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Judgments and decisions based on attempts to disambiguate the given information:

Effects of decision frames, non-diagnostic information, and information order

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The paper is followed by a **discussion**

Should George buy the tomato soup or should he not buy it? The tomato soup is of a particular quality, it is available for certain price, and buying as well as eating the soup is most likely to be a social activity. Hundreds (if not more) pieces of information may influence George in making this decision. Decision makers, like George, gather information about the feasibility and the desirability of buying a product in question; however, often this comes with an obstacle: much of the available information is ambiguous, requiring that the decision maker makes sense of the available information. So, besides gathering information, the decision maker needs to decide whether the available information is important (vs. unimportant) and whether it is valid (vs. invalid). In essence, people often need to search for clues in order to disambiguate the vague information that is available at first. This includes that people focus on a subset of the available information and give greater weight to some pieces of information than to others.

The literature in psychology and decision making has thoroughly described and explained the processes of information search and integration. The present paper stresses the need to go beyond the given information (Bruner, 1957) and the role of conversational rules as social and meta-cognitive tools for decision makers to disambiguate the inherently ambiguous information that is available. Specifically, it will be explained how conversational rules affect the well-known risky choice framing effect, 'objectively' irrelevant information for predictions, and primacy and recency effects in decision making and persuasion. As all of the phenomena discussed here relate to some of the research conducted by Daniel Kahneman and Amos Tversky, this paper is, in a particular way, a tribute to their research.

Conversational Rules

Much of the information that we rely on when making decisions is communicated information. Due to the limits of language (e.g., ambiguity of semantic meaning) and social world constraints (e.g., time pressure), it cannot be expected that communicated information is always clear to a message recipient. As communicated information is thus ambiguous, people need to have tools that help them to understand what is communicated and what is implied. Conversational rules can serve as such tools.

The philosopher Paul Grice (1975) suggested that communicators and recipients co-operate in everyday life in order to determine the *pragmatic* meaning of information exchange. This co-operative principle operates on the basis of four central maxims, the maxim of relation, the maxim of quantity, the maxim of manner, and the maxim of quality.

According to the maxim of relation, communicators are expected to give information that is relevant for the ongoing conversation. For example, when George asks a salesperson about the price of the soup, he expects that the salesperson responds to the meaning of this question, and he would thus be surprised if the salesperson elaborated on the rain in Ireland. George would then likely try to understand the utterance based on the assumption that it must be somehow relevant because in general communicated information comes with a "guarantee of relevance" (e.g., Sperber & Wilson, 1995).

According to the maxim of quantity, speakers are expected to be informative, that is, they are expected to avoid redundancies in their messages. For example, if George asked for the price of the soup, the salesperson may respond by revealing its price, but George would be quite surprised if the salesperson repeated this information three times

back-to-back, at least if there was no reason for the salesperson to believe that George was not able to understand the utterance (e.g., due to bad hearing). This maxim or norm is also known as the "given new contract" (Clark & Haviland, 1977; Clark, 1985), as new information is usually given and recipients expect communicators to provide them with new information.

According to the maxim of manner, communicators are expected to present information in a way that the recipient can understand the message. For example, if George, an Englishman, asked for the price of the soup, then the salesperson, an Englishwoman, should be clear in naming the price of the soup; George would be surprised if the salesperson mumbled the price or started responding in a different language (e.g., French instead of English). Finally, according to the maxim of quality, communicators are expected to tell the truth. For example, if George asked a question about the price of the soup, he expects that the price mentioned by the salesperson is correct or at least based on the knowledge that the salesperson has available; it would be odd if the salesperson blatantly lied about the price of the soup.

Certainly, these maxims are vague and each of us can list many instances in which these maxims have been violated. As with other norms, violations are part of everyday life, but experienced violations indicate that these rules exist. Of interests here is that people rely on these maxims as guidelines for giving and interpreting messages (see Higgins, 1981; Schwarz, 1994, 1996). In this sense, inherently social norms guide information processing, which in turn affects people's judgments and decisions. Below I will summarize the effects of conversational rules on the risky choice framing effect, the dilution effect, and conversational order effects in decision making and persuasion.

Risky Choice Framing Effects

The literature documented in great detail that the framing of a situation or a decision problem affects people's judgments and decisions (e.g., Levin et al., 1998; Levin, Gaeth, & Schneider, 2002; Kühberger, 1998). One of the well-know effects is the risky choice framing effects (e.g., Levin et al., 1998): People's decisions for either a risky or a secure alternative depend largely on whether the prospects of alternatives are framed in terms of gains (gain frame) or losses (loss frame). Tversky and Kahneman (1981) demonstrated this effect with the now classic *Asian disease* decision scenario. Participants imagine that 600 individuals have been infected with an Asian disease. Half of the participants receive a *gain* frame version of two intervention programs.

Program A: *200 individuals will be saved.*

Program B: *A 1/3 probability that 600 individuals will be saved and a 2/3 probability that nobody will be saved.*

Both alternatives have the same expected value (probability x outcome), however, participants usually prefer the secure alternative (Program A) to the risky alternative (Program B). Importantly, the preference is usually reversed in favor of the risky alternative when the alternatives are presented in terms of losses:

Program A: *400 individuals will die.*

Program B: *A 1/3 probability that nobody will die and a 2/3 probability that 600 individuals will die.*

Tversky and Kahneman (1981) explained the framing effect with the value function of prospect theory (Kahneman & Tversky, 1979). The relationship between objective and subjective values is curvilinear, convex for negative values and concave for

positive values. The framing of the decision scenario shifts the reference point to either negative values (losses) or positive values (gains). Preference as a function of decision frames (gains vs. losses) thus reflects the difference in subjective values between the secure and the risky alternative.

Since the introduction of this framing effect, numerous researchers have addressed its causes and boundary conditions (e.g., Bless, Betsch, & Franzen, 1998; Igou & Bless, 2007a; Kühberger, 1998; LeBoeuf & Shafir, 2003; Levin et al., 1998; McElroy & Seta, 2003; for overviews see Keren, 2010), and debates about moderating and mediating variables are ongoing.

Of interest here is that we understand the situation that decision makers are in when they are being confronted with such a problem. First, as with many decision problems, there are two alternatives, naturally leading to a comparison of the two. Further, the alternatives are different in terms of probabilities and values, but they are similar in terms of the expected value of the outcomes. This in itself poses a problem for the decision maker as she has to understand what the difference between the alternatives may be. From the perspective of the logic of conversation, the decision maker has no reason to doubt that there is a difference between both alternatives, why else would she have been given a task asking for a preference? That is, the decision maker expects that the given information, including the instructions of making a choice between seemingly similar alternatives, is relevant. Add to the ambiguity of the alternatives that the Asian disease seems to relate to a complex medical and ethical problem (e.g., Maule, 1989).

As the decision maker is confronted with inherently ambiguous information, that is, the similar alternatives and a scenario that implies some moral values, she searches for

information that may help to disambiguate the information (e.g., Bless, Betsch, & Franzen, 1997). Ironically, although she was given ambiguous information, the decision maker expects it to be relevant. Given that standard research situations often do not allow for clarification questions, the decision maker turns back to the given task information in order to distill its meaning (e.g., Schwarz, 1994). As the decision frame is part of the scenario information, it thus becomes more influential, the more the decision maker hinks about the meaning of the communicated information. It is then the subjective representation of the event (ambiguous moral-ethical problem) that allows for the transformation of objective values into subjective values as described by prospect theory (e.g., Tversky & Kahneman, 1981). This reasoning is consistent with Bless and colleagues' (1998) findings that the framing effect emerged when the decision situation was presented as a medical problem, but that is was reduced when the situation was presented as a statistical problem. Note also that the most robust risky choice framing effects seem emerge for the Asian disease in comparison to other risky choice framing problems (e.g., Kühberger, 1998). Presumably, the ambiguity of this problem invites pronounced subjective representations of the problem, which in turn lead to pronounced transfers of 'objective' into 'subjective' values.

This idea that the decision maker relies on a constructive processing strategy trying to make sense of the communicated ambiguous information, was the starting point of our research on framing effects (Igou & Bless, 2007a). We predicted that more constructive thought would lead to greater framing effects than less constructive thought because in the former case decision frames were more likely to be considered than in the latter case. In particular we argue that it is an effortful constructive processing strategy,

which Forgas' (1995, 2001) specifies as substantive processing, that accounts for framing effects. Consistently we found that a measured longer duration of thinking about the task led to more framing effects than a shorter duration of thinking about the task (Study 1). We replicated this effect by manipulating the duration of deliberation (Study 3), and we demonstrated that processing motivation (accountability; e.g., Tetlock, 1983) moderated the framing effect such that for highly motivated participants we observed a greater framing effect than for participants who were not particularly motivated (Study 2). Importantly, the effect of processing effort was only observed when the situation was framed as an ambiguous problem (medical decision), but not when it was presented as a less ambiguous problem (statistical decision; Study 1). That is, only when the situation was particularly ambiguous *and* when decision makers engaged in effortful processing, was the framing effect observed.

This example demonstrates how the consideration of conversational rules contributes to the understanding of how people process particular information. In this case, the conversational processes do not contradict the assumptions of Tversky and Kahneman (1981), however, they add to the full understanding of the processes that contribute to the framing effect and they allow for the specification conditions under which the effects are more or less likely to emerge. The next two sections will examine conversational bases for the dilution effect and order effects, both relating to Kahneman and Tversky's (1973) representativeness heuristic.

Dilution Effect

According to Kahneman and Tversky (1973), judgments and decision can be affected by people's use of the representativeness heuristic. That is, people make

judgments and decision based on the extent to which stimuli or events are similar to elements of a particular category. For example, a lottery outcome of 1, 2, 3, 4, 5, and 6 is seen as less representative of lottery outcomes than 12, 27, 29, 32, 34, and 41 (Strack, 1993); therefore, according to the representativeness heuristic are more optimistic about the second than on the first outcome.

Nisbett, Zukier, and Lemley (1981) and Zukier (1982) examined what happens if people make prediction of an outcome when besides diagnostic information non-diagnostic information is also presented. For example, when people predict the GPA of a student, diagnostic information could be the amount of time that the student is studying, non-diagnostic information could be the love that the student feels for her grandma. Normatively speaking, people should ignore the non-diagnostic information when making their judgments. However, here the representativeness heuristic allows for a different prediction: diagnostic information (study time) is similar to the category in question (study success), that is, their features overlap, whereas non-diagnostic information (loving grandma) is not similar to and representative of the outcome. When people predict the outcome as stated they rely on the level of similarity of the predictors (diagnostic and non-diagnostic information) with the outcome. Consequentially, if non-diagnostic information is added to the diagnostic information, the strength of the association between the diagnostic information and the outcome is reduced by the non-diagnostic information although - normatively - the addition of the non-diagnostic information should not play a role for the relationship between the diagnostic information and the outcome. As a result, the predictions of the outcome are less affected by the diagnostic information when the non-diagnostic information is added than when it is not

added. In a series of studies this is exactly what happened: the addition of non-diagnostic information diluted the impact of diagnostic information.

From a logic of conversation perspective this effect is not surprising. In these studies, the experimenter gave participants diagnostic and non-diagnostic information. However, the objectively non-diagnostic information becomes subjectively relevant for the 'conversation' with the experimenter because communicated information comes with a 'guarantee of relevance' (e.g., Sperber & Wilson, 1995; Schwarz, 1994; Igou & Bless, 2007).

In an experiment we (Igou & Bless, 2005) varied the diagnosticity of information, whether non-diagnostic information was added or not, and the applicability of the conversational rule. The latter was done by informing half of the participants that some of the information was randomly selected thus discrediting the conversational expectation of relevance. As predicted, the dilution effect emerged when participants had no reason to question the conversational rule that the communicated information comes with a guarantee of relevance (Sperber & Wilson, 1995). However, the dilution effect was reduced when the conversational expectation was not applicable. This experiment thus demonstrates that people are quite able to distinguish diagnostic from non-diagnostic information and to rely on the first rather than the latter if the context does *not* imply that the non-diagnostic information is relevant simply because it has been communicated.

Conversational Order Effects

In a famous study on the representativeness heuristic, Kahneman and Tversky (1973) demonstrated that people's likelihood to estimates whether or not a person was an engineer (vs. lawyer) depends more heavily on person descriptions that may or may not

resemble the stereotype of this category (i.e., similarity) than on the base rate with which the person belongs to this category. This study has inspired much research, which in part qualifies the generality and robustness of the demonstrated base rate neglect. For example, Krosnick, Li, and Lehman (1992) showed that the effects of individuating information (i.e., person descriptions) versus base rate information depends on the order in which the information is presented, if these two pieces of information are contradictory. More specifically, the neglect of the base rate was more pronounced when person descriptions followed the statistical information, as it was done in Kahneman and Tversky's (1973) study, than when the information was presented in the reversed order.

Krosnick and colleagues (1992) argue that for these two contradictory pieces of information, the latter information is seen as more important, outweighing the first piece of information, thus leading to recency effects. They base their argument on Grice's (1975) maxim of quantity: the first piece may be seen as relevant, but when the additional information is contradictory, receivers (here participants) infer that the second piece of information must be particularly informative because otherwise there would be no reason for the communicator (here the experimenter) to present this additional contradictory information. "The first piece of information I was given (i.e., the base rate) has clear implications for my judgment, so it was sufficient. A speaker should only give me additional information if it is highly relevant and informative, so the experimenter must believe that the individuating information should be given special weight in my judgment" (Krosnick et al., p. 1141). That is, simply presenting additional, non-informative contradictory information would contradict conversational expectations,

therefore this information must be particularly representative of the communicators message.

We (Igou & Bless, 2003, 2007b) investigated conversational order effects more closely in the context of persuasion. Specifically, we argue that the inconsistency of the information would be the crucial difference for the emergence of primary versus recency effects. In persuasion, a distinction is made between one and two-sided communications. Once-sided communications consist of either pro or con arguments, which may vary in strength. Two-sided communications consist of both pro and con arguments.

On a general level, conversational rules contribute to an efficient information exchange: people should be clear, relevant, and not present redundant information. In this sense, communicators should present the important information early in order to ensure efficient information exchange. For one-sided communications we thus predicted that recipients expect the most important information at the beginning of the persuasive message. Consistently, we found primacy effects, that is, arguments were more influential when they were presented that the beginning of the message than when they were presented at the end of the message. However, the order effect did not emerge when we discredited the conversational order expectation by informing half of the participants that the order of argument presentation was determined randomly (Igou & Bless, 2003).

Interestingly, and consistent with the findings and the argumentation of Krosnick and colleagues (1992), in two-sided communications we found recency effects (Igou & Bless, 2003, 2007b). That is, when the arguments were inconsistent (pro vs. con), participants put greater weight on the second set of arguments than on the first set of arguments (Igou & Bless, 2007b). This effect did not emerge, however, when the

conversational expectations were discredited by indicating to participants that the order of arguments was random or when the inconsistent arguments were presented by two different communicators, that is, when the order was not information with regard to the importance of the arguments.

In essence, we argue that the presentation format is associated with different conversational expectations. For one-sided communications (either pro or con arguments) recipient expect that the first presented information is of particular importance, resulting in primary effects. This expectation, however, does not apply to two-sided communication, that is, when the arguments are inconsistent (pro vs. con). Then the latter information is seen as more relevant than the first, resulting in recency effects. These studies thus demonstrate that conversational expectations guide information processing such that either the first or the last pieces of information become particularly important for judgments and decisions, resulting in order effects. In this sense, conversational expectations add to the knowledge about cognitive processes that underlie order effects (e.g., Haugtvedt & Wegener, 1994; Hogarth & Einhorn, 1992).

General Discussion

I discussed three areas of research, all originating in some of Daniel Kahneman's Amos Tversky's work on biases, heuristics, and decision making. In particular, these examples show how conversational rules add to the understanding of the processes that contribute to these psychological effects. As the research on order effects implies, conversational processes contribute to the emergence of well-known psychological phenomena. That is, the logic of conversation (Grice, 1975) approach in psychology has a

general value for the understanding of information processing in judgment and decision making.

Besides this general value, the logic of conversation approach helps to understand both the researchers' and participants' behaviour and underlying processes in standardised research situations. Bless, Strack, and Schwarz (1993) and Schwarz (1994, 1996) have described in detail how conversational rules often have an unaccounted influence on outcomes in research. Participants expect communicated information to be true, relevant, informative, and clear. However, often researchers provide irrelevant information (e.g., to test if participants use it) or ask for particular information several times (e.g., in order to increase the reliability of measures). That is, researchers violate the conversational rules; however, as participants have no reason to believe that researchers do not co-operate conversationally, they themselves continue to co-operate, which in turn contributes to some of the biases reported in psychological research. In essence, research findings may result in a 'bias' based on different interpretations of the situation by researchers and participants. Note that Bless and colleagues discuss in detail how research procedures can be improved in order to reduce this error.

By no means does the acknowledgement of conversational rules as meta-cognitive inference rules automatically suggest that people's judgments or decision are rational and that biases or heuristics are artefacts of research situations, only rooted in experimenters' violations of conversational rules. Conversational rules are mental tools that are used by people in and outside of research situations. Therefore, acknowledging conversational processes simply allows researchers to better explain the processes that underlie these phenomena and to specify the conditions under which particular phenomena occur.

Limitations and Future Research

Grice's (1975) logic of conversation developed into an important psychological approach, allowing researchers to model cognitive processes and helping them to design their research. However, from a social cognitive perspective, we still do not know very much about the nature of people's pragmatic inferences. To which degree are they automatic (vs. controlled)? To which degree can they be conscious? Are pragmatic inferences relatively dependent on cognitive resources? As with other knowledge structures, the more they are used, the more they should be automatic. And if conversational rules are tools used in everyday life, then it is fair to assume that they function, at least to some degree, automatically, and should thus be detectable with implicit measures. Additionally, as with other psychological qualities, it can be expected that people vary in the degree to which they know of and/or rely on conversational rules when processing information (e.g., Slugoski & Wilson, 1998). In sum, more research is needed to fully understand the nature of conversational rules and how they operate.

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