42	.41	.522
Expectedness x Age Group	3	2.28	.76	.75	.523
Error	113	114.29	1.01		
Total	117	116.99			

NONSENSE QUESTIONS - Tests of Between-Subjects Effects

Source	df	Sum of Squares	Mean Square	F Ratio	Sig
Intercept	1	324.36	324.36	51.53	.000
Age Group	3	564.16	188.06	29.88	.000
Error	113	711.30	6.30		
Total	117	1599.82			

Appendix E

Questions asked in Experiment 2

Test Questions asked in Experiment 2

Object	Expected Actions	Question
1. Cup	1. Drink from the cup 2. Clean the cup	1. Did I drink from the cup? 2. Did I clean the cup? 3. Did I dloh the cup?
2. Ball	1. Bounce the ball 2. Roll the ball	1. Did I bounce the ball? 2. Did I roll the ball? 3. Did I twireno the ball?
3. Colouring Book	1. Open the book 2. Colour in the book	1. Did I open the book? 2. Did I colour in the book? 3. Did I nepo the book?
Object	**Unexpected actions**	**Questions**
1. Apple	1. Put clothes on the apple 2. Sit on the apple	1. Did I dress the apple? 2. Did I sit on the apple? 3. Did I onsti the apple?
2. Spoon	1. Put it through earring 2. Step on the spoon	1. Did I put the spoon in my earring? 2. Did I step on the spoon? 3. Did I ponest the spoon?
3. Toothbrush	1. Kick the toothbrush 2. Cut the bristles of the toothbrush	1. Did I kick the toothbrush? 2. Did I cut the toothbrush? 3. Did I citthek the toothbrush?