

UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

Knowledge structure and type of explanation in the domain of bodily functioning

Permalink

<https://escholarship.org/uc/item/8pd364hq>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 21(0)

Authors

Wiers, Reinout W.

Velde, Cindy van de

Hemmes, Baukje

Publication Date

1999

Peer reviewed

Knowledge structure and type of explanation in the domain of bodily functioning

Reinout W. Wiers (R.Wiers@psychology.unimaas.nl)

Faculty of Psychology, University of Maastricht, PO BOX 616,
6200 MD, Maastricht, The Netherlands

Cindy van de Velde

(former student) Clinical Psychology; University of Amsterdam
Roetersstraat 15, 1018 WB Amsterdam, The Netherlands

Baukje Hemmes (B.Hemmes@psychology.unimaas.nl)

(student) Faculty of Psychology University of Maastricht,
PO BOX 616, 6200 MD, Maastricht, The Netherlands

This study addresses two related issues of current debate: the coherence of intuitive knowledge structures and the use of "vitalistic" explanations in the domain of biology. Hatano and Inagaki (1994) proposed that early theories in this domain are characterized by a unique type of explanation: vitalistic explanation (VE). With VE, a biological phenomenon is explained by the activity of an internal organ as if the organ is a (semi-) autonomous agent, functioning independently of the person's intentions. VE is fundamentally different from intentional explanation (IE) and mechanistic explanation (ME). The type of explanation used is important with respect to the nature of cognitive change (e.g. Gutheil, Vera & Keil, 1998). The biological function that was primarily targeted in this study was digestion. We were interested in the coherence of knowledge when explaining the digestion of "good stuff" (milk and bread) and "bad stuff" (alcohol, generally regarded "bad", Wiers, Gunning, & Sergeant, 1998) and the types of explanations used.

Methods

Participants Ten girls and ten boys from a primary school (7-12 years old), eleven girls and eight boys from a secondary school (12-18 years) and four female and eight male psychology students (18-25 years old) participated. **Materials** A semi-structured interview was developed consisting of factual and generative questions. **Procedure-Scoring** Participants were interviewed individually. After scoring the transcribed interviews at the question level, the overall frameworks used and the types of explanation used were scored (as in Samarapungavan & Wiers, 1997). Protocols were scored by two independent judges, with 92% agreement. Disagreements were resolved through discussion.

Results

Three theories were found (framework level): 1. foods and drinks remain in the alimentary canal; 2. only good stuff enters the body; 3. good and bad stuff enters the body. Adherence shifted with age from theory 1 to 3. Counter intuitively, primary school children responded significantly more consistent when compared with secondary school children and students, $\chi^2(1) = 7.0, p < .01$ (Table 1).

Table 1: Consistent and inconsistent use of a theory

Group	Theory 1		Theory 2		Theory 3	
	Consis	Incons	Consis	Incons	Consis	Incons
Primar	2	2	12	4		
Secon			8	11		
Adult			1	10	1	

We hypothesized that young children remained more consistent due to their more frequent use of VE when confronted with anomalies such as: how does alcohol influence behavior when it does not leave the alimentary canal (as a bad stuff)? Indeed, young children used more VE, and older participants more ME, $\chi^2(4) = 11.6, p < .05$ (Table 2).

Table 2: Types of explanations used

Group	Intentional - IE	Vatalistic - VE	Mechanistic-ME
Primar	3	16	1
Secon	2	11	6
Adult		5	7

Discussion

When confronted with an anomaly in the domain of biology, young children remain more coherent than older children. This is probably due to their more frequent use of VE, which was higher here than in Hatano & Inagaki (1994).

References

- Gutheil, G., Vera, A. & Keil, F. C. (1998). Do houseflies think? Patterns of induction and biological beliefs in development. *Cognition*, 66, 33-49.
- Hatano, G. & Inagaki, K. (1994). Young children's naive theory of biology. *Cognition*, 50, 171-188.
- Samarapungavan, A. & Wiers, RW (1997). Children's thoughts on the origin of species. *Cognitive Science*, 21, 147-177.
- Wiers, R.W., Gunning, W.B. & Sergeant, J.A. (1998). Do young children of alcoholics hold more positive or negative alcohol-related expectancies than controls? *Alcoholism: Clinical and Experimental Research*, 22, 1855-1863.