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Research Article

An information theory account of preference prediction accuracy

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Abstract

Knowledge about other people's preferences is essential for successful social interactions, but what exactly are the driving factors that determine how well we can predict the likes and dislikes of people around us? To investigate the accuracy of couples' preference predictions we outline and empirically test three hypotheses: The positive valence hypothesis predicts that predictions for likes are more accurate than for dislikes. The negative valence hypothesis predicts the opposite, namely that dislikes are predicted more accurately than dislikes. The base rate hypothesis predicts that preference knowledge critically depends on the base rates of likes and dislikes within a given domain. In a series of studies we show that predicting likes over dislikes has relatively little effect compared with base rates. That is, accuracy is greater for relatively rare events regardless of whether they are liked or disliked. Our findings further suggest that when predicting preferences, people seem to rely on a combination of general, stereotypical knowledge of common preferences on the one hand and specific, idiosyncratic knowledge of rare preferences on the other.

Keywords: Preferences; Prediction accuracy; Positivity effect; Negativity effect; Base rate

Knowing about the likes and dislikes of friends and acquaintances is an important aspect of our social lives. Accurate predictions of preferences are particularly important in close relationships, where couples often make important and consequential decisions on behalf of each other (Fagerlin, Ditto, Danks, & Houts, 2001). Despite this importance, it has been found that the accuracy of such predictions is often rather low even though couples have the opportunity of getting ample feedback over time (Lerouge & Warlop, 2006; Pollmann & Finkenauer, 2009; Scheibehenne, Mata, & Todd, 2011; Swann & Gill, 1997). We test accuracy in more detail by distinguishing between general accuracy (e.g., my partner does not like romantic comedies) and specific accuracy (e.g., although my partner does not like romantic comedies, he does like the movie "When Harry met Sally") and by investigating how accuracy relates to the base rates of preferences. From a statistical point of view, accuracy further depends on the reliability or consistency of the to-be-predicted person's preferences (Cronbach, 1955). To help people make better predictions it is important to gain a better understanding of the diverse factors that drive accuracy in preference predictions. Two factors that may be particularly relevant here are the internal cognitive processes underlying preference predictions and the external environmental structures that people face (Anderson & Schooler, 1991; Gigerenzer, Todd, & the ABC research group, 1999).

To investigate the accuracy of preference predictions in more detail, here we focus on three research hypotheses that have been proposed in the literature. The positive valence hypothesis predicts that predictions for likes are more accurate than for dislikes. The negative valence hypothesis predicts the opposite, namely that dislikes are predicted more accurately than dislikes. Next to these two valence-based accounts there is

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the base rate hypothesis, which predicts that preference knowledge critically depends on the prevalence of likes and dislikes within a given domain. Even though these different accounts are closely related, they have not yet been considered in concert. Below, we provide a theoretical outline of all three hypotheses, followed by a series of three experiments that put them to an empirical test.

Positive valence hypothesis

In support of the positive valence hypothesis, Gershoff, Mukherjee, and Mukhopadhyay (2003) found that, when given the opportunity to learn about a person's preferences, people often seek out information about liked alternatives, presumably because there is less ambiguity in likes as compared to dislikes (Gershoff, Mukherjee, & Mukhopadhyay, 2007) For example, if someone likes a movie, chances are that they will like all of its attributes (actors, plot, genre) at least a little. If the movie is disliked, it may not be clear if this is due to one particular attribute of the movie, a combination of attributes, or all of them. From this perspective, likes are more informative than dislikes because they provide one with more definite information. Besides this, people may often prefer to communicate likes rather than a dislikes, because they want to make a cheerful impression (Leary & Kowalski, 1990; Zhao, Grasmuck, & Martin, 2008). In turn, positive information may also be better remembered, which would increase the chances of making accurate predictions (Matt, Vázquez, & Campbell, 1992). In line with this, Mata, Scheibehenne, and Todd (2008) found that parents knew likes better than dislikes when predicting the preferences of their children for school lunch dishes.

Negative valence hypothesis

In contrast to the positive valence hypothesis, there are also arguments suggesting that dislikes will be better predicted than likes. Dislikes are more likely to be communicated (Eisenhower, Mathiowetz, & Morganstein, 1991) and negative information has been shown to attract more attention than positive information (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001), providing more opportunity for learning. In a consumer context, negative product information is often regarded as more diagnostic and more important than positive information (Ahluwalia, 2002; Herr, Kardes, & Kim, 1991).

In many social situations, giving something that is disliked will be the more costly error as compared to not giving something that is liked as the former will lead to negative feedback, which can improve the encoding and memory of negative preferences (Baumeister et al., 2001; Ito, Larsen, Smith, & Cacioppo, 1998; Pratto & John, 1991; Taylor, 1991). Empirical support for the negative valence hypothesis stems from a study by Liem, Zandstra, and Thomas (2010) who found that parents who predicted the food flavor preferences of their children were more accurate for dislikes than for likes.

Base rate hypothesis

In difference to the previous valence-based accounts, the base rate hypothesis predicts that accuracy depends on the proportion of likes and dislikes within a given domain. From the perspective of information theory, rare events or exceptions are more informative than more frequent events (Shannon, 1948). Formally, the informational value I of an item x can be expressed as the negative logarithm of its probability p: $I_x = -\log(p_x)$ (Shannon & Weaver, 1949). As a simple example, imagine a waitress serving drinks to a table of five customers, four of whom ordered a beer and one a glass of wine. To remember who ordered which drink, it will be much easier for the waitress to remember the single person who ordered the wine rather than what each of them ordered separately.

As in the example of the waitress, trying to memorize each individual preference for every single person around us would tax our limited cognitive resources and thus be biologically costly (Dukas, 1999). Here, a more efficient way of encoding would be to memorize the general tendency plus exceptions. With respect to preference prediction, this suggests that people will be more accurate when predicting rare idiosyncratic or uncommon preferences of their partner within a given domain, and that they have a general understanding of the respective common or default preferences.

While there is an ongoing debate regarding the extent to which decision makers consider or neglect base-rate information (e.g. Kahneman & Tversky, 1973; Kruglanski & Gigerenzer, 2011), past research consistently found that people's predictions are strongly influenced by base-rates (see Ajzen, 1977, for an early demonstration). With respect to preference prediction, an empirical study by West (1996) provides further support for the base rate hypothesis. In her experiment, participants who predicted preferences for abstract quilt patterns paid more attention to rare preferences during learning. Similarly, people also seem to pay more attention to rare events in real-word contexts, for example when forming social judgments (Skowronski & Carlston, 1987). The importance of base rates is further supported by research showing that people are sensitive to the diagnosticity of preferences, for example by paying more attention to extreme likes and dislikes (Gershoff et al., 2003). In addition, Scheibehenne et al. (2011) found that people often seem to possess some sort of general knowledge about the stereotypical or common preferences within a given domain. To our knowledge, it has not yet been tested, however, whether increased attention to rare preferences leads to more specific knowledge about rare preferences.

Measuring prediction accuracy

Testing these three hypotheses on empirical grounds requires a solid and interpretable measure of prediction accuracy. Here, one possible measure is to calculate the proportion of correct predictions separately for all liked and all disliked items within a given set. While feasible, this measure systematically depends on the base rates of the predictions,