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Author(s): Nagy, Katalin

Title: The function of olfactory experience in reasoning : An empirical study

Year: 2016

Version:

Please cite the original version:

Nagy, K. (2016). The function of olfactory experience in reasoning : An empirical study. In A. Botinis (Ed.), *ExLing 2016 : Proceedings of 7th Tutorial and Research Workshop on Experimental Linguistics* (pp. 123-126). International Speech Communication Association.

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The function of olfactory experience in reasoning: An empirical study.

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Abstract

This study reports the role of olfactory experience (i. e. smell of medication) in a nine-year old girl's reasoning in pair-work situation where the children were asked to choose items useful on a desert island. The extract analysed here is part of the larger data set of my dissertation, in which I investigate how sensory-motor activities involved in reasoning. I video-recorded an experimental task, in which the participants (N=27; age=9; Hungarian L1) have been asked to choose 7 items out of 14 to take those to an imaginary uninhabited island. The multimodal analysis shows that children did not choose the vitamin pills due to its unpleasant smell. The findings suggests that crossmodal experiences can be structural elements of reasoning.

Key words: multimodal analysis, sensory-motor activities, children's reasoning

Introduction

The distributed view of language has become a widely used term in applied linguistics. Most often it used to refer to the bodily, ecologically, socially or situationally distributed nature of language (Streeck, Goodwin & LeBaron 2011). During the last two decades, a great deal of research has been conducted on the embodied, visible aspect of interaction. In the last five years, kinetic behaviour, especially the use of gestures has been studied in a variety of contexts as well, including children's reasoning (e. g. Alibali et. al. 2011, 2014; Ehrlich et. al 2006). However, the function of sensory perception and motor activity during reasoning has been under-researched so far. The aim of my paper is to explore how smell as sensory experience was involved in children's justifications.

Current investigations suggest that we create the cross-sensory experience of the world on the basis of interrelation between different sensual experiences (Fulkerson 2014; Calvert & Thesen 2004; Ernst et al. 2007). Nevertheless, we have little information about how olfactory experiences are connected to body movements and verbal utterances during reasoning. My study fills this gap in the research.

Method

Data collection

Data collection took place in the hobby room of a Hungarian elementary school in the period of 3 weeks, during the afternoon day-care service. The multimodal data includes video-recordings of children completing a desert island task. In this activity the students were asked to choose 7 objects out of 14 to take with themselves to an imaginary uninhabited island. The task was completed in pairs where children were asked to make a shared choice. Furthermore, participants were asked individually and in pairs to justify their choices in an interview conducted by the researcher. In this paper I analyse a unique extract of a pair-work where children smelled the vitamin pills while they were reasoning about its' necessity.

The children and their parents were informed about the research task and the use of data in advance and their permissions were collected according to the Ethical Regulation of the University of Jyväskylä¹. Further, I used pseudonyms and I blurred the video extracts in order to ensure the participants' privacy.

Participants

All together 27 fourth-grade students of two classes completed the Desert Island activity. In this study I analyse a pair-work of Janka and Orsi, since they smelled one of the objects (vitamin pills) while they were solving the task. The children recreated their olfactory experience at the verbal, visual and kinetic levels of reasoning while they negotiated and made their decision whether they should or should not take the pills.

Data presentation and analysis

I applied multimodal interaction analysis to examine how olfactory experience was integrated with gestures and verbal utterances during reasoning. I annotated verbal and body actions in the Elan software for practical reasons. This kind of separate annotation of auditive and visible modalities was the most suitable strategy of data presentation I found for the purposes of my study. However, verbal and body activities have been viewed here as overlapping modalities, since speech is embodied by its nature (Levinson and Holler 2014). The transcript of the extract analysed in this paper covers an approximately 10-second-interval in the video-data. I provide a transcription

¹ Principles of research data management at the University of Jyväskylä, 2014. <https://www.jyu.fi/tutkimus/tutkimusaineistot/rdmenpdf> (accessed on 21 May 2016).

of the utterances where an English translation appears below the original Hungarian utterances in italics, followed by the annotation of bodily actions in double brackets. Overlapping actions are annotated in rectangles (see: Table 1).

Table 1. Transcript

1	Janka:	Melyik legyen? Which one should it be? ((picks up vitamine box))
2	Orsi:	Szerintem I think ((moves Rh towards the VB)) ((opens VB))
3	Janka:	
4	Orsi:	((slightly pulls Rh backwards))
5	Janka:	Ebben igazi vitamin van! There is real vitamin in this! ((looks at Orsi)) ((looks at Janka (. nods))
6	Orsi:	
7	Janka:	((looks at VB, pulls it under her nose, smells))
8	Orsi:	((looks and moves her body and head towards VB))
9	Janka:	((pulls VB away of her nose))
10	Orsi:	((stops))
11	Janka:	((pushes VB under Orsi's nose))
12	Orsi:	((pulls head and torso backwards but moves her head towards VB and smells))
13	Janka:	Büdös. Stinky.
14	Orsi:	((gazes at Janka))
15	Janka:	((pulls back VB, gazes downwards, closes VB))

Multimodal data is used to analyse auditive and visual modalities of speech in linguistics. However, due to the crossmodal and multisensory nature of interaction it includes information about the integration of olfactory experiences to speech as well (Fulkerson, 2013). The data shows that involving movements and verbal utterances, sharing the experience of smell was in the focus of reasoning. Janka made her decision mainly on the basis on the perceived olfactory information. Orsi remained passive, but accepted the sensory reason (smell) and it's verbal conceptualization ("stinky") provided by Janka. Although they integrated multisensory experiences with speech, latter modality was only used to comment on/ to summarise their decision. Based on this data I argue that reasoning is a multisensory activity. Children's justification included only one verbal comment of Janka (büdös/stinky) and the rest of the reasoning elements came from integrated

cross-sensory perceptions (visual, auditory and olfactory) and kinetic actions.

Results

The micro-level observation of the data indicated that smell and vision in connection to the synchronised movements of heads, upper bodies, limbs and verbal processes were integrated while children were negotiating about the necessity of vitamin pills. This data suggest that reasoning is multisensory activity. The verbal utterance (büdös/stinky) summarised the decision which had already been indicated through body actions since Janka had put the pills among the unnecessary objects earlier.

Although there is a constant seek of underlying mental processes which may regulate human reasoning (e. g. [Johnson-Laird, Khemlani and Goodwin, 2015](#)) the findings of this paper suggest that a wide scale of bodily experiences have meaningful functions in arguing. Nevertheless, linguistic research on the connection between smell and meaning-making has just started ([Pennycook and Otsuji 2015](#)) and the findings of my case study are also limited. Therefore further studies are needed to explore how olfactory experiences are contribute in reasoning.

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