

Less Is More: The Availability Heuristic in Early Childhood

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Abstract

This study examined whether young children are influenced by the subjective experience associated with an easy or difficult recall when making memory decisions. Seventy-one children, aged 4, 6, and 8 years, were asked to generate either a small (easy condition) or large (hard condition) number of first names. Statistical analyses revealed that participants in the hard condition were more likely to infer that they did not know many names than participants in the easy condition, contrary to what would be expected if children based their memory judgement on the objective number of recalled items. Overall, our results support the hypothesis that children as young as 4 years old rely on the subjective experience of ease to regulate their decision-making processes. Theoretical implications of these findings are discussed.

Keywords: Availability heuristic, Metacognition, Decision making, Judgement, Children

One of the most compelling issues currently examined by researchers studying the development of child metacognition relates to determining what kind of information children use in assessing their memory (Geurten, Willems, & Meulemans, 2015b; Hembacher & Ghetti, 2014). Many studies of adults have shown that people may rely on the accessibility of information to evaluate their memory, a processing strategy that is known as the *availability heuristic* (Tversky & Kahneman, 1973). In their classic experiment, Tversky and Kahneman (1973) demonstrated that people assess the relative frequency of two classes of stimuli on the basis of the ease with which relevant instances of each class come to mind (e.g., people judge words starting with a K to be more frequent than words where K is in the third position because the former are easier to generate). Over time, studies have revealed that people may rely on different aspects of the accessibility of information when making decisions: namely (1) what comes to mind and (2) how easily it comes to mind (Schwarz, 1998). On the one hand, some research shows that judgements about ambiguous information are dominated by the content that is the most accessible at the time of the evaluation (e.g., Pachur, Hertwig, & Steinmann, 2012). Other studies suggest that we also form judgements on the basis of the ease with which this content can be brought to mind (Schwarz, 1998). According to the latter studies, we have the metacognitive belief that experienced ease of retrieval is a diagnostic cue of the 'true' frequency of different categories of stimuli.

Interestingly, Winkielman, Schwarz, and Belli (1998) established that the subjective experience of ease of retrieval can also guide memory decisions. Specifically, they showed that people who were required to recall four childhood events (easy task) were more likely to infer

that they could remember large parts of their childhood than people who were asked to recall twelve such events (difficult task), although the former recalled only a third as many episodes.

Nowadays, the involvement of the experienced ease of retrieval has been demonstrated in many domains of judgement. For instance, people rely on the ease with which examples of self-confident behaviours are recalled to determine whether they have an assertive personality (Schwarz et al., 1991). However, despite the well-established influence of experienced ease on a wide range of judgements, very few investigations have been conducted to examine whether children also rely on the subjective feeling of ease to guide their decisions. To our knowledge, the only research that has been conducted from a developmental perspective is the study by Davies and White (1994), which indicated that *frequency* judgements are already based on the ease with which names are processed by the age of 7 years. Thus far, the question of whether the same is true for *younger* children or for *memory* decisions has remained unexplored. From a theoretical point of view, the finding that young children's memory judgements are influenced by the experienced ease of retrieval rather than only by the objective content of their memory would provide crucial information about the nature of the processes that are involved in decision making in early childhood. More specifically, it would corroborate the recent findings indicating that metacognitive expectations may already influence judgements in children as young as 4 (Geurten et al., 2015b).

For these reasons, the present study was designed to examine whether young children under the age of 7 years old are influenced by the subjective feeling of ease when making their memory judgements. To this end, a paradigm inspired by the one described in Winkielman et

al.'s (1998) study was employed. However, because young children's poor episodic memory prevents them from recalling many childhood events (Ratner, Smith, & Dion, 1986), an adapted procedure was used in our experiment. Specifically, children aged 4 (i.e., the youngest age at which reliance on metacognitive heuristics has been demonstrated; Geurten et al., 2015b), 6 (i.e., an intermediate age between two important stages), and 8 years old (i.e., the age at which children seem to start exerting some control over metacognitive heuristics; Geurten et al., 2015b) were required to retrieve either a small (easy condition) or a large (hard condition) number of first names, and then were asked to rate their memory for names. If participants based assessments of their memory on the ease with which they could generate the requested items (i.e., experienced ease), we predicted that they should judge their memory as worse after reporting many names than after reporting a few names. However, if subjective ease was considered non-diagnostic or was not experienced, or if a more systematic processing strategy was adopted, children might base assessments of their memory on the actual number of generated items (i.e., accessible content). In that case, they should judge their memory as better after reporting many names. Finally, if children did not base assessments of their memory on either of these cues, no difference should be found between the experimental conditions. Moreover, some authors have argued that the mature implementation of a heuristic requires inferential processes (Westerman, Miller, & Lloyd, 2003) that may be subject to effortful regulation (Miller & Lloyd, 2011). Therefore, once children attain a sufficient level of cognitive maturity, they may begin to effortfully control their decisions, thus becoming less likely to rely on subjective cues in irrelevant contexts. In the present study, 8-year-old children

were therefore expected to be more circumspect than younger children in their use of the availability heuristic.

Methods

Participants

Participants were 71 typically developing children aged 4, 6, and 8 years old. The proportion of girls and boys was roughly equivalent in each group, $\chi^2(2) = 4.44, p = .11$. An additional participant was tested but not included in our analyses because he refused to generate any other name than his own. No group difference was found in terms of parental education level and nonverbal intelligence, $F_s < 1.94$, respectively assessed using both parents' years of education and scores on the Matrix test (Wechsler, 2005; Table 1).

< Table 1 >

Materials and Procedure

Children were tested individually in a quiet room in their school after performing a battery of recognition memory tests (the results of these tests are presented elsewhere; Geurten, Meulemans, & Willems, in press). Each child was randomly assigned to one of the two experimental conditions (Easy vs. Hard).

In the 'Hard' condition, participants were required to generate a large number of names (males' names for boys; females' names for girls). Pretests indicated that 4-year-old children found it challenging to generate more than six names, 6-year-old children found it challenging to give more than eight names, and 8-year-olds found it very difficult to produce more than ten names. In this context, the number of names that was requested in the hard condition was age-adjusted: eight names were required from 4-year-old children, ten from 6-year-old children,

and twelve from 8-year-old children. Next, all participants were asked to judge how many names they knew (i.e., 'Do you think you know a lot of boys'/girls' names?'). Response options were 'yes', 'no', and 'unsure'.

In the 'Easy' condition, children in each age group were first asked to give four names before judging how many names they knew on the 3-point scale. Following their memory judgements, participants in the easy condition were also required to report an additional set of names (i.e., 4, 6, and 8 names, for the 4-, 6-, and 8-year-old age groups, respectively). This procedure was used to ensure that differences in participants' judgements were not due to objective differences in the amount of information that they could retrieve from memory.

After answering the memory question, children in both experimental conditions also rated how difficult it was to generate the requested number of names on a 3-point scale ranging from *not at all difficult* (1) to *very difficult* (3), providing a measure of their recall experience.

Results

Data Analyses

Pearson chi-square analyses were conducted to examine whether young children judged their memory as worse after retrieving a large (hard condition) than after retrieving a small (easy condition) number of names. Moreover, to ensure that our results were based on the responses of children who did not experience any failures in generating the requested number of names, we excluded from our analyses the children ($n = 9$) who were not able to report the number of names that was demanded for their age group (for a similar procedure, see Winkielman et al., 1998). However, the results of all the analyses presented in the following

section are similar when all 71 participants are left in the sample. Preliminary analyses revealed no gender effect on any of the dependent variables, all $ps > .15$.

Manipulation Checks

Our manipulation of the task difficulty was successful. Results of a two-way 3 (Age Group) x 2 (Condition) analysis of variance revealed a main effect of experimental condition. Specifically, participants in the hard condition rated the name generation task as more difficult ($M = 2.42$) than participants in the easy condition ($M = 1.61$), $F(1,56) = 16.85$, $p < .001$, $\eta^2_p = .23$. No other effect reached significance, $F_s < 1$.

Memory Judgements

Table 2 shows the number of children who endorsed each response category ('yes', 'no', or 'unsure') as a function of experimental condition (easy vs. hard). As expected, the results of the chi-square analyses indicated that the number of children who reported poor knowledge of names was significantly higher in the hard than in the easy condition for the whole sample, $\chi^2(2,62) = 25.96$, $p < .001$, as well as for the 4-year-old, $\chi^2(2,18) = 8.05$, $p = .018$, 6-year-old, $\chi^2(2,21) = 13.74$, $p < .001$, and 8-year-old groups, $\chi^2(2,23) = 7.97$, $p = .019$. In other words, despite recalling more exemplars, children in the hard condition rated their access to names as worse than children in the easy condition. These findings seem to indicate that children—whatever their age—rely on the experienced ease of recall to guide their memory decisions. Interestingly, post hoc analyses revealed that only 8-year-old children made significant use of the 'unsure' option, $\chi^2 = 3.56$, $p < .05$. This pattern suggests that older children might be starting to exert some kind of control over their memory judgements and thus are less apt to rely on the availability heuristic in irrelevant contexts.

< Table 2 >

Discussion

The primary focus of this research was to determine whether young children's assessments of their memory are influenced by the subjective ease experienced during the retrieval process. Our results provide evidence supporting this hypothesis. In this study, even 4-year-old children are shown to judge their memory as better after generating a small number of names than after generating a large number of names, suggesting that participants rely more on the subjective feeling of ease than on the absolute number of generated items to make their memory decisions.

From a theoretical point of view, these findings are consistent with the results of other studies which have recently established that the implementation of inference rules, based on subjective experience or metacognitive expectations, to regulate decision-making processes develops very early in childhood (Geurten, Willems, & Meulemans, 2015a; Geurten et al., 2015b; Hembacher & Ghetti, 2014). Moreover, the results obtained for the 8-year-old group suggest that, at some point in their development, children stop blindly relying on the subjective feeling of ease when making decisions. Specifically, we hypothesize that children have metacognitive beliefs about when ease of processing should be used to guide memory decisions. Based on these beliefs, we suspect that older children (who have more cognitive resources) start to strategically disqualify the feeling of ease as a cue for judgements when it is experienced in irrelevant contexts (Westerman et al., 2003). Interestingly, the latter hypothesis is supported by the results of Pachur, Mata, and Schooler (2009) indicating that adults with

good cognitive capacities are able to strategically disqualify subjective cues for judgments when those cues are perceived as irrelevant.

In conclusion, consistent with the “experienced ease” interpretation of the availability heuristic, this study indicates that, in some circumstances, young children may base their memory decisions on the subjective ease of retrieval rather than the objective number of items they are able to recall. These findings will, of course, need to be generalized to other sorts of memory procedures. Nevertheless, given the alleged involvement of the availability heuristic in a wide range of decision-making processes, the developmental trend—and especially, the transition from automatic to controlled use—in this inference rule should be carefully examined in future research on children’s decision making.

References

- Davies, M., & White, P. A. (1994). Use of the availability heuristic by children. *British Journal of Developmental Psychology, 12*, 503–505. doi:10.1111/j.2044-835X.1994.tb00651.x
- Geurten, M., Meulemans, T., & Willems, S. (in press). Memorability in context: A heuristic story. *Experiment Psychology*.
- Geurten, M., Willems, S., & Meulemans, T. (2015a). Are children conservative, liberal, or metacognitive? Preliminary evidence for the involvement of the distinctiveness heuristic in decision making. *Journal of Experimental Child Psychology, 132*, 230–239. doi:10.1016/j.jecp.2014.12.010
- Geurten, M., Willems, S., & Meulemans, T. (2015b). Beyond the experience: Detection of metamemorial regularities. *Consciousness and Cognition, 33*, 16–23. doi:10.1016/j.concog.2014.11.009
- Hembacher, E., & Ghetti, S. (2014). Don't look at my answer: Subjective uncertainty underlies preschoolers' exclusion of their least accurate memories. *Psychological Science, 25*, 1768–1776. doi:10.1177/0956797614542273
- Miller, J. K., & Lloyd, M. E. (2011). The development of the fluency heuristic in childhood: More questions than answers. In P. A. Higham & J. P. Leboe (Eds.), *Constructions of remembering and metacognition* (pp. 28–39). Basingstoke, UK: Palgrave Macmillan.

Pachur, T., Hertwig, R., & Steinmann, F. (2012). How do people judge risks: Availability heuristic, affect heuristic, or both? *Journal of Experimental Psychology: Applied*, *18*, 314–330.

doi:10.1037/a0028279

Pachur, T., Mata, R., & Schooler, L. J. (2009). Cognitive aging and the adaptive use of recognition in decision making. *Psychology and Aging*, *24*, 901–915. doi:10.1037/a0017211

Ratner, H. H., Smith, B. S., & Dion, S. A. (1986). Development of memory for events. *Journal of Experimental Child Psychology*, *41*, 411–428. doi:10.1016/0022-0965(86)90002-0

Schwarz, N. (1998). Accessible content and accessibility experiences: The interplay of declarative and experiential information in judgment. *Personality and Social Psychology Review*, *2*, 87–99. doi:10.1207/s15327957pspr0202_2

Schwarz, N., Bless, H., Strack, F., Klumpp, G., Rittenauer-Schatka, H., & Simons, A. (1991). Ease of retrieval as information: Another look at the availability heuristic. *Journal of Personality and Social Psychology*, *61*, 195–202. doi:10.1037/0022-3514.61.2.195

Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology*, *5*, 207–232. doi:10.1016/0010-0285(73)90033-9

Wechsler, D. (2005). *Echelle d'intelligence de Wechsler pour enfants: WISC-IV*. Paris: Les Editions du Centre de Psychologie Appliquée.

Westerman, D., Miller, J., & Lloyd, M. (2003). Change in perceptual form attenuates the use of the fluency heuristic in recognition. *Memory and Cognition, 31*, 619–629.

doi:10.3758/BF03196102

Winkielman, P., Schwarz, N., & Belli, R. F. (1998). The role of ease of retrieval and attribution in memory judgments: Judging your memory as worse despite recalling more events.

Psychological Science, 9, 124–126. doi:10.1111/1467-9280.00022

Table 1

Participants' Characteristics (Means and Standard Deviations) by Age Group

	4 years	6 years	8 years
No. of females	11/23	12/24	18/24
Age (months)	56.62 (1.91)	77.04 (3.66)	99.27 (9.67)
Parental education level	13.78 (1.97)	13.65 (2.30)	13.42 (2.79)
Nonverbal intelligence	9.22 (2.07)	9.88 (2.56)	10.71 (3.06)

Table 2

Number of Children Endorsing Each Response Category in the Two Experimental Conditions by Age Group

Group	Condition	Response category		
		Yes	No	Unsure
Total (n = 62)	Easy	<u>26</u>	4	1
	Hard	6	<u>22</u>	3
8 years (n = 23)	Easy	<u>9</u>	2	0
	Hard	3	<u>6</u>	3
6 years (n = 21)	Easy	<u>9</u>	1	0
	Hard	1	<u>10</u>	0
4 years (n = 18)	Easy	<u>8</u>	1	1
	Hard	2	<u>6</u>	0

Note. Critical cells for comparison are underlined.