Social Cognition, Vol. 28, No. 5, 2010, pp. 630–640

DO BLURRED FACES MAGNIFY PRIMING EFFECTS? THE INTERACTIVE EFFECTS OF PERCEPTUAL FLUENCY AND PRIMING ON IMPRESSION FORMATION

Ursula M. Sansom-Daly and Joseph P. Forgas
University of New South Wales, Sydney, Australia

How do subtle subliminal cues such as perceptual fluency (e.g., the visual clarity of a face) and priming influence the way we form impressionS of people? In this experiment, participants (N = 114) received an affective priming manipulation, and then viewed sharp (perceptually fluent) or slightly blurred (disfluent) photographs of target individuals. Impressions were assessed on a trait checking task, a trait rating task, and open-ended descriptions, and processing latency was also measured. Results indicated that both positive primes and greater fluency increased the positivity of impressions. In an interesting pattern, priming effects were greater for perceptually disfluent (blurred) faces, consistent with disfluent images also triggering more elaborate, constructive, and longer processing. These results are discussed in terms of the important and so far little understood interactive role of priming and fluency cues in impression formation judgments in everyday life.

Impression formation is a cognitively demanding task. Judges need to integrate complex and ambiguous sources of information into a coherent impression, and do so in dynamic social situations (Forgas, 1992, 2002). Classical theories of impression formation focused on the rational, predictable ways that social information is combined into a coherent impression (Anderson, 1968), although the dynamic, constructive nature of impression formation judgments has also long been recognized (Asch, 1946). Recent research suggests however that subtle peripheral influences also play a critical role in how social information is processed (Bargh, 2007; Förster & Lieberman, 2007).

For example, when we notice a person in a bar, observable details such as level of attractiveness (Dion, Berscheid, & Walster, 1972), and facial expression (Lander & Metcalfe, 2007) are one source of input into impressions. Peripheral, *experiential* information outside the focus of awareness may also have an effect (Winkielman, Schwarz, Fazendeiro, & Reber, 2003). For example, irrelevant cues, such as nega-

The authors would like to thank Simon Haynes for his generous technical assistance in the creation of the experimental program used in this study.

Correspondence concerning this article should be addressed to Joseph P. Forgas, School of Psychology, University of New South Wales, Sydney 2052, Australia. E-mail: jp.forgas@unsw.edu.au.

tive ideas primed in an earlier conversation, the mood we happen to be in, or the clarity or "perceptual fluency" of what we see may all influence impressions (Alter & Oppenheimer, 2008; Bargh & Morsella, 2008; Clore & Storbeck, 2006; Forgas, 1992, 2002; Unkelbach, 2006). We shall focus on the combined effects of priming and perceptual fluency on impression formation here.

PRIMING EFFECTS ON SOCIAL COGNITION

Priming involves the incidental activation of concepts and knowledge below the threshold of consciousness (Bargh, 2007; Förster & Liberman, 2007; Higgins, 1996), typically producing a prime-congruent effect on evaluations. For example, priming hostile words produces more hostile evaluations of a fictitious character, and affective priming also has robust effects on judgments and social behaviors (Bargh, 2007; Forgas, 1998). The fluency of the experience itself—how easy or difficult it is to perceive a target (for example, another person in a dimly lit bar)—may well serve to alter the effects of a prime, just as processing ease can moderate priming effects on stereotyping (Castelli, Macrae, Zogmaister, & Arcuri, 2004). We explored the possibility that perceptual fluency (Unkelbach, 2006) may moderate priming effects, such that visually blurred, disfluent targets are more susceptible to priming effects than are visually clear, fluent targets.

FLUENCY EFFECTS ON IMPRESSIONS

Fluency effects may be due to *perceptual* or *conceptual fluency* (Winkielman et al., 2003). Most past research looked at the effects of semantic or conceptual fluency on information processing. In contrast, our experiment focuses on perceptual (visual) fluency, a variable that may be especially important in real-life impression formation based on face-to-face encounters. Perceptual fluency occurs when some aspect of a stimulus (e.g., figure-ground contrast) is manipulated to influence processing ease. Greater fluency generally improves the valence of evaluations (Jacoby, Woloshyn, & Kelley, 1989), and enhances judgments of familiarity (Whittlesea & Williams, 1998), beauty (Reber, Schwarz, & Winkielman, 2004), and intelligence (Oppenheimer, 2006). Fluency also seems to be associated with the experience of distance and abstraction. Seeing an object clearly (perceptual fluency) triggers the impression of reduced distance, and greater detail and concreteness. Disfluent stimuli in turn increase distance estimates between cities, produce more abstract descriptions, and more abstract definitions for English words (Alter & Oppenheimer, 2008). Extrapolating from this earlier research, we expected here that perceptually fluent (clear) targets (a) should be judged more positively, and (b) should also be described in less abstract and more concrete terms.

THE INTERACTION OF FLUENCY AND PRIMING

Fluency can also influence processing style, as disfluent stimuli function as metacognitive signals, communicating task difficulty and recruiting a more

elaborate, systematic processing style (Alter, Oppenheimer, Epley, & Eyre, 2007). When disfluency recruits more elaborate, constructive processing, the effects of primes should also be enhanced as a result. Such a pattern has been reported, for example, in the affect-priming literature: judging unusual, atypical, or odd (disfluent) individuals typically recruits more constructive and elaborate processing, and resulted in stronger mood-priming effects in several experiments (Forgas, 1992, 1993). We expect here that perceptually disfluent, blurred targets should magnify the effects of a prime, whereas highly fluent, easily processed stimuli should reduce priming effects. This prediction is also consistent with evidence that more elaborative processing—whether due to individual differences (*need for cognition*; Petty, DeMarree, Briñol, Horcajo, & Strathman, 2008), or situational demands (*M*andel & Johnson, 2002)—increases priming effects.

In summary, we hypothesized that positive primes and more fluent stimuli should lead to more positive personality descriptions. Perceptual fluency was also expected to interact with priming effects, such that priming effects should be greater for disfluent (blurred) targets.

METHOD

OVERVIEW, DESIGN AND PARTICIPANTS

Participants were exposed to happy or sad face primes, and then formed impressions of people pictured in a perceptually fluent (sharp, clear images) or disfluent manner (fuzzy, blurred images). The main and interaction effects of priming and fluency variables on the positivity (valence) and concreteness (concrete-abstract) of impressions were examined using (1) an adjective checklist, (2) adjective ratings, and (3) open-ended responses. The study was a (2) x (2) within subjects design, with priming (happy/sad) and fluency (fluent/disfluent) as the independent variables. Participants were first-year undergraduates (N = 114; average age 20.18 years, 67 females and 47 males), who received course credit for their participation.

TARGET STIMULI AND MANIPULATIONS

The targets were photographs of 12 Caucasian males with neutral expressions, sourced from the NimStim picture database (Tottenham et al., 2009). Three photos each were randomly assigned to each of the four priming x fluency combinations.

Priming consisted of happy or sad schematic faces (e.g., Winkielman, Zajonc, & Schwarz, 1997), presented for 250 ms and masked both forwards and backwards for 80 ms with a black-and-white chequered pattern to prevent afterimage effects (Abreu, 1999). After a 500 ms Stimulus Onset Asynchrony (SOA), the target individual's face was presented for two seconds, to simulate real-life situations where persons are briefly encountered (Winkielman et al., 2003).

Target *fluency* was manipulated by creating a slightly unclear "motion blur" effect for each target face on the Paint.Net program (see Figure 1), as previously used successfully to manipulate perceptual fluency (e.g., Harley, Carlsen, & Loftus, 2004). It is important to note here that this manipulation did not influence the

FIGURE 1. Example of (a) a fluent (clearly visible) and (b) a disfluent (blurred) target image as used in the study.

perceived ambiguity of the facial targets. In a pilot study, disfluent targets were rated as no more ambiguous to judge than were fluent targets on 7-point ambiguous–unambiguous scales, $t(24) = .043$; *ns* ($M = 3.12$ vs. 3.51).

DEPENDENT MEASURES AND PROCEDURE

Impressions were assessed using three measures, an adjective checklist, adjective rating scales, and open-ended responses. Sixteen personality adjectives were used representing an orthogonal combination of two features, valence (positive–negative), and concreteness (abstract–concrete), with four adjectives in each cell (for example, positive/abstract: nice, intelligent; positive/concrete: witty, hard-working; negative/abstract: cold, stupid; negative/concrete: argumentative, pedantic). The adjectives were linguistically balanced in terms of processing latency and word frequency, using the English Lexicon Project Database (Balota et al., 2007). Each adjective category contained two social-evaluative and two task-related adjectives.

The task was introduced as a study in social perception, and in a computer-controlled procedure, each participant saw 12 target faces (3 faces in each of the four priming by fluency combinations), and provided impression formation judgments after each face on three measures, an *adjective checklist* (select 4 out of the 16 randomly presented personality adjectives) to describe the person, *adjective ratings* (rate each target on 16 adjectives on 7-point scales), and *open ended descriptions* (write four sentences describing the target). Open descriptions were scored by two raters blind to the manipulations using the coding scheme by Alter and Oppenheimer (2008, Study 3). Cohen's Kappa, Inter-rater agreement was high for both dimensions (Cohen's Kappa (1960), $\kappa_{valence} = 0.902$ and $\kappa_{concreteness} = 0.835$ respectively). The procedure concluded with a careful debriefing; verbal probing revealed no awareness of the design and the manipulations.

RESULTS AND DISCUSSION

A series of planned contrast within-subjects (2) x (2) ANOVAS were performed on the three impression formation measures, controlling the family-wise Type 1 error rate at $p = .05$ (Bird, 2004) and using an F-critical value of $F(1, 113) = 3.93$.

PRIMING EFFECTS

Positive primes resulted in more positive adjectives checked, $F(1, 113) = 4.159$ ($MSe = 0.732$; $d = .18$; $M = 2.22$ vs. 1.85), more positive adjective ratings, $F(1, 113) = 4.550$ ($MSe = 0.325$; $d = .17$; $M = 3.78$ vs. 3.64), and more positive open-ended descriptions of the target, $F(1, 113) = 4.527$ ($MSe = 0.523$; $d = .18$; $M = 1.56$ vs. 1.42), compared to sad primes, confirming the predicted valence-congruent influence of primes on impressions.

FLUENCY EFFECTS

As predicted, fluent targets were seen as more positive on the adjective check task, $F(1, 113) = 14.004$ ($MSe = 0.795$; $d = .35$; $M = 2.09$ vs. 1.78), on the adjective ratings task, $F(1, 113) = 13.863$ ($MSe = 0.438$; $d = .29$; $M = 4.08$ vs. 3.98), and in open-ended descriptions, $F(1, 113) = 14.424$ ($MSe = 0.48$; $d = .30$; $M = 1.61$ vs. 1.37), confirming the prediction that greater fluency is experienced positively, producing more positive impression formation judgments.

Interestingly, greater perceptual fluency, signalling closeness and specificity, also resulted in more concrete judgments (Alter & Oppenheimer, 2008). Fluent targets produced a preference for, $F(1, 113) = 4.834$ ($MSe = 0.199$; $d = .40$; $M = 1.24$ vs. .58), and higher ratings on, $F(1, 113) = 10.605$ ($MSe = 0.140$; $d = .53$; $M = 3.89$ vs. 2.87), concrete, behavior-related adjectives, compared to disfluent targets.

PRIMING BY FLUENCY INTERACTION

Disfluency magnified priming effects on adjective ratings, $F(1, 113) = 7.747$ ($MSe = 0.482$; $d = .23$). The effects of positive and negative primes were greater when the targets were disfluent and fuzzy, rather than clear and fluent, consistent with the prediction that disfluency recruits a more elaborate and constructive processing style, Figure 2). Simple effects tests confirmed that for fluent pictures, priming had no effect on adjective ratings, $F(1, 113) = 0.002$; $p = .964$. However, when the pictures were disfluent (fuzzy), there was a significant priming effect on judgments, $F(1, 113) = 8.254$; $p = .005$.

This interaction was further confirmed when the 16 adjective ratings were subjected to a principal components analysis, resulting in three factors, *evaluation*, *competence*, and *social skill*, explaining 54.82% of the variance. We found significant fluency by priming interactions on two of these judgmental factors, *evaluation* and *social skill*, $F(1, 113) = 206.71$ ($MSe = 0.42$; $d = 1.50$, and $F(1, 113) = 8.323$ ($MSe = 0.111$; $d = .20$), respectively. Simple effects tests confirmed that as expected, when the

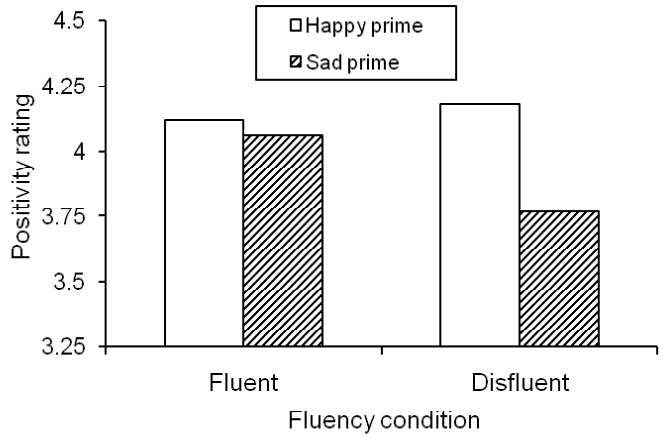

FIGURE 2. The interaction of perceptual fluency and priming on impression formation in the adjective ratings task: Perceptual disfluency magnifies priming effects.

targets were fluent priming effects were not significant either on the evaluation, $F(1, 113) = 0.394$; $p = .531$ ($M = 4.16$ vs. 4.04), or on the social skill judgments, $F(1, 113) = .839$; $p = .361$ ($M = 3.84$ vs. 3.84). However when targets were disfluent and fuzzy, the priming effect was significant both on evaluations, $F(1, 113) = 10.67$; $p = .001$ ($M = 3.73$ vs. 2.73), and on social skill judgments, $F(1, 113) = 8.549$; $p = .054$ ($M = 3.98$ vs. 3.47). The interaction between fluency and priming was only obtained for the more sensitive adjective ratings task, but did not reach significance for the adjective checklist task and the open-ended responses.

PROCESSING LATENCY AND MEDITATIONAL ANALYSES

As predicted, the fluency manipulation had a significant main effect on *processing latency*, $F(1, 113) = 23.482$ ($MSe = 5.47$; $M = 6.44$ vs. 17.07). Blurred, "disfluent" targets took significantly longer to process, consistent with the predicted function of disfluency as a meta-cognitive signal indicating processing difficulty. These processing differences cannot be attributed to the greater ambiguity and greater difficulty to process disfluent faces, as fluent and disfluent faces did not in fact differ in perceived ambiguity according to a pilot study (see above).

In order to determine if it was simply longer processing that was responsible for greater priming effects on judgments, a series of three *mediational analyses* were also performed on the three dependent variables that showed a fluency by priming interaction effect, (a) adjective ratings, and judgments on the (b) evaluative and (c) social skills factors. In order to establish mediation (Baron & Kenny, 1986), for each judgment three regression analyses were performed. First, the independent variables, fluency and priming, were used to predict the mediator, processing latency. Second, fluency and priming were used to predict the dependent variable, judgments. Third, the independent variables and the mediator were simultaneously entered into a regression to predict each dependent variable. If there is me-

diation, all three regression analyses should be significant, and the effects of the independent variable on the dependent variable should be significantly reduced in the third equation (when the mediator is also present) compared to the second equation (when the mediator is absent). These analyses found no such evidence for processing latency mediating priming effects on judgments (β^a = .173 vs. .172, *ns*; β^b = .146 vs. .144, *ns*; β^c = .100 vs. .100, *ns*). In other words, increased length of processing alone was not the reason that priming effects were greater for disfluent rather than fluent targets. Rather, disfluency was likely to increase priming by serving as a meta-cognitive signal that changed the *quality* rather than just the *quantity* of processing, triggering a broader and more generative information processing strategy capable of enhancing priming effects.

GENERAL DISCUSSION

In everyday life, we often encounter people only briefly, and see them either clearly (high fluency) or not clearly (disfluency). Such fleeting encounters may frequently occur in the presence of positively or negatively valenced primes. We found that both perceptual fluency and priming function as important peripheral cues that influence impression formation. We also demonstrated, for the first time, that perceptual disfluency can influence processing quality and so magnify priming effects. Whereas past research mostly looked at the effects of semantic or conceptual fluency, person perception is often based on visual information. Accordingly, this experiment explored the role of visual (perceptual) fluency in impression formation judgments. Some of the theoretical and practical implications of these findings will be considered next.

THEORETICAL IMPLICATIONS

Unrelated prior exposure to happy or sad schematic faces produced a significant priming effect, as also suggested by other research (e.g., Kouider & Dehaene, 2007; Mandel & Johnson, 2002). Our results are consistent with a growing number of studies demonstrating that subtle semantic and affective primes can have a major and often subconscious influence on the valence of social judgments (Forgas, 2002; Förster & Liberman, 2007; Higgins, 1996). Greater perceptual fluency resulted in more positive impressions, consistent with theoretical accounts that suggest that processing fluency is a pleasant experience that cues more positive judgments (e.g., Winkielman et al., 2003).

Fluency also cues closeness and concreteness (Alter & Oppenheimer, 2008). Unclear and disfluent objects are experienced as more distant, appear more abstract, and recruit more elaborate and detailed processing. Consistent with this idea, we found greater preference for concrete, behavioral person descriptions when the target persons were fluent and easy to process. This is the first time that such a fluency–concreteness effect has been established for person judgments as distinct from object construals (Alter & Oppenheimer, 2008). Given the many ways that the perception of another person may be disfluent in real life, this finding is important and suggests that the level of concreteness and specific detail in our impressions of others may often be influenced by such peripheral fluency cues.

PROCESSING EFFECTS OF FLUENCY

The processing effects of fluency have only recently been uncovered (Oppenheimer, 2008), showing that disfluent stimuli recruit a qualitatively different (*M*ore elaborate, constructive, and generative processing style (Alter et al., 2007). We found here that disfluent, blurred targets also took longer to process, but the meditational analyses showed that it was not simply longer processing by itself that resulted in greater priming effects. Rather, fluency was likely to function as a metacognitive signal recruiting a qualitatively different (*M*ore open and elaborative processing style increasing the likelihood that incidental information such as priming can influence judgments.

Somewhat similar results were reported by Mandel and Johnson (2002), who found that disfluency triggered a broader and more open, constructive information search strategy. In their study disfluency resulted in people paying greater attention to peripheral features of websites, just as our judges paid greater attention to primed information. The current results thus extend recent evidence suggesting that perceptual fluency has important qualitative processing consequences as a metacognitive signal (e.g., Alter et al., 2007). This kind of processing dichotomy, contrasting open, generative processing with more narrow, focused processing is frequently invoked in social and cognitive psychology (Evans, 2008; Forgas, 2002), and fluency now appears to be one of the key variables that influences such alternative processing styles.

It is paradoxical that longer and more generative processing recruited by disfluency may actually *reduce* accuracy by accentuating priming effects. Similar findings have been reported in the affect–cognition literature, where more elaborate, constructive processing also enhanced mood-priming effects on judgments and behavior (Forgas, 2002, 2009). Thus (*M*ore elaborate processing does not always increase accuracy, and can sometimes have the opposite, paradoxical effect (e.g., Evans, 2008; Forgas, 1995; Petty et al., 2008).

Could it be that the blurred faces simply contained less information? As our manipulation of picture clarity was unlikely to influence actual information content, and there was no difference in the perceived ambiguity of the fluent and disfluent targets, we do not believe that this was a factor here. Rather, perceptually disfluent faces were likely to function as a metacognitive signal indicating processing difficulty, and triggered a more open, generative, and less focused thinking style that inadvertently magnified priming effects.

The absence of a priming effect with fluent targets is interesting and somewhat unexpected. It could be that the combination of fluent targets, and the slightly longer presentation of 250 ms for the primes combined to produce a more controlled, focused processing style that erased priming effects. Of course, we only manipulated fluency as a binary variable here. Using a continuous manipulation (e.g., using graded picture clarity) could allow a more precise analysis of the links between fluency and processing style. Future work could also explore the fluency effects on primes that vary in strength and modality.

It is also interesting that we only obtained a fluency by priming interaction for the *evaluation* and *social skill* judgmental factors, but not for *competence* judgments. The most likely reason for this is that judgments of evaluation and social skills

may require relatively more elaborate, generative processing than is the case for more specific judgments such as competence. There is interesting evidence from other domains suggesting that measurement dimensions may interact with stimulus characteristics in determining processing styles and outcomes, such that stimulus effects may be obtained for some scales and not for others, as has been the case here (Fiedler, 1991).

Finally, in interpreting these results we should be mindful that there are a variety of priming and knowledge activation effects, such as affective, semantic, goal, and procedural priming (Förster & Liberman, 2007; Higgins, 1996), and different sorts of priming manipulations may have different kinds of effects (Förster, Liberman, & Higgins, 2005). In our case, as we used pictorial stimuli to prime positive and negative affect, our results are most likely to apply to affective priming phenomena. Future studies may profitably explore the possibility that disfluency also potentiates other kinds of priming effects, such as semantic, goal, or procedural priming (Förster & Liberman, 2007; Förster, Liberman, & Friedman, 2007).

PRACTICAL IMPLICATIONS

Our results also suggest new avenues for investigating fluency and priming interactions, in judgmental situations that mimic complex, real-life impression formation judgments. Visual fluency cues are extremely common in everyday situations and it seems that people seem automatically attuned to using such peripheral cues in their judgments (Bargh, 2007). The possibility that disfluency can systematically magnify priming effects has interesting implications for many social situations. For example, video-conferencing in organizations (e.g., Storck & Sproull, 1995), conversations using skype, encounters in poorly lit settings, and other interactions relying on degraded or overloaded communication channels may all produce perceptual disfluency, and thus accentuate affective priming effects. In the forensic domain, target fluency may also influence impressions and processing styles, and atypical, unusual or strange targets may be particularly subject to fluency and priming effects (Forgas, 2009; Rhodes, 2006). Within the consumer domain, peripheral cues such as fluency and priming may be important in persuading consumers that certain items are desirable and relevant to them (*M*andel & Johnson, 2002).

CONCLUSIONS

This study found that peripheral fluency and priming cues have significant main and interaction effects on impression formation judgments, influencing both the valence and the concreteness of impressions. We also identified an intriguing *processing paradox,* as more generative processing recruited by disfluency increased rather than reduced priming effects. These findings have interesting theoretical and applied implications for our understanding of how automatic impression formation strategies are triggered by subtle peripheral cues, and the role of such strategies in everyday social judgments deserves further investigation.

REFERENCES

Abreu, J. M. (1999). Conscious and nonconscious African American stereotypes: Impact on first impression and diagnostic ratings by therapists. *Journal of Consulting and Clinical Psychology, 67*(3), 387-393.

Alter, A. L., & Oppenheimer, D. M. (2006). Predicting short-term stock fluctuations by using processing fluency. *Proceedings of the National Academy of Sciences, (USA), 103*(24), 9369-9372.

Alter, A. L., & Oppenheimer, D. M. (2008). Effects of fluency on psychological distance and mental construal (Or why New York is a large city but *New York* is a civilized jungle). *Psychological Science, 19*(2), 161-167.

Alter, A., Oppenheimer, D. M., Epley, N., & Eyre, R. N. (2007). Overcoming intuition: Metacognitive difficulty activates analytic reasoning. *Journal of Experimental Psychology: General, 136*(4), 569-576.

Anderson, N. H. (1968). Application of a linear-serial model to a personality impression task using serial presentation. *Journal of Personality and Social Psychology, 10*(4), 354-362.

Asch, S. E. (1946). Forming impressions of personality. *Journal of Abnormal and Social Psychology, 41,* 258-290.

Balota, D. A., Yap (*M.* J., Cortese (*M.* J., Hutchison, K. A., Kessler, B., Loftis, B., et al. (2007). The English lexicon project. *Behavior Research Methods, 39*(3), 445-459.

Bargh, J. A. (2007). *Social psychology and the unconscious: The automaticity of higher mental processes*. New York: Psychology Press.

Bargh, J. A., & Morsella, E. (2008). The unconscious mind. *Perspectives on Psychological Science, 3*(1), 73-78.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.

Bird, K. D. (2004). *Analysis of variance via confidence intervals.* London: Sage.

Castelli, L., Macrae, C. N., Zogmaister, C., & Arcuri, L. (2004). A tale of two primes: Contextual limits on stereotype activation. *Social Cognition, 22*(2), 233-247.

Clore, G. L., & Storbeck, J. (2006). Affect as information about liking, efficacy, and importance. In J. P. Forgas (Ed.), *Affect in social thinking and behavior* (pp. 123-141). New York: Psychology Press.

Cohen, J. A. (1960). A coefficient of agreement for nominal scales. *Education and Psychological Measurement, 20*, 37-46.

Dion, K., Berscheid, E., & Walster, E. (1972). What is beautiful is good. *Journal of Personality and Social Psychology, 24*(3), 285-290.

Evans, J. St. B. T. (2008). Dual-processing accounts of reasoning, judgment, and social cognition. *Annual Review of Psychology, 59*, 255-278.

Fiedler, K. (1991). On the task, the measures and the mood in research on affect and social cognition. In J. P. Forgas (Ed.), *Emotion and social judgments* (pp. 83-106). Oxford: Pergamon.

Forgas, J. P. (1992). On mood and peculiar people: Affect and typicality in impression formation. *Journal of Personality and Social Psychology, 62*, 863-875.

Forgas, J. P. (1993). On making sense of odd couples: Mood effects on the perceptions of mismatched relationships. *Personality and Social Psychology Bulletin, 19*, 59-70.

Forgas, J. P. (1995). Mood and judgment: The Affect Infusion Model (AIM). *Psychological Bulletin, 117*(1), 39-66.

Forgas, J. P. (1998). Asking nicely? The effects of mood on responding to more or less polite requests. *Personality and Social Psychology Bulletin, 24*(2), 173-185.

Forgas, J. P. (2002). Feeling and doing: Affective influences on interpersonal behavior. *Psychological Inquiry, 13*(1), 1-28.

Forgas, J. P. (2009). Affect in legal and forensic settings: The cognitive benefits of not being too happy. In R. Wiener & B. Bornstein (Eds.), *Emotion and the law: Psychological perspectives*. *Nebraska Symposium on Motivation*. Lincoln, NE: University of Nebraska Press.

Förster, J., & Liberman, N. (2007). Knowledge activation. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (2nd ed.). New York: Guilford.

Förster, J., Liberman, N., & Friedman, R. (2007). Seven principles of goal activation: A

systematic approach to distinguishing goal priming from priming of non-goal constructs. *Personality and Social Psychology Review, 11,* 211-233.

Förster, J., Liberman, N., & Higgins, E. T. (2005). Accessibility from active and fulfilled goals. *Journal of Experimental Social Psychology, 41,* 220-239.

Harley, E. M., Carlsen, K. A., & Loftus, G. R. (2004). The "saw-it-all-along" effect: Demonstrations of visual hindsight bias. *Journal of Experimental Psychology: Learning* (*Memory, and Cognition, 30*(5), 960-968.

Higgins, E. T. (1996). Knowledge activation: Accessibility, applicability, and salience. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles.* (pp. 133-168). New York: Guilford.

Jacoby, L. L., Woloshyn, V., & Kelley, C. (1989). Becoming famous without being recognized: Unconscious influences of memory produced by dividing attention. *Journal of Experimental Psychology: General, 118*(2), 115-125.

Kouider, S., & Dehaene, S. (2007). Levels of processing during non-conscious perception: A critical review of visual masking. *Philosophical Transactions of The Royal Society: B, 362*, 857-875.

Lander, K., & Metcalfe, S. (2007). The influence of positive and negative facial expressions on face familiarity. *Memory, 15*(1), 63-69.

Mandel, N., & Johnson, E. J. (2002). When web pages influence choice: Effects of visual primes in experts and novices. *Journal of Consumer Research, 29*, 235-245.

Oppenheimer, D. M. (2006). Consequences of erudite vernacular utilized irrespective of necessity: Problems with using long words needlessly. *Applied Cognitive Psychology, 20*, 139-156.

Oppenheimer, D. M. (2008). The secret life of fluency. *Trends in Cognitive Sciences, 12*(6), 237-241.

Petty, R. E., DeMarree, K. G., Briñol, P., Horcajo, J., & Strathman, A. J. (2008). Need for cognition can magnify or attenuate priming effects in social judgment. *Personality and Social Psychology Bulletin, 34*(7), 900-912.

Reber, R., Schwarz, N., & Winkielman, P. (2004). Processing fluency and aesthetic pleasure: Is beauty in the perceiver's processing experience? *Personality and Social Psychology Review, 8*, 364-382.

Rhodes, G. (2006). The evolutionary psychology of facial beauty. *Annual Review of Psychology, 57*, 199-226.

Storck, J., & Sproull, L. (1995). Through a glass darkly: What do people learn in videoconferences? *Human Communication Research, 22*(2), 197-219.

Tottenham, N., Tanaka, J., Leon, A. C., McCarry, T., Nurse, M., Hare, T. A., et al. (in press). The NimStim set of facial expressions: Judgments from untrained research participants. *Psychiatry Research, 168*(3), 242-249.

Unkelbach, C. (2006). The learned interpretation of cognitive fluency. *Psychological Science, 17*, 339-345.

Whittlesea, B. W. A., & Williams, L. D. (1998). Why do strangers feel familiar, but friends don't? A discrepancy-attribution account of feelings of familiarity. *Acta Psychologica, 98*(2-3), 141-165.

Winkielman, P., Schwarz, N., Fazendeiro, T. A., & Reber, R. (2003). The Hedonic marking of processing fluency: Implications for evaluative judgment. In J. Musch & K.C. Klauer (Eds), *The psychology of evaluation: Affective processes in cognition and emotion* (pp. 189-217). Mahwah, NJ: Erlbaum.

Winkielman, P., Zajonc, R. B., & Schwarz, N. (1997). Subliminal affective priming resists attributional interventions. *Cognition and Emotion, 11*(4), 433-465.