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Similarity-based Influences in Judgment and Decision Making

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Similarity in Judgment and Decision Making

Psychological similarity—the subjective distance between objects in the world or memory—is a highly influential concept in many areas of cognitive psychology, such as learning, memory, categorization, judgment, and preferential choice. The contributions within this symposium will evaluate the fundamental role that similarity plays in human judgment and decision making. We bring together experts from distinct subdisciplines of psychology, who examine the influence of similarity on categorization, consumer choice, risky choice, social norms, and in memory-based choices. Specifically, the contributions elaborate on three key questions repeatedly pursued within cognitive psychology: 1) how does similarity activate previous experiences and renders them available within a given choice context? 2) how does similarity interact with feature or knowledge abstraction processes? 3) how is similarity represented psychologically? To reach this goal, the contributions within this symposium focus on reinstating similarity-based processes within formal cognitive models and test their predictions experimentally.

Symposium Paper 1
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The first contribution asks **do people select between or blend criterion- and similarity-based judgments?** To answer this question this paper presents insights from a learning model. When making a judgment, such as evaluating the kindness of a stranger, it has been argued that people select between two kinds of judgment strategies: a capacity-limited abstraction of knowledge and a similarity-based retrieval of past instances from memory. To disentangle the strategies, past research has usually assumed that people consistently pursue the same strategy over time. How people develop these strategy preferences has attracted less attention. We

instantiated global and item-specific preferences for knowledge abstraction over similarity-based retrieval within a learning model that learns to adjust the relative importance of different cues and past memories during learning. Next, we tested distinct predictions of this learning model for global- and item-specific strategy preferences in a task requiring knowledge abstraction and similarity-based retrieval to make accuracy and familiarity judgments . In line with the idea that people may develop a global strategy preference, participants learned to accurately judge objects consistent with abstracted knowledge, but objects similar to past instances were more difficult to judge. Importantly, new instances requiring retrieval were not more familiar to participants than new instances requiring feature-based knowledge, ruling out trial-by-trial strategy shifts. In sum, these results suggest that a learning model integrating knowledge abstraction and similarity-based retrieval may provide a suitable tool for understanding learning processes in human judgment.

Symposium Paper 2
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The second talk turns to similarity in a preferential domain, **testing a theory of similarity in preferential choice.** According to many theories of preferential choice people prefer options because the attribute values of an option are in sum better than the attribute values of alternative options (Keeny & Raiffa, 1976). However, people also seem to construct preferences from their previous experiences from memory. This means that people might compare novel options to memorized experiences and prefer options that are similar to past highly-valued options. The data of two experimental studies support this similarity- and memory-based account for preferential value formation. Computational modeling and predictive model comparison among three models with data from two incentivized preferential choice experiments showed that only a few participants relied on sums of subjectively weighted attribute values when the experience was

available. Most participants in both experimental studies showed preferences consistent with the memory-based view on preferences, which bases preferences on previous experience and the similarity between novel and memorized options. Further, people whose experience consisted of direct sensory exposure such as tasting a food were also those with higher likelihoods of memory-based preference construction, compared to people whose exposure was indirect. These results highlight the central role of memory and experiences in preference formation, and provide novel avenues for theories of preferences, showcasing the path dependency of human preferences.

Symposium Paper 3
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Besides inferential and preferential choices, the third contribution concerns **estimating norms by social similarity**. People often do not accurately perceive their social surroundings. Importantly, people regularly overestimate the prevalence of unfavorable behaviors from alcohol consumption to daily conflicts. To explain these misperceptions, recently developed social sampling models propose that people use their own social circle to infer these norms and thereby oversample certain behavioral patterns. Yet, it remains an open question how well social sampling models explain norm perception if the actual social surrounding is considered. We thus sampled a friendship network of college freshmen ($N = 108$) and assessed norm perceptions and self-reported behavior in eight different domains, such as alcohol consumption or study time, across two timepoints.

Descriptively, freshmen misperceived the average social norm and systematically overestimated behaviors like alcohol/meat consumption, or conflicts. In line with previous research, the best fitting model of norm perceptions suggests that people first sample individuals from the population by behavioral similarity and then discard individuals too similar to themselves. Models assuming sampling by social closeness were only performing second best. Yet, social closeness models more accurately predicted norm perceptions at a second time point, indicating that sampling models based on behavioral similarity may be overfitting. However, on average, sampling models considering the actual social surrounding fared worse at describing and predicting norm perception than sampling models considering participants' impression of their social surrounding.

Taken together, our study provides the first direct test of how sampling processes shape norm perception in a complete social network. We discuss potential avenues for theories of norm perception.

Symposium Paper 4
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The last contribution of the symposium is concerned with the way that the cognitive system computes the similarity between pairs of objects. Using a categorization and a judgment task, it examines **a simplification of similarity-based processes in speeded categorization: a test of an extended exemplar model.** Exemplar-based theories have shown that people rely on similarity-based processes in categorization and inferential judgments (Hoffmann et al., 2014; Juslin et al., 2003; Nosofsky, 1992). The psychological similarity between new and old objects is usually assumed to be the linear distance between two objects' features (Euclidean similarity). Importantly, the computation of Euclidean similarity requires the calculation of the exact metric distance between all pairs of features of two objects, which is computationally demanding. The present study tests, if cognitive capacity limitations cause people to use a new psychological similarity—the discrete similarity—which is computationally easier than the Euclidean distance. To test this, half of N=60 participants performed categorizations under time pressure, and half of them faced no time pressure. The task design was optimized to distinguish learners who use a Euclidean similarity and those using a Discrete similarity in Nosofsky's generalized context theory (Nosofsky, 1986). All participants knew the category structure through trial-by-trial supervised learning (without time pressure). Participants categorized new and old stimuli in a test phase, in which they faced time pressure. The results show that the observed categorization behavior with time pressure and without time pressure was fit best by a model using the traditional Euclidean similarity. Also, individual cognitive modeling by an extension of Nosofsky's generalized context model revealed that under time pressure, a random choice model described most participants' behavior. These findings suggest that under time pressure, people are still capable of complex similarity processing, and instead decrease their choice consistency.

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