Personality and Individual Differences 125 (2018) 97–101

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Degree of handedness: A unique individual differences factor for predicting and understanding hindsight bias

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ARTICLE INFO

Keywords:
Hindsight bias
Handedness
Individual differences
Memory
Anchoring
Belief updating
Neuroscience

ABSTRACT

Hindsight bias is a pervasive error in judgment and decision making. Thus, predicting when and why it occurs is an important task. The present study was designed to directly compare two methods that elicit potentially different kinds of hindsight bias and to relate the magnitude of the bias to degree of handedness, a neurologically-related individual difference variable associated with differences in both memory performance and anchoring. 160 introductory psychology students were given 64 general knowledge questions, half under "memory instructions" and the other half under "hypothetical instructions". Results indicated that individuals showed greater hindsight bias under hypothetical than memory instructions, replicating previous research. They also showed that consistent right-handers are relatively more affected under memory instructions, while inconsistent-handers are relatively more affected under hypothetical instructions. In sum, the current study demonstrates that two kinds of hindsight bias exist, and the kind that emerges depends on both the person and situational context. The findings also suggest that different mechanisms may be involved, these mechanisms may have neurological underpinnings, and a multicomponent model of hindsight bias may be best for future theorizing.

1. Introduction

Everyday our judgments and decisions knowingly or unknowingly subject us to various biases (Tversky & Kahneman, 1974). One such bias studied by both cognitive and social psychologists is hindsight bias. Hindsight bias is said to exist whenever responses made after the fact lie closer to the correct answer than those made in foresight (Schkade & Kilboume, 1991). Thus, when a measure captures this difference, and it is significantly larger in the experimental than the control group, we presume that hindsight bias exists for that event. Hindsight bias is important partly because the phenomenon is widespread; it has been observed in domains as diverse as general knowledge (Fischhoff, 1975), the reporting of scientific findings (Davies, 1987), sports results (Leary, 1981), election outcomes (Blank, Fischer, & Erdfelder, 2003; Powell, 1988), the selection of host cities for the Olympic Games (Blank & Nestler, 2006), and even the location of cities on a map (Pohl & Eisenhauer, 1995). It is also a critical issue in situations such as jury decisions and eyewitness testimony, and may provide insights into other related biases in belief updating, perspective taking, and theory of mind (Birch & Bernstein, 2007).

While hindsight bias is no doubt pervasive, there are individual differences. According to Musch and Wagner (2007), the person-related variables that seem to be most predictive of the bias are field dependence, intelligence, and self-presentational concerns. In sum, individuals who are more field-independent (i.e., they are more reliant on an internal rather than external frame of reference and less receptive to social cues), have higher cognitive ability, and are less concerned with appearing to be smarter than they are or managing their impression to others are less susceptible to hindsight bias. Other predictors, which tend to be more mixed in results, are age, gender, expertise, intolerance of ambiguity, dogmatism, desire for control, need for cognition, and conscientiousness (see Musch & Wagner, 2007 for a review). What is interesting is that most of the significant results in the literature are limited to what is termed the hypothetical design – an experimental procedure in which participants are first given outcome information and then asked what they would have answered had they not already been given the solution. This led Musch and Wagner to suggest that future researchers exploring individual differences in hindsight bias avoid the other methodology known as the memory design – a procedure in which individuals first give an (unbiased) response, then receive the correct answer (feedback), and are then (after a period of time) asked to recall their original answer as accurately as possible. We think this might be a bit premature, but will save that for the discussion after attempting to provide empirical evidence to the contrary.

The purpose of the present study is to introduce a new individual difference factor – degree of handedness – that may help to predict

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https://doi.org/10.1016/j.paid.2017.12.036
Received 22 June 2017; Received in revised form 18 November 2017; Accepted 26 December 2017
Available online 04 January 2018
0191-8869/

when hindsight bias occurs and provide more insight into the causal mechanism. Degree of handedness is related to brain organization, specifically neurostructural (McDowell, Felton, Vazquez, & Chiarello, 2016) and perhaps even functional dissimilarity in the interaction between the two hemispheres of the brain (Davidson & Tremblay, 2013). While the mechanism is still not completely understood, some (Prichard, Propper, & Christman, 2013) argue that strong (or consistent)-handed (CH) individuals (those who use their dominant hand for virtually all tasks) have less interaction between the left and right hemispheres as compared to mixed (or inconsistent)-handed (ICH) individuals (those who use their non-dominant hand for at least some tasks). It is also argued that this individual difference is related to the inherent size of the corpus callosum. Specifically, there is some evidence that callosal size is larger in inconsistent- than consistent-handers (Luders et al., 2010), which may result in differential communication and give ICH a connectivity advantage, i.e., ICH might experience more communication or perhaps greater communication efficiency than CH between the hemispheres.

The advantages of handedness strength, as assessed by the Edinburgh Handedness Inventory (EHI; Oldfield, 1971), are at least threefold: 1) it is easily and quickly measured (usually less than a minute), 2) it represents a true individual trait (at the neurological level), and 3) it can, at times, uniquely predict differences that direction of handedness cannot (Prichard et al., 2013). It has also been used successfully to predict responses to a variety of cognitive activities in areas such as perception (Christman, 2001), episodic memory (Lyle, Hanaver-Torrez, Hacklander, & Edlin, 2012; Propper, Christman, & Phaneuf, 2005), persuasion and belief updating (Christman, Henning, Geers, Propper, & Niebauer, 2008; Niebauer, Aselage, & Schutte, 2002), and judgment and decision making (Jasper & Christman, 2005; Westfall, Jasper, & Christman, 2012).

In sum, these handedness studies have shown that ICH more readily update their beliefs, are more susceptible to anchoring effects (if the anchors are relevant), are more persuadable and gullible, are more field dependent, and are more likely to exhibit cognitive dissonance. At the same time, ICH tend to generate more counterfactuals and have significantly better episodic memory. The first set of findings would suggest that ICH might be more susceptible to hindsight bias, while the second set of findings would suggest just the opposite. Our argument for the present paper is that it may depend on the situational demands, i.e., what an individual is asked to do. If a ICH, for example, was first given outcome information and then asked what he/she would have answered had they not already been given the solution (hypothetical design), that individual might indeed show more hindsight bias than a CH. But if a ICH was asked to first give a response, then received the correct answer, and finally (after a period of time) was asked to recall their original answer as accurately as possible (memory design), that individual would probably demonstrate less bias. In sum, people are adaptable, both biases exist, and the same person may commit neither, one, or both kinds and that would largely be dependent on the person and situational context.

A similar argument was made by Blank and Nestler (2006) (see also Blank, Nestler, von Collani, & Fischer, 2008 and Nestler, Blank, & Egloff, 2010), who posited that hindsight bias was not a unitary, but rather multi-component phenomenon. Specifically, they argued that there are three fundamentally distinct components of the bias (each influenced by different processes and each designed to serve a different function), namely: memory distortions, impressions of foreseeability, and impressions of necessity/inevitability. Their integrative approach has allowed other researchers to resolve what might be considered empirical anomalies and to create theoretical links between specific hindsight components and various other research traditions and variables. According to Musch and Wagner (2007), for instance, the memory design likely involves memory distortions (which is more dependent on cognitive factors), whereas hindsight bias in the hypothetical design seems to be more sensitive to impressions of foreseeability and impressions of necessity (wherein socio-motivational influences are more likely to manifest).

Although many researchers (e.g., Blank et al., 2003) discuss the differences between the hypothetical and memory designs, very few use both in the same study and directly compare their effects (see Campbell & Tesser, 1983 and Musch, 2003 for exceptions). The current study is designed to do just that. In addition to receiving questionnaire items under the context of two different situations (one memory, the other hypothetical), participants were given some with feedback and some without feedback. The difference between these two conditions assesses the magnitude of hindsight bias, which if form holds, should be larger in the hypothetical than memory design. Finally, we measured one's degree of handedness, which as mentioned before appears to be a likely predictor of hindsight bias and may well interact with the situational context such that ICH will show more bias in the hypothetical situation and CH will show more bias in the memory design.

2. Method

2.1. Participants

One hundred and sixty volunteers (92 females) from introductory psychology classes at a large Midwestern University participated in the study. Participants were tested individually. The duration of each experimental session was approximately 45 min.

2.2. Experimental materials and procedure

The stimulus material consisted of 64 almanac-type assertions (32 true and 32 false) taken from the studies of Campbell and Tesser (1983) and Hasher, Goldstein, and Toppino (1977). The assertions dealt with different general knowledge questions ranging from biology to medicine, history, politics, current affairs, geography, and others. These items were chosen such that participants would not likely possess the specific knowledge to answer them correctly, but would be able to estimate their correct answer. Two examples were “One knot is equivalent to 1.84 km/hr.” (True) and “The first country to use paper was Egypt.” (False). For each statement, participants were asked to indicate the degree to which they thought the statement was true or false by responding on a 21-point line scale anchored by − 10 meaning “completely false” and + 10 meaning “completely true” with 0 referring to uncertainty either way.

Each booklet had 5 sections. The first 4 sections were for the memory design; the last section was for the hypothetical design. Section 1 consisted of 32 items without any feedback information, where participants were asked to rate whether each statement was true or false on the 21-point scale described above. In the second section of the booklet, participants were asked to answer other research items that were unrelated to the present study. These filler task items took about 20 min to complete and provided a memory retention interval. In the third section, participants were provided with the same 32 almanac questions as in Section 1. Sixteen of these were accompanied with feedback; the other 16 were not. Here, participants were not asked to respond; instead they just read each item. The fourth section required participants to recall the responses that they gave for the 32 items in Section 1, while ignoring the feedback given for 16 of these 32 questions in Section 3. Specifically, they were given the following instructions: “*Recall as accurately as possible the response you gave earlier to this statement and ignore the feedback that has been given to you.*” The fifth and last section contained another 32 items (all new) for the hypothetical design, half of which were accompanied by feedback. In this section, participants were asked to give their true/false confidence response to the questions for all 32 items. However, for the 16 items where feedback was provided they were given the following instructions: “*Try to estimate as accurately as you can the answer you believe you would have given to the statement if we had not told you the correct answer.*”