

available at www.sciencedirect.comjournal homepage: www.elsevier.com/locate/cortex**Special issue: Research report****Visual attentional capture predicts belief in a meaningful world***Paola Bressan*, Peter Kramer and Mara Germani**Dipartimento di Psicologia Generale, Università di Padova, Italy***ARTICLE INFO***Article history:*

Received 20 October 2006

Reviewed 13 February 2007

Revised 12 August 2007

Accepted 20 August 2007

Published online 10 July 2008

Keywords:

Attentional capture

Surprise

Religiosity

Paranormal belief

Coincidences

ABSTRACT

Here we show that the automatic, involuntary process of attentional capture is predictive of beliefs that are typically considered as much more complex and higher-level. Whereas some beliefs are well supported by evidence, others, such as the belief that coincidences occur for a reason, are not. We argue that the tendency to assign meaning to coincidences is a byproduct of an adaptive system that creates and maintains cognitive schemata, and automatically directs attention to violations of a currently active schema. Earlier studies have shown that, within subjects, attentional capture increases with schema strength. Yet, between-subjects effects could exist too: whereas each of us has schemata of various strengths, most likely different individuals are differently inclined to maintain strong or weak ones. Since schemata can be interpreted as beliefs, we predict more attentional capture for subjects with stronger beliefs than for subjects with weaker ones. We measured visual attentional capture in a reaction time experiment, and correlated it with scores on questionnaires about religious and other beliefs and about meaningfulness and surprisingness of coincidences. We found that visual attentional capture predicts a belief in meaningfulness of coincidences, and that this belief mediates a relationship between visual attentional capture and religiosity. Remarkably, strong believers were more disturbed by schema violations than weak believers, and yet appeared less aware of the disrupting events. We conclude that (a) religious people have a stronger belief in meaningfulness of coincidences, indicative of a more general tendency to maintain strong schemata, and that (b) this belief leads them to suppress, ignore, or forget information that has demonstrably captured their attention, but happens to be inconsistent with their schemata.

© 2008 Elsevier Srl. All rights reserved.

1. Introduction

The high prevalence of various paranormal (Gallup and Newport, 1991) and religious beliefs suggests that there could be an important reason for their existence. Some of these beliefs are accompanied by the conviction that coincidences occur for a reason (Brugger et al., 1995; Bressan, 2002). In the current article, we hypothesize that the tendency to assign

meaning to coincidences is the byproduct of an adaptive system that is responsible for the efficient processing and memorization of information, and for guiding our attention away from what is already known, and toward what is new and relevant. We will show that the automatic, involuntary process of attentional capture is predictive of beliefs that are typically considered as much more complex and higher-level.

* Corresponding author. Dipartimento di Psicologia Generale, Università di Padova, Via Venezia 8, 35131 Padova, Italy.

E-mail address: paola.bressan@unipd.it (P. Bressan).

0010-9452/\$ – see front matter © 2008 Elsevier Srl. All rights reserved.

doi:10.1016/j.cortex.2007.08.021

Our hypothesis is based on Bartlett's (1932) notion of *schemata* and on what Schützwohl (1998) calls the *psychoevolutionary model of surprise*, that we, for brevity, will call the *schema model* (e.g., Horstmann, 2006; Meyer et al., 1991; Reisenzein, 2000; Schützwohl, 1998). Although the notion of schema is inconsistently defined by different researchers, there is agreement that a schema is an abstract representation in memory that is built up by concrete past actions or experience (e.g., Bartlett, 1932; Rumelhart, 1984; Schützwohl, 1998). This representation includes variables for aspects of repeated events that change over time, and constraints to encode the regularity of changes. For example, if a dot is repeatedly shown above or below fixation, but never to the right or left of it, then a schema is created for these events with a variable for the location of the dot, and the constraint that this location can only be either above or below fixation, and not to the right or the left of it.

The purpose of having schemata is to relate present events to past ones, and to process them with greater efficiency and speed, in order to leave more processing resources available for what is new and unexpected (e.g., Bartlett, 1932; Bower et al., 1979; Minsky, 1975; Shank and Abelson, 1977; Thorndyke and Hayes-Roth, 1979). For example, a schema that has been created for dots that repeatedly appear either above or below fixation helps to process the appearance of a new dot, if it is similar to the previous ones. In this case, the dot activates the schema, and only few resources need to be spent on processing the information about its size, color, or contrast with the background, whereas more resources can be devoted to the detection of whether it appeared above or below fixation.

According to the schema model, violations of a currently active schema elicit surprise and automatically and involuntarily capture attention, which subsequently allows the stimulus to be encoded into memory (e.g., Schützwohl, 1998). The schema model follows the so-called *contingent-capture-of-attention hypothesis* (e.g., Folk et al., 1992, 1993, 2002). This hypothesis is a rival of an earlier conjecture, according to which the sudden appearance of novel objects captures attention in a bottom-up, rather than top-down, fashion (Yantis and Jonides, 1990). According to the contingent-capture hypothesis, attentional capture is indeed bottom-up but nevertheless contingent on a top-down attentional set that is determined by one's earlier experience and current goal. Whereas the experiments in support of the contingent-capture hypothesis focus on stimulus properties (a distractor, for example, has been shown to capture attention if it shares some feature with a target), the experiments in support of the schema model emphasize the role of violations of expectations (e.g., Reisenzein, 2000; Schützwohl and Borgstedt, 2005; cf. Gendolla and Koller, 2001; Teigen and Keren, 2003).

The schema model links the study of attention to the one of memory (in which schemata are used to explain why memories appear to be actively, and often inaccurately, reconstructed rather than merely retained), and also connects it to social and personality psychology, in which the notion of schemata is also quite common. (For a social-psychological review of religiosity in which the related concepts of "scripts" and "cognitive structures" play an important role, see Batson et al., 1993; for neuropsychological evidence of the involvement of the prefrontal cortex in scripts, see Wood et al.,

2005.) Little is known about the causes of paranormal and religious beliefs, and the latter has been associated with rather many different brain areas (e.g., Azari et al., 2001; Saver and Rabin, 1997). Yet, it is the aspect of the schema model that links different areas of psychology to each other that allows us to connect something as relatively basic and simple as attention to something as apparently complex as the belief that coincidences are meaningful or that divine beings exist.

Fig. 1 shows the stimuli that have been used to test the schema model (e.g., Niepel et al., 1994) and that we also adopted in the present study. Each subject is presented with a sequence of 33 trials containing a pair of words (one above and one below fixation). After a Stimulus Onset Asynchrony (SOA) a dot is added, either above or below the word pair, and the subject's task is to press, as fast as possible, the left key if the dot appeared above the upper word, and the right key if the dot appeared below the lower word. In all trials, except the last one, the words are white on a black background. The characteristics of the words and their meaning are irrelevant to the task but, in the last trial, one of the words is not white-on-black, but instead black-on-white. The last trial is similar to the others and activates the same cognitive schema that has been built up in the previous 32 trials. However, the deviant word violates this schema and therefore, according to Schützwohl (1998), it captures attention and is experienced as surprising.

The strength of a schema increases with the number of its activations (e.g., Mandler, 1984; Thorndyke and Hayes-Roth, 1979), and decreases with the variance of the events that activate it (e.g., Mandler, 1984). The schema model predicts more surprise and more attentional capture when an event violates a strong schema than when it violates a weak one. Corroborating the model, Schützwohl (1998) found that surprise and

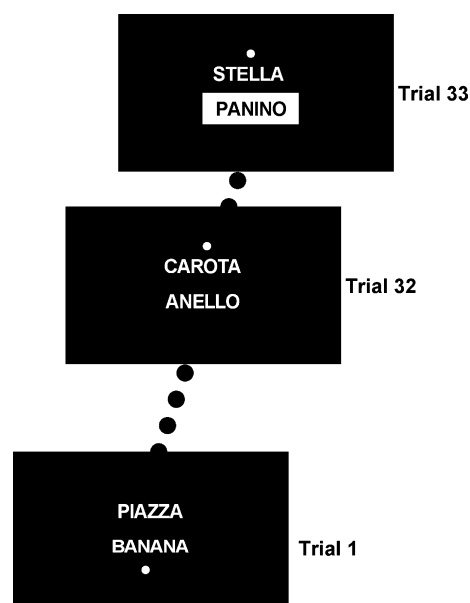


Fig. 1 – Sequence of trials in Experiment 1 (not to scale). In each trial two words are presented and, after a variable SOA, a dot (the target) appears. In Trial 33, after 32 trials in which the words were always white-on-black, one of the two words is unexpectedly presented in black-on-white.

Download English Version:

<https://daneshyari.com/en/article/942657>

Download Persian Version:

<https://daneshyari.com/article/942657>

[Daneshyari.com](https://daneshyari.com)