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## COMMENTARIES

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### On the Role of Abstraction in Global and Local Processing Phenomena

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In their target article, Förster and Dannenberg (this issue) review empirical findings from diverse lines of research that highlight the importance of understanding global and local processing differences in psychology. Importantly, the authors then attempt to integrate these findings under a unitary theoretical framework. We are excited to see Förster and Dannenberg draw much needed attention to the distinction between global and local processing. Although conceptual frameworks such as action identification theory (Vallacher & Wegner, 1987), the linguistic category model (Semin & Fiedler, 1988), and construal level theory (Trope & Liberman, 2003) have discussed related constructs, to our knowledge this is the first comprehensive review of global and local processing phenomena, specifically. Förster and Dannenberg describe an impressive array of findings that connect these two modes or types of processing to important outcomes and triggers, and they review provocative research suggesting a relationship between perceptual and conceptual global and local processing.

As with all innovative advances, this work raises a number of questions. In what follows, we highlight several such questions that we see as central to understanding the basic principles of GLOMO<sup>sys</sup>. Given the potential of GLOMO<sup>sys</sup> as an integrative framework, we hope that the subsequent discussion serves as a starting point for further endeavors to refine and advance Förster and Dannenberg's model, which we believe to be an ambitious and important approach toward understanding the widely relevant distinction between local and global processing.

#### **To What Do Global and Local Processing Refer?**

An impressive aspect of the target article is how the authors are able to discuss research in disparate

domains, which include perception, cognition, judgment, motivation, and self-regulation, all under the same conceptual framework, namely, the distinction between global and local processing. Using this distinction, the authors draw connections between areas that generally do not speak to one another, and we can only hope that this work will serve as a bridge to facilitate greater cross-talk between traditionally separate subdisciplines in our field. At the same time as we are excited by this remarkable breadth, however, we have found ourselves searching for greater precision in Förster and Dannenberg's explication of their central concepts of global and local processing. Their description of the distinction between global and local processing seems to point to a difference in processing scope or breadth. People engage in global processing when they "zoom out and pay attention to [the] entire figure" or "attend to the Gestalt of a stimulus set," whereas local processing involves attending to details. This visual attention metaphor of scope and breadth has descriptive merits, and may be particularly appropriate in this case because, as Förster and Dannenberg detail, perceptual global and local processing and conceptual global and local processing appear to be related to one another.

Nevertheless, it remains unclear to us why perceptual and conceptual global and local processing appear to be so intertwined. More specifically, what cognitive procedures promote this apparent association? Much of the empirical evidence supporting the association between perceptual and conceptual global and local processing relies on two classic paradigms: the Navon (1977) letter task and the Kimchi and Palmer (1982) figures task. These tasks respectively present participants with compound letters (larger letters made up of smaller letters) or shapes (larger shapes made up of smaller shapes). Perceptual global processing is elicited by instructing individuals to attend to the global stimulus (the large letter/shape), whereas perceptual local processing is elicited by instructing

individuals to attend to the details of the stimulus (the small letters/shapes). Note, however, that it is not fully clear what cognitive operations these instructions elicit (for more extensive discussion of this issue, see Kimchi, 1992). For example, attending to the global shape might increase the scope or breadth of one's attention. That is, focusing on the larger letter in the Navon letter task requires a wider scope of visual attention than seeing the smaller letter; one needs to attend more to the periphery of the computer screen to process the more global letter presented. The global processing instructions, however, might equally elicit a conceptual process by which people understand that they are to create broader elements from smaller elements, that they are to focus on the whole and not the constituent elements. Local processing, by contrast, requires a conceptual understanding that the global configuration of letters is irrelevant and that one's task is to respond to the local constituent parts. That is, although the Navon and Kimchi tasks use visual stimuli, it seems plausible that instructions to focus on global/local elements are interpreted as conceptual rules (e.g., "Focus on the big picture" versus "focus on the details").

To illustrate this point, consider the following thought experiments. One might imagine constructing a task with the intention of solely measuring or manipulating one's breadth of attention. Instead of seeing larger letters composed of smaller letters as they do in the Navon letter task, participants would simply see a single very small versus very large letter in the center of the screen. Processing the larger letter should require enlarged scope of visual attention. Alternatively, one could present participants with letters of an equal size either in the center versus peripheral edges of the screen. To process the letters at the edge of the screen, one would need to increase breadth of visual attention. These two tasks still require the "zooming out" and "zooming in" processes that Förster and Dannenberg suggest are part of global and local processing, respectively. At the same time, however, these two tasks decouple the two potential mechanisms for the global versus local processing phenomenon evident in the Navon and Kimchi-Palmer tasks. Specifically, these proposed tasks would manipulate the breadth of one's visual attention while controlling for the breadth of one's conceptual processing (for more extensive discussion of the confounding of these two constructs, see Kimchi, 1992; Navon & Norman, 1983). Examining whether such tasks would influence conceptual global and local processing, or whether this link would be confined to perceptual manipulations that entail a conceptual element, might allow investigators to detail with greater precision the relationship between perceptual and conceptual scope.

What does it mean, however, to process information in a conceptually global manner? In describing global processing as focusing on the Gestalt of an object,

Förster and Dannenberg appear to suggest that conceptual global processing entails extracting or imposing conceptual structure on incoming information. This is consistent with our understanding of conceptual global processing as abstraction, that is, as reflecting a construal or meaning-making process whereby people distill the essence or gist of some stimulus. Conceptual local processing, in contrast, reflects a construal process whereby people discern those specific features of a stimulus that render it unique or distinct from some broader context. Conceptual global processing can thus be understood as a construal or meaning-making process whereby people extract abstract essences from and impose schematic structures on incoming information, whereas local processing is a construal process whereby they focus on those concrete characteristics and details that distinguish one stimulus from another. Said differently, whereas global conceptual processing entails abstract construal, local conceptual processing entails concrete construal.

Indeed, a stronger distinction between perceptual versus conceptual global and local processing might be accomplished by referring to the former as breadth of attention (wide vs. narrow) and the latter as level of construal (abstract vs. concrete). We believe these terms better clarify those cognitive operations that are entailed in each form of global and local processing. We are, however, completely open to the suggestion that breadth of attention can affect level of construal, and that level of construal can affect attention. In the Navon letter task, for example, construing more abstractly a configuration of smaller letters as a larger letter may promote widening of one's visual attention. Wider visual attention, in turn, might more readily elicit abstract construals. Our point is that understanding specifically how breadth of attention might impact level of construal and vice versa may allow us to understand with greater precision the research findings that the authors highlight. More generally, specifying more clearly what is meant by the terms global and local processing might promote an even more enriched understanding of the remarkable literature that Förster and Dannenberg review.

### **Do Global and Local Processing Reflect Two Systems, Two Processes, or a Continuum?**

Förster and Dannenberg's exposition of global and local processing is somewhat unclear with respect to the nature of interaction, if any, between the two styles or modes of processing. We are unsure whether they intend the distinction to represent independent constructs or ends of a continuum. On one hand, the authors call their model "GLOMO<sup>sys</sup>" and explicitly propose the existence of two systems. They further suggest that there are preliminary neurophysiological data

suggesting the existence of two brain systems dedicated to the two types of processes. On the other hand, Förster and Dannenberg might not intend their theorizing about the existence of two systems to be taken quite as literally as other dual-systems theories in psychology. Dual-systems models postulate the existence of different substrates that process different types of information (e.g., Keren & Schul, 2009). As a result of these two systems, dual-systems models propose that two separate representations of a stimulus can coexist (e.g., Greenwald & Banaji, 1995; Schacter & Tulving, 1994; Wilson, Lindsey, & Schooler, 2000). We doubt that Förster and Dannenberg mean to make such claims with respect to global and local processing; indeed, they explicitly state that they believe that when one system gets activated, the other one is deactivated, a claim that is at odds with the use of the term *system* (note, however, that others have suggested that parallel global and local processing is a theoretical possibility; Navon, 1981).

Rather than reflect a dual-systems model, the authors instead appear to espouse a dual-process or continuum model. Note that whereas a dual process explanation would allow for both global and local processing to occur at the same time (e.g., Chaiken & Trope, 1999), a continuum model would not. The authors' suggestion that global and local processing cannot co-occur thus seems most consistent with a continuum model. Intriguingly, however, the authors' theorizing at times appears to suggest a third option: a duality, in which one or the other type of processing (but never both) is activated at any one time. Rather than reflect relative differences in the amount of global (vs. local) processing, this duality perspective suggests a more categorical distinction: one is engaged in either global or local processing. It is not entirely apparent, though, to what extent the authors intend for this conclusion to be made.

Although the appropriateness of the term *systems* may seem to simply be a semantic issue, it is important to appreciate that this term is highly specific and carries theoretical assumptions that we would imagine Förster and Dannenberg would consider inappropriate for their conceptualizations of global and local processing. Indeed, considering whether GLOMO<sup>sys</sup> is best termed a dual-systems model, dual-process model, continuum model, or some other alternative might help to bring greater conceptual clarity to the authors' position about the nature of these two processing styles.

### **What Is the Glue that Binds Global and Local Processing Phenomena?**

The impressive and diverse number of empirical findings related to global and local processing that Förster and Dannenberg enumerate begs for a con-

ceptual framework with which to unify the various streams of research systematically. To this end, Förster and Dannenberg attempt to find an "umbrella" factor under which the different precursors of global and local processing might be integrated. They review several possibilities, including regulatory focus, psychological distance, and novelty, and assess to what degree each accounts for the available data. Ultimately, they favor novelty, seemingly because a link between culture and processing style can be accommodated into a novelty framework more easily than the other two candidates, making novelty the widest potential umbrella.

We have a number of concerns with this approach. First, as researchers whose own focus is on distance, we feel obliged to point out the close connection between novelty and the concept of uncertainty, which has been explicitly discussed as distance (Wakslak & Trope, 2009b; Wakslak, Trope, Liberman, & Alony, 2006) and incorporated into Construal Level Theory's distance framework (Trope & Liberman, 2010). Moreover, we caution that Förster and Dannenberg's list of factors that impact global and local processing is not an exhaustive list; ongoing and future work will undoubtedly reveal more variables that impact global and local processing. Especially given the recent resurgence of interest in this topic (prompted, in no small part, by these authors' own impressive research program), comparing "umbrella" candidates on the basis of the number of current research findings that they might accommodate feels somewhat shortsighted. As an example, in some of our own recent work we find that self-affirmation (focusing on important values) increases performance on tasks associated with global processing rather than tasks associated with local processing (Wakslak & Trope, 2009a). It is unclear what focusing on one's own values would have to do with novelty; if anything, focusing on other people's values (which we find is associated with local processing) should be the more novel case. Our point is not that this rules out the usefulness of a novelty framework for exploring many global and local processing effects but rather that this highlights the limitation of comparing the merit of potential explanatory factors simply on the basis of the number of other research findings that these factors can explain.

At a broader level, though, we wonder if, rather than search for a single common cause of global and local processing, it may be more fruitful to assume that these processing styles serve a variety of functional concerns and that what binds all of these phenomena together is that they engage the same cognitive procedures. In other words, we need not assume that the same cognitive procedure necessarily serves the same purpose. In fact, it might be considered quite cognitively (and conceptually) parsimonious if global and local processing were multifinal, capable of serving different functions in different situations. That is, having a single process

accomplish a multitude of ends is more cognitively parsimonious than having a unique process for every functional concern that we might have. What may link the various global and local processing phenomena together may not be a single common functional concern such as processing novelty or transcending psychological distances; instead, what may bind them is that they all entail differences in level of construal.

Indeed, Förster and Dannenberg's effort to find a common motive with which to integrate the various global and local processing phenomena may have caused them to overlook important differences in the motives that researchers propose are served by these processes. For example, novelty categorization theory and construal level theory each emphasize the role of lack of information but do so in quite different ways. Novelty categorization theory proposes that when encountering something novel, people engage in processes that render them more open- and broad-minded (Förster & Dannenberg, this issue). In doing so, people are in a better position to perceive and encode important new information about the novel object or event. The epistemic motive that global processing in novelty categorization theory serves is thus one concerned about information search and exposure. Construal level theory, in contrast, proposes that people construe more abstractly because they lack the information with which to think about more distal versus proximal events (e.g., Liberman & Trope, 2008; Liberman, Trope, & Stephan, 2007; Trope & Liberman, 2003, 2010; Trope, Liberman, & Wakslak, 2007). Lacking specific information about distant events, people rely on abstract construals to focus on what they perceive to be the invariances of a particular event—those features that are likely to be true of the event irrespective of any specific contextual details. Construal level theory thus proposes that people rely on more abstract construals not out of a desire to search for more information but rather out of a desire to use what limited information they have to make appropriate judgments and decisions.

On an empirical level, a number of research findings seem to support this conjecture that global and local processing phenomena serve a variety of functional concerns. In addition to the research on self-affirmation and abstract construals discussed already (Wakslak & Trope, 2009a), research on the intergroup linguistic bias has demonstrated that more global or abstract construal can serve social identity concerns (Maass, Salvi, Arcuri, & Semin, 1989). When their esteem for their in-group is threatened, people construe positive behaviors by in-group members, and negative behaviors by out-group members, more globally or abstractly. Doing so results in perceptions that one's in-group possesses stable positive dispositional qualities, whereas the out-group possesses stable

negative dispositional qualities (Maass, Ceccarelli, & Rudin, 1996). Note here that this abstract construal of positive behaviors by one's in-group involves neither novelty nor psychological distance nor regulatory focus—this biased judgment is motivated by a desire to maintain positive esteem toward one's valued social groups.

Research also suggests that abstract construal can serve goal-protection motives (e.g., Fujita & Han, 2009; Fujita, Trope, Liberman, & Levin-Sagi, 2006; Mischel & Baker, 1975; Moore, Mischel, & Zeiss, 1976; see also Myrseth & Fishbach, 2009). People are frequently tempted to abandon more valued global goals in favor of salient temptations in their local contexts. The presence of chocolate cake, for example, tempts dieters to abandon their weight-loss goals. Empirical findings indicate that construing these events more globally or abstractly promotes greater goal adherence. Indeed, the mere anticipated threat of a temptation is enough to motivate people to construe impending events more abstractly (Fujita & MacGregor, 2010). Again, abstract construal in this research is not motivated by novelty, psychological distance, or regulatory focus—this change in construal is prompted by a desire to protect one's goals from being undermined by local situational factors.

There are thus theoretical and empirical reasons for proposing that rather than reflecting some common factor (such as novelty, psychological distance, or regulatory focus) or motive (such as epistemic motivation), global and local processing phenomena reveal very different functional concerns depending on the context in which they are observed. We propose that the diversity of global and local processing phenomena can be understood as revealing shared, common cognitive procedures. As just noted, we believe that an integrating principle that binds global and local processing phenomena is that they all involve differences in level of construal. That global and local processing phenomena are evident in so many diverse phenomena may reflect the diversity of psychological functions that abstract and concrete construals fulfill.

### Summary and Conclusions

We believe that Förster and Dannenberg's target article represents an important and bold first step toward understanding the antecedents and consequences of global and local processing. We are encouraged by the wide array of findings that they describe and are impressed at their ambitious attempt to reconcile these disparate findings into an overarching framework. Like all innovative work, however, their review raises a number of questions. We highlight these in the spirit of academic dialogue, and we hope that any ensuing debate leads to continued empirical investigation and an

even stronger theoretical grasp of this critical, widely relevant, issue.

### Note

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