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How social information affects information search and choice in probabilistic inferences☆

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ABSTRACT

When making decisions, people are often exposed to relevant information stemming from qualitatively different sources. For instance, when making a choice between two alternatives people can rely on the advice of other people (i.e., social information) or search for factual information about the alternatives (i.e., non-social information). Prior research in categorization has shown that social information is given special attention when both social and non-social information is available, even when the social information has no additional informational value. The goal of the current work is to investigate whether framing information as social or non-social also influences information search and choice in probabilistic inferences. In a first study, we found that framing cues (i.e., the information used to make a decision) with medium validity as social increased the probability that they were searched for compared to a task where the same cues were framed as non-social information, but did not change the strategy people relied on. A second and a third study showed that framing a cue with high validity as social information led to a more focused search and facilitated learning to rely on a non-compensatory decision strategy. Overall, the results suggest that social in comparison to non-social information is given more attention and is learned faster than non-social information.

1. Introduction

In everyday life people can access information from social and non-social sources when making a decision: Suppose you are hiring a new employee. You might make an informed decision by reading the applicant's resume, by consulting prior employers, or simply by asking your colleagues for advice. There is good reason to believe that besides the validity of a piece of information the source of the information also influences whether it is looked up or not. Previous research suggests that social information such as advice receives more attention than non-social information of the same validity because people are inherently biased towards acquiring, remembering and transmitting social information (Heyes, 2012; Mesoudi, Whiten, & Dunbar, 2006). Accordingly, social information is frequently considered (Drehmann, Oechssler, & Roider, 2007; Gibson, 2004), even when non-social information is available (Smith & Collins, 2009; Sommerfeld, Krambeck, Semmann, & Milinski, 2007). Consistently, research in categorization has found that people adhere to social information even if it carries no additional informative value (Collins, Percy, Smith, & Kruschke, 2011; Puskaric, von Helversen, & Rieskamp, 2017). The goal of the current research is to investigate whether framing information as social or non-social also influences information search and decision making in probabilistic inference tasks.

1.1. Social information in decision-making

Humans have a strong predisposition towards socially transmitted information (Rendell et al., 2011). People often attribute a unique value to social information and pay more attention to it than to non-social information irrespective of it being communicated by real, human individuals or simply being framed as social (Collins et al., 2011; Önkal, Goodwin, Thomson, Sinan, & Pollock, 2009; Promberger & Baron, 2006; Wærn & Ramberg, 1996). For instance, people tend to trust social information more than factual information coming from a non-social source such as information generated by a statistical method. In this vein, Promberger and Baron (2006) found that people were more likely to follow the recommendation of a social source compared to the recommendation of a computer algorithm. A similar study (Wærn & Ramberg, 1996) showed that the reported trust in social sources was much higher compared to non-social ones. Moreover, participants more

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often attributed positive characteristics such as insight and explanatory value to advice coming from a social source than they did to a non-social source.

From an evolutionary perspective a preference for social information can be very beneficial: Following social information is adaptive because it removes the necessity to explore the problem environment by, for instance, time-consuming trial-and-error learning (Henrich & McElreath, 2003; McElreath et al., 2005; McElreath, Fasolo, & Wallin, 2010). Indeed, if another person has already invested a substantial effort to solve a problem, acquiring this information through imitation or advice can be a cheap and relatively effortless alternative (Grüter, Leadbeater, & Ratnieks, 2010), especially so when it is difficult or costly to explore an environment and gather firsthand experience (Henrich & Boyd, 1998; Henrich & McElreath, 2003; McElreath et al., 2005). This suggests that people could have a predisposition towards considering social information, which can influence how much they rely on this information when searching for information and when making judgments and decisions. In line with this idea, Collins et al. (2011) found in a classification task that when social and non-social information was provided simultaneously, people considered social information even if it did not provide any additional insight. Conversely, when both pieces of information were of the same type, the redundant piece of information was ignored (see also De Houwer, Beckers, & Vandorpe, 2005). Similarly, Önkal et al. (2009) showed that in a forecasting task, advice stemming from a human expert received more attention than advice from a forecasting algorithm. Furthermore, the advice coming from a social source had a longer-lasting effect on forecasts.

Nevertheless, people do not exclusively rely on social information (Franz & Matthews, 2010), but also consider information from other sources (e.g. Puskaric et al., 2017). Moreover, they sometimes underweight social information compared to non-social information (Weizsäcker, 2010; Yaniv & Kleinberger, 2000). This raises the question whether in a probabilistic inference task, in which people often need to deal with social and non-social information, denoting information as social will increase the probability that people search for this information and give it a greater weight in the decision process.

1.2. Information search in probabilistic inferences

Probabilistic inference refers to the process of inferring which of two or more options (e.g., different job candidates) has a higher value on a criterion (e.g., candidates' suitability for the open position) on the basis of a number of probabilistic cues (e.g., work experience, education, or skills). To explain how people make probabilistic inferences, current research has distinguished a multi-strategy and a single-strategy approach (Bröder & Eichler, 2006; Busemeyer & Townsend, 1993; Gigerenzer & Todd, 1999; Glöckner & Betsch, 2008; Hausmann & Läge, 2008; Lee & Cummins, 2004; Rieskamp, 2006; Rieskamp & Hoffrage, 2008). A multi-strategy or toolbox approach assumes that humans have a repertoire of strategies from which they choose the appropriate strategy depending on the demands of the decision task (Gigerenzer & Todd, 1999; Payne, Bettman, & Johnson, 1993). Strategies can be broadly classified into compensatory and non-compensatory strategy types (e.g., Payne et al., 1993). Compensatory strategies such as the weighted additive strategy (WADD) assume that people make a decision by weighing and integrating all available information — which allows compensating low values on an important cue by high values on less important ones. In contrast, non-compensatory strategies such as the take-the-best strategy (TTB, Gigerenzer & Goldstein, 1996) assume that people make a decision based only on the most valid, discriminating cue independent of the option's value on the other cues. Only when a cue does not discriminate, is the next most valid cue considered. Past research has shown that people can learn to select the best-performing strategy for a specific environment based on outcome feedback (Mata, von Helversen, & Rieskamp, 2010, 2011; Rieskamp, 2006; Rieskamp & Otto, 2006).

In contrast, the single-strategy approach assumes that decision makers employ a single decision-making mechanism that is adjusted to a given inference problem. Different models have been proposed to describe the decision processes within a single-strategy approach, with connectionist models and evidence accumulation models featured most prominently (Glöckner, 2009; Newell & Lee, 2011). These models capture the observed changes in behavior in compensatory or non-compensatory tasks via changes in model parameters. For instance, connectionist models assume changes in the weighting of cues (Glöckner & Betsch, 2008) and evidence accumulation models assume changes of decision thresholds (Hausmann & Läge, 2008; Lee & Cummins, 2004; Newell, 2005). In general, both single and multi-strategy frameworks have been shown to account well for empirical data. The current work does not aim to test both approaches against each other. Although we use a multi-strategy approach in the current paper, we use it purely as a tool to show how framing information as social compared to non-social may affect people's information search and their decisions.[1]

Past research has shown that people adapt their decision behavior to the features and demands of the task. In this vein, it has been shown that people search for less information and rely more frequently on non-compensatory strategies when time is scarce, information search is costly, and information needs to be searched or retrieved from memory, and when the cue validities differ strongly (Bröder, 2000; Bröder & Schiffer, 2003; Newell & Shanks, 2003; Newell, Weston, & Shanks, 2003; Rieskamp & Hoffrage, 2008; Rieskamp & Otto, 2006). In contrast, if all information is easily available, people have sufficient time, are in a positive mood, and validities are similar, people search for more information and rely more frequently on compensatory strategies (e.g., Bröder, 2000; Bröder & Schiffer, 2006; Payne, Bettman, & Johnson, 1988; Platzer & Bröder, 2012; Scheibehenne & von Helversen, 2014; Söllner, Bröder, & Hilbig, 2013). Furthermore, as well as highlighting different information during feedback, the design of the decision display can influence how people represent and solve the decision task (Bröder, Glöckner, Betsch, Link, & Ettlin, 2013; Söllner et al., 2013). Here, we aim to investigate whether framing the information about the decision options as social or non-social will also affect how people solve the decision task.

1.3. Social information in probabilistic inference tasks

So far, there is relatively little research on the use of social information in probabilistic inference tasks. Betsch and colleagues (Betsch & Lang, 2013; Betsch, Lang, Lehmann, & Axmann, 2014) found in a social decision-making task with children that when focusing attention on an advice giver (in this case, different animals) by calling it a personal friend, it increased how often the animal was asked for advice and how strongly the advice influenced the decision. Studies with adults have studied inferences using different types of tasks ranging from asking people to infer which cities have more inhabitants to which companies' stocks bring a higher profit, or which movies will attract more viewers. Although some of these studies have provided social cues such as advice from experts (e.g., Ettlin & Bröder, 2015; Scheibehenne & von Helversen, 2014) and others have provided non-social cues such as indicators of a company's past performance or information about a city's attributes (e.g., Rieskamp, 2006), to our knowledge no study has examined whether the social nature of cues has a specific influence on the decision process.

However, there is research in probabilistic inference tasks suggesting that how people search for information in the environment is also guided by preexisting concepts about the cues (García-Retamero &

[1] In a single-strategy framework the changes we observe in “decision strategies” would likely be reflected in the decision weights that the cues receive in the social compared to the non-social condition.