Teleological Explanation in Alzheimer's Disease

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Teleological Explanation

Humans have a tendency to view the world *teleologically* — in terms of function and design (Kelemen, 1999). For example, children are "promiscuous" in their acceptance of teleological explanations: they claim pens are for writing, but also that mountains are for climbing. In contrast, adults accept teleological explanations selectively, typically for artifacts, artifact parts, and biological traits (Kelemen, 1999). This selectivity results from the restriction of teleological explanations to cases for which the function invoked in the explanation played a causal role in bringing about what's being explained (Lombrozo & Carey, 2006): artifacts generally have specific properties *because of* their functions, whereas entities like mountains have properties irrespective of consequences like permitting climbing.

Here we report the results of an experiment investigating teleological explanation (TE) in patients with Alzheimer's disease (AD), a neurodegenerative disease characterized by impairment in episodic and semantic memory. AD patients may have lost or fail to access knowledge of an entity's causal history (e.g. how and why mountains have their properties) or generalizations about its domain (e.g. that non-biological natural objects do not typically support TEs). In the absence of such causal knowledge, their ability to decide between a TE ("there are mountains because they are for climbing") and a mechanistic alternative ("there are mountains because of movements in the earth's crust") may be impaired. The finding of "promiscuous teleology" in children suggests that in the absence of mechanistic knowledge to suggest a TE is unwarranted, TEs may be accepted and even preferred. We thus predict that AD patients will accept TEs more often than healthy adults.

Participants and Methods

Participants were 17 patients diagnosed with AD, 12 healthy age-matched participants, and 12 young adults. Participants completed an interview in which they were presented with 10 why-questions and 2 candidate answers for each: one teleological and one mechanistic (modeled after tasks reported in Kelemen, 1999). Participants indicated which explanation they preferred. For example, they were asked "why is the sun so bright?" and offered a TE ("so that animals and plants have enough light to survive") and an alternative ("because the chemical reactions on the sun produce light"). Four questions involved objects from domains that typically warrant TEs (e.g. cars, eyes), and 6 involved objects from domains that do not typically warrant TEs (e.g. trees, mountains).

Results and Discussion

An ANOVA with the status of the TE (warranted, unwarranted) as a within-subjects variable and population as a between subjects variable revealed a significant effect of both explanation status and population on the percent of TEs preferred (see Fig 1). TEs were preferred more often for warranted than unwarranted cases ($p < .01$), and more often by the AD group than the other groups ($p < .01$). These main effects were qualified by a significant interaction ($p < .05$): AD patients disproportionately preferred TEs in unwarranted cases. The preference for warranted TEs in the AD patients was significantly different from chance ($p < .01$), suggesting that the elevated acceptance levels for the unwarranted cases resulted from a genuine preference or ambivalence, and not random guessing. These findings support the hypothesis that TEs are accepted in the absence of causal knowledge to suggest the TE is unwarranted, and may thereby reflect a basic explanatory preference.

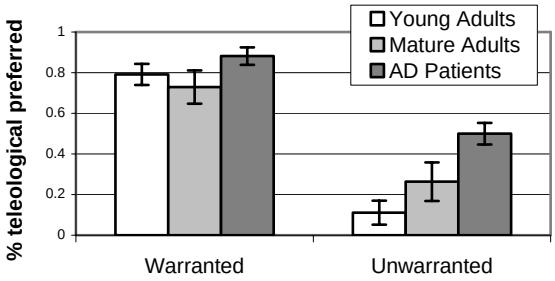

Figure 1: Percent of TEs preferred.

Acknowledgments

We thank Susan Carey and Deborah Kelemen for discussion and Lynelle Cortellini and Caren Walker for help with data collection. This work was supported by an NSF graduate fellowship awarded to Tania Lombrozo and NIH Grant number 5K01AG020548 awarded to Deborah Zaitchik.

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