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The fate of activated information in impression formation: Fluency of concept activation moderates the emergence of assimilation versus contrast

Abstract

Prior research has shown that activated concepts may influence subsequent interpretation and judgmental processes via priming. Building on this evidence, we suggest that the fluency associated with concept activation may determine whether activated content elicits assimilation or contrast. In two experiments, concept activation in a typical priming experiment was rendered fluent or non-fluent. Consistent with hypotheses, fluent concept activation led to assimilation, whereas non-fluent concept activation led to contrast.

Keywords: priming, fluency, usability, assimilation; contrast

The fate of activated information in impression formation: Fluency of concept activation moderates the emergence of assimilation versus contrast

In their pioneering work on concept priming, Higgins, Rholes, and Jones (1977) reported that a target person named Donald was evaluated more or less positively depending on whether participants had unobtrusively been exposed to trait adjectives signifying persistence or recklessness. Presumably, this was because the ambiguously described Donald (who had, e.g., taken part in a demolition derby) was perceived in line with the activated trait concept, which in turn led to an according assimilation of evaluations (see also Srull & Wyer, 1979). Since then, the concept of priming generated tremendous amounts of research and gained support not only in impression formation tasks (e.g., Sedikides, 1990; for overviews, see Higgins, 1996; Wyer & Srull, 1989), but also in other domains such as behavior (e.g., Smeesters, Yzerbyt, Corneille, & Warlop, 2009). Much to our surprise, however, priming has rarely been linked to another very prominent concept in social-cognitive research: the *fluency* of cognitive processing (e.g., Schwarz, 1998, 2004). Addressing this gap, we propose that the fluency of concept activation may moderate whether subsequent judgments are assimilated to or contrasted against this activated concept. What follows is to substantiate this hypothesis by briefly reviewing the relevant literature on concept priming (for other effects of priming, see, e.g., Förster & Liberman, 2007).

Concept priming

The initial findings by Higgins and colleagues (1977) as well as Srull and Wyer (1979) revealed that the activation of a trait concept results in assimilation, in that judgments reflect the implications of the activated primes. However, this occurred only when the primes were applicable to Donald's behavior (e.g., persistent) but not when the primes were non-applicable (e.g., obedient).

Subsequent research showed that accessible and applicable primes do not necessarily lead to assimilation, but may also result in contrast, in that judgments reflect the

opposite of the activated primes. Such contrast effects are likely to occur, for instance, when individuals become aware of the primed information (e.g., Martin, 1986; Strack, Schwarz, Bless, Kübler, & Wänke, 1993), or when the primes are extreme rather than moderate (Herr, Sherman, & Fazio, 1983).

To account for the emergence of assimilation and contrast effects, different explanations have been proposed (e.g., Martin, 1986; Petty & Wegener, 1993; Schwarz & Bless, 1992). Many of these focus on how the activated content is used. On the one hand, the activated content can be perceived as representative and relevant for the target and hence used to construct an according mental representation (Schwarz & Bless, 1992) or interpretation frame (Stapel, 2007), resulting in assimilation. Alternatively, individuals may perceive the activated content as *not* representative or relevant for constructing the target representation, and may therefore use this information to construct a standard of comparison (Schwarz & Bless, 1992) or comparison frame (Stapel, 2007), resulting in contrast.

Higgins (1996) summarized representativeness and relevance within the notion of *judged usability*, which holds that accessible and applicable content information produces assimilation effects when perceived as appropriate for target evaluation. He emphasized that judged usability goes beyond accessibility and applicability, and crucially determines the fate of primed information. In what follows we argue that judged usability may be affected by the fluency with which information is activated.

Fluency

Fluency refers to the ease with which cognitive processes can be executed. It may take various forms, including encoding fluency (Koriat & Ma'ayan, 2005), retrieval fluency (e.g., Schwarz et al., 1991; Weick & Guinote, 2008), or perceptual fluency (e.g., Reber & Schwarz, 1999). The impact of fluency on judgments and decisions is generally conceptualized as a feelings-as-information-process (e.g., Schwarz & Clore, 2007). This influence is not rare, but ubiquitous and strong (e.g., Schwarz, Song, & Xu, 2008), supposedly because fluency engenders from continuous monitoring of cognitive processing and is therefore constantly available (Whittlesea & Leboe, 2000).

Going beyond existing research, we propose that fluency may provide information about the usability of activated concepts. Specifically, we hypothesize that fluent activation serves as a "use-tag," whereas non-fluent activation serves as a "non-use-tag" with respect to the *default use* of an accessible and applicable concept when constructing the representation of the *target*. When activation is fluent, the concept may be perceived as usable and is included in the representation of the target, resulting in assimilation. When concept activation is non-fluent, the concept may be perceived as less usable for constructing the target representation. Intriguingly, information deemed non-usable for target representation may be used to construct the *standard* against which the target is compared, thus resulting in contrast (e.g., Schwarz & Bless, 1992; Stapel, 2007).

Several lines of research support the hypothesis that fluency signals usability. For instance, fluency has been identified as a signal of *truth* (truth effect, e.g., Hasher, Goldstein, & Toppino, 1977), supposedly because information multiply observed (and therefore fluent) has convergent validity. Similarly, fluency has been identified as a signal of *confidence* (e.g., Haddock, Rothman, Reber, & Schwarz, 1999; Kelley & Lindsay, 1993; Wänke, Bless, & Biller, 1996), presumably because well-supported information, which can be relied on confidently, is retrieved more fluently. Fluency has also been shown to signal importance and usability. For instance, Shah and Oppenheimer (2007) observed that a consumer review was weighted more heavily in product evaluation when it could be read fluently, seemingly because the fluency from reading the review influenced the use of this piece of information in subsequent evaluation. Finally, the proposed fluency-usability hypothesis maps onto the central tenets of the self-validation hypothesis (Briñol & Petty, 2009), which holds that for information to influence judgments, individuals must have confidence in this information. Among other sources, this confidence may arise from fluency (Tormala, Petty, & Briñol, 2002).

From a process-perspective, the proposed fluency-usability account may be categorized as an indirect effect, as fluency determines the subsequent use of content information—such as when fluency influences the weight of (Shah & Oppenheimer, 2007) or

the confidence in (Tormala et al., 2002) activated information. Shah and Oppenheimer (2007) differentiated such indirect effects from direct uses of fluency, for instance, when experiences of ease-of-retrieval *themselves* serve as information in judgment formation (Schwarz et al., 1991).

Experiment 1

To test the proposed fluency-usability hypothesis, a variant of the sentence unscrambling task introduced by Srull and Wyer (1979) was used to supraliminally activate concepts related to *interdependence* (e.g., family, team; task adapted from Kühnen & Hannover, 2000). Processing fluency was manipulated by rendering sentence unscrambling easy or difficult. In an ostensibly unrelated task, participants were exposed to the description of a target person Paul who showed ambivalent behaviors with respect to interdependence.

Method

Participants and design

Seventy-three University of Mannheim students (all male to match the gender of the target person) participated in return for 2 EUR and a chocolate bar (about 3.00 USD). Participants (mean age 23.36 years, *SD* = 3.31) were randomly assigned to a low fluency, high fluency, or control condition. Two participants were excluded from analyses as they did not comply with the necessary order of “unrelated experiments.“

Procedures and materials

Concept priming. Participants worked on 27 six-word combinations in the context of a sentence unscrambling task labeled language comprehension test. Twenty-three word combinations pertained to the concept of interdependence; four were unrelated fillers. For each word combination, participants were instructed to find the one word that did *not* fit into a meaningful 5-word-sentence and to write it on a line alongside the scrambled words. There was only one possible solution for each word combination. By focusing on non-fitting words

(only some of which were related to the primed concept), participants' attention was directed away from the coherent sentence primes, thus minimizing concept awareness. Participants in the control condition did not work on this task.

Processing fluency. We hypothesized that the non-fitting word can be identified more *fluently* the more the five fitting words are presented in correct grammatical order. Accordingly, to establish different levels of processing fluency, we manipulated the *order* in which the six words were presented by following (high fluency) or violating (low fluency) grammatical rules.[1] Independent pre-testing revealed that solving the high-fluency set (e.g., I feel other people with classify) was perceived as more fluent than solving the low-fluent set (e.g., with feel other I classify people; four items, Cronbach's α = .88; M = 8.13, SD = 0.66, M = 5.08, SD = 1.51, respectively; $t(5) = 3.68$, $p < .01$, Cohen's d = 2.61). We expected that this manipulation creates *differential* levels of processing fluency that are, if anything, negatively correlated to the primed concept's accessibility (see General Discussion).

Impression formation task. Directly afterwards, in a presumably unrelated experiment, participants read a story about Paul, an old friend from school the narrator had not been in contact since then. Paul is described ambiguously with respect to his interdependence, including statements that indicate *in*dependence (e.g., "Paul lives on his own"), statements that indicate *inter*dependence (e.g., "Paul has served on a student committee"), and unrelated statements (e.g., "Paul has recently started jogging"). Care was taken that the interdependent statements were different from those in the priming procedure.

Dependent measures. Participants evaluated Paul on a series of eight statements that were created based on standard assessment tools of primarily interdependent self-construal (e.g., Singelis, 1994). The first four items were presented on 9-point-scales (from 1 to 9, with varying labels), and read, for example, "When making an important decision, how likely is it that Paul bears the interests of others in mind?" (1, *not at all likely*, to 9, *very likely*). The last four items were presented on 11-point-scales (from 0, *does not apply*, to 10, *strongly applies*), and read, for example, "Paul strongly values harmony."

Finally, participants were probed for the cover story of unrelated experiments. None of the participants reported a connection between the two ostensibly unrelated experiments.

Results and Discussion

The eight evaluative items were rescaled such that higher values indicate more interdependence, were individually z-transformed, and were averaged (Cronbach's α = .69). Planned contrast analysis revealed that Paul was evaluated as significantly more interdependent in the condition of high as compared to low fluency (M = .18, SD = .66, M = -.18, SD = .48, respectively; $t(69) = 2.35$, $p < .03$, Cohen's $d = 0.63$), with the control group falling in between (M = .00, SD = .47; overall-ANOVA, $F(2, 69) = 2.76$, $p < .072$, $\eta^2 = .07$). This pattern of results supports the assumption that individuals use the activated content to interpret the target when concept activation is fluent, presumably because fluency signals usability with respect to the default use in representing the target. When concept activation is non-fluent, however, it appears that the activated content is not used for constructing the target representation, but to construct a *standard* against which the target is compared, thus resulting in contrast.

Experiment 2

Two important changes were introduced in Experiment 2: First, the unrelated-experiment story was strengthened by conducting the priming task computer-based, whereas the ostensible second experiment was assessed paper-and-pencil. Second, only half of the participants were primed with *inter*dependence (Experiment 1), whereas the other participants were primed with *in*dependence. To the extent that the proposed fluency-usability hypothesis is viable, a reversal of the findings reported for primed interdependence is expected for primed independence, namely that Paul is evaluated as *more* interdependent the *less* fluently the concept of independence was activated. Importantly, such an interaction finding would refute alternative explanations, such as that indicating the non-matching word would focus participants on relationships between words and thus would *procedurally* prime the concept of interdependence (see Kühnen & Hannover, 2000). If this was true, the same

pattern of results would be expected for priming the concepts of interdependence versus independence, because the task of indicating the non-matching word remains constant.

Method

Participants and design

Sixty male University of Mannheim students participated in return for 1 EUR and a chocolate bar (about 1.80 USD). Participants (mean age: 22.86 years, *SD* = 3.94) were randomly assigned to a 2 (priming: interdependence vs. independence) x 2 (fluency: low vs. high) factorial design.

Procedures and materials

Processing fluency. Except for minor changes in word order, the interdependence primes were identical to those in Experiment 1. For the *independence* primes, again a high fluency and a low fluency version was constructed by adhering to or violating grammatical rules. One high-fluency prime read “I really love being works independent,“ whereas the low-fluency prime read “independent works I really being love.“ Independent pre-testing revealed that solving the high-fluency as compared to low-fluency set was not only perceived as more fluent (four items, Cronbach’s α = .92; *M* = 7.32, *SD* = 1.03, *M* = 5.76, *SD* = 1.63, respectively; $F(1, 43) = 14.58$, $p < .01$, $\eta^2 = .25$; all other *F*s < 1.2), but could also be solved more quickly (average latency per item in seconds; *M* = 8.46, *SD* = 1.78, *M* = 9.87, *SD* = 2.98, respectively; $F(1, 43) = 3.65$, $p < .065$, $\eta^2 = .08$; all other *F*s < 1).

Dependent measures. The items from Experiment 1 were refined, yielding a new set of six items such as “Paul is a group person,“ all assessed with 11-point-scales, ranging from 0, *does not apply*, to 10, *strongly applies*.

Finally, participants were probed for the cover-story of unrelated experiments. None of the participants reported any connection between the two ostensibly unrelated experiments.

Results and Discussion

The six dependent variables were scaled such that higher values indicate higher levels of interdependence, averaged (Cronbach's α = .75), and subjected to a 2 (priming: interdependence vs. independence) x 2 (fluency: low vs. high) analysis of variance (ANOVA), which yielded the predicted significant interaction, $F(1,56) = 4.06$, $p < .05$, $\eta^2 = .07$ (all other Fs < 1). Evaluations reflected the implications of the prime (assimilation) when concept activation was fluent, but presumably elicited contrast when concept activation was non-fluent (see Figure 1). It needs to be acknowledged that the simple contrasts did not reach conventional levels of significance, $t(56) = 1.14$, $p < .26$, Cohen's $d = 0.41$, $t(56) = -1.71$, $p < .095$, Cohen's $d = 0.64$, for interdependence versus independence primes, respectively. Although this would have been desirable, it appears secondary given that a significant interaction and a clear disordinal pattern of results were observed. Note also that the conclusion that both assimilation and contrast occurred is supported in reference to the findings observed in Experiment 1, but remains tentative here, because no control group was assessed in Experiment 2.

Taken together, the present findings replicate the results for interdependence primes observed in Experiment 1, and revealed an opposite pattern for *independence* primes. Finding the reverse pattern of results when priming the opposite construct attests to the notion that fluency may moderate the impact of activated concepts. Moreover, the observed interaction pattern refutes alternative explanations that would predict main effects.

General Discussion

In two experiments, participants evaluated a target person displaying ambiguous behaviors. Consistent with prior research (e.g., Higgins et al., 1977), activating an applicable concept affected evaluations. Extending these findings, the impact on evaluations depended on *how* the concepts were activated. When concept activation was fluent, subsequent evaluations reflected the implications of the activated concepts. However, when concept activation occurred non-fluently, evaluations were influenced in a direction opposite to the

implications of the primed concepts. This occurred presumably because fluency may serve as a "tag" as to the usability of activated concepts. When perceived as usable, an accessible and applicable concept produces assimilation. However, when deemed unusable (for the default of constructing the target representation), the activated concepts may instead be used to construct the standard of comparison, thus eliciting contrast. These conjectures are consistent with the notion of judged usability (Higgins, 1996). Together with prior research on assimilation and contrast in concept priming (e.g., DeCoster & Claypool, 2004), the present findings suggest that in order to understand context dependency in social judgment, it is essential but not sufficient to relate to the notion of accessibility, but also to *how* the accessible information is used.

Several aspects of the present research deserve mention. First, to rule out accessibility-based alternative explanations for the observed pattern of results, a new fluency manipulation was introduced. Specifically, concept activation was rendered fluent by manipulating the ease or difficulty of sentence unscrambling. In contrast to other manipulations of fluency (such as perceptual contrast, e.g., Reber & Schwarz, 1999), this methodology is likely to set the stage such that fluency and accessibility are uncorrelated. This is because semantic processing may be expected to be complete only when the word combinations are fully unscrambled, such that prime exposure and concept accessibility are independent of manipulations affecting the task of unscrambling itself, like variations in word order. But even if concept priming occurred before the word combinations are unscrambled, low-fluency participants would be exposed *longer* (rather than shorter) to prime information, hence producing higher (rather than lower) concept accessibility. Accordingly, by manipulating the ease or difficulty of unscrambling, the stage can be set such that fluency and accessibility are not positively correlated, and hence discernable. While theoretically compelling, it is important to note that concept accessibility was not directly assessed in the present experiments. Alternative outcomes are thus at least theoretically conceivable, such as that difficult unscrambling focuses participants' attention towards alternative semantic constructs that may potentially be triggered by the presented words. In contrast to the above

conjectures, this may reduce the accessibility of the primed concepts in the difficult unscrambling condition, thereby aligning fluency and accessibility.

Second, one may argue that in the non-fluent conditions individuals have become more aware of the priming episode, and that it was not perceived non-fluency, but rather awareness that caused the contrast effects (e.g., Martin, 1986). Note however, that in both experiments we probed for evidence that participants saw any connection between the ostensibly unrelated studies, but none of the participants reported so. Moreover, by instructing participants to find the non-fitting words, participants' attention was directed away from the coherent prime sentences. It appears likely that this proceeding prevented participants from spontaneously becoming aware of the primed concept. Nevertheless, it is not impossible that (non-)fluency increased prime awareness, especially given the fact that the majority of the to be unscrambled sentences was related to the prime concept. To overcome this limitation, future research should strive to reduce the likelihood of concept awareness as well as to improve its assessment.

Finally, it is important to acknowledge that no direct evidence regarding the presumed mediation via judged usability is available.[2] Of course, this opens the door for potential alternative mechanisms, which we briefly discuss in the remaining paragraphs.

Fluency and positive affect. As fluency has been linked to positive affect (Winkielman & Cacioppo, 2001), one may hypothesize that fluently activated concepts are valued positively, whereas non-fluently activated concepts are valued negatively. This positivity-negativity-tag may then determine whether information is used in impression formation. Note that this hypothesis has considerable conceptual overlap with our fluency-usability account, as it differs only in the "tagging."

Fluency and categorization processes. Oppenheimer and Frank (2008) reported that high-fluency exemplars are more likely to be perceived as members of an activated category. Based on this finding, one may speculate that fluency increases the likelihood for activated information to be perceived as pertinent to the category, and hence included in the target representation. Note that this explanation is different from the here advanced fluency-

usability account, because fluency is assumed to exert its influence on the level of categorization processes.

Fluency and processing strategies. Like affective feelings, cognitive feelings have been suggested to act as “go“ or “stop“ signals for subsequent information processing (Schwarz & Clore, 2007). One may therefore suspect that non-fluent concept activation increases the likelihood that individuals, when constructing the target representation, scrutinize the activated concepts carefully for whether they are usable. This may increase the likelihood of detecting undue prime influences, resulting in contrast (Martin, 1986).

In sum, several conceptually related processes concur that the fluency of concept activation may moderate the use of activated concepts. Based on the present data, it cannot be determined which of the outlined mechanisms was underlying the observed effects, though the here advocated fluency-usability hypothesis appears most plausible in light of prior theorizing (Higgins, 1996). It is up to future research to fruitfully dissociate these different possibilities. Together with the present findings, such evidence is likely to further elucidate and highlight the important role that fluency plays in the regulation of cognitive processing.

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Footnotes

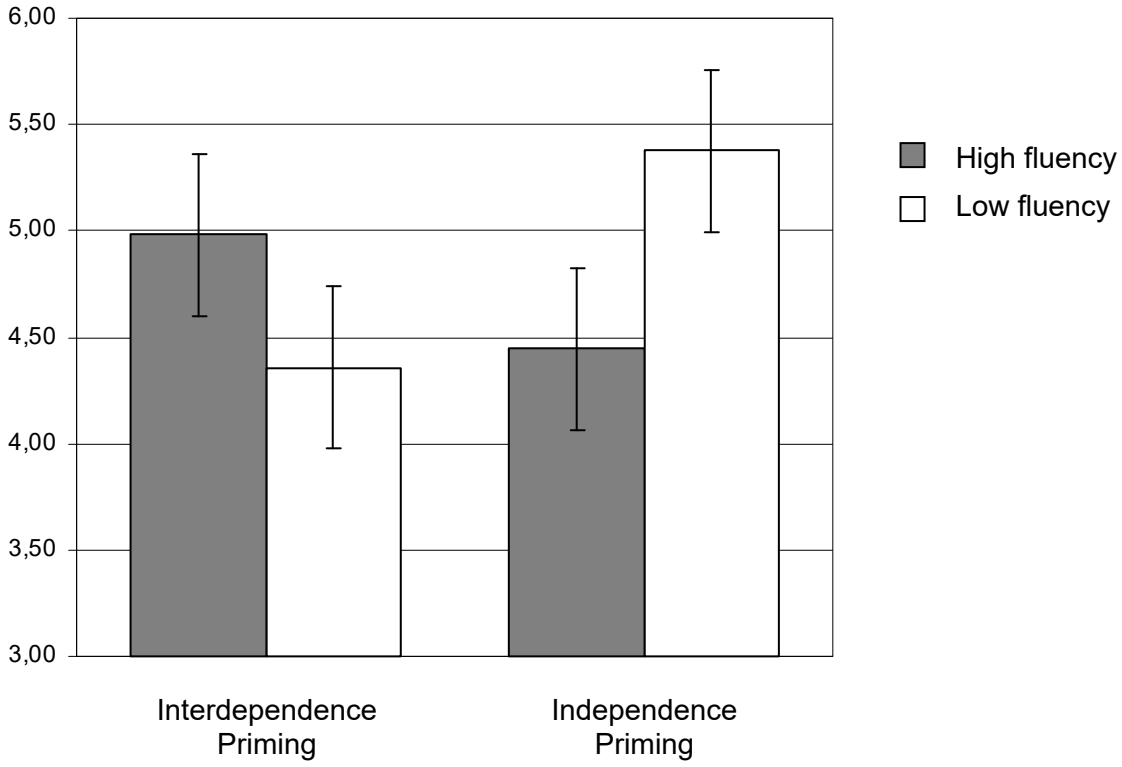
[1] For illustrative purposes, the cited examples adhere to or violate English (instead of German) grammatical rules.

[2] It is interesting that while variants of usability (e.g., relevance, representativeness) are widely accepted as mediators of assimilation and contrast, evidence mostly pertains to manipulations of these variables rather than to their assessment. Presumably this reflects that individuals have little introspective access to this kind of information.

Figure Caption

Figure 1. Mean evaluation ratings of Paul with standard errors in Experiment 2 as a function of fluency and priming. Higher ratings indicate a more interdependent evaluation.

Figure 1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Interdependence Priming
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