

## Global and Local Processing: A Clarification and Integration

Robert S. Wyer, Jr.

*Department of Business Administration, University of Illinois at Urbana-Champaign, Illinois*

Global and local information processing can influence judgments and decisions in almost every area of daily life experience. The research summarized by Förster and Dannenberg (this issue) is therefore important in documenting both the diverse implications of this processing and the cognitive and motivational factors that affect it. The indication that stimulating individuals to employ global or detailed criteria as a basis for judgments in one domain can influence the way in which information is processed in other, quite unrelated situations is particularly provocative.

The scope and penetration of Förster and Dannenberg's review and analysis are certainly impressive, and it is difficult to find serious fault with their conclusions. The vast amount of evidence they compile concerning the determinants and consequences of global versus local (piecemeal) processing phenomena (to which the first author has made a major contribution) is truly remarkable, and their discussion of more general factors that potentially bind the phenomena together is provocative. Nevertheless, the cognitive and motivational underpinnings of the phenomena could stand some further elaboration. Moreover, although the situational determinants of global and local processing are considered in detail, the factors that give rise to chronic individual differences in this processing may also be worth considering.

Following Smith (1990, 1994), Förster and Dannenberg distinguish between *content* (the concepts and declarative knowledge that individuals bring to bear on their judgments and behavioral decisions) and the mental *processes* that operate on this content. This distinction is less clear than it appears. That is, many procedures are stored in memory as part of declarative knowledge and are recalled and used deliberately in the course of attaining goals to which they are relevant. Other processes, however, may be elicited spontaneously by a configuration of internal and external stimulation and performed with little if any awareness. In practice, content and process differences can be difficult to separate (but see Smith & Branscombe, 1994; Wyer, Shen, & Xu, in press).

The difference is nevertheless of conceptual importance in the present context. For one thing, the effects of content and processing differences on global versus local judgment phenomena are likely to be localized at different stages of cognitive activity. At the early,

comprehension stage, differences exist in the breadth or abstractness of the concepts that individuals bring to bear on the information they receive. At a later, inference stage, differences exist in the disposition to base judgments of a stimulus on a global appraisal of the stimulus as a whole, or alternatively, to conduct a detailed analysis of the stimulus' individual features. (For an early conceptualization that makes this distinction, see Fiske & Neuberg, 1990; Fiske & Pavelchak, 1986.)

Second, the generality of the concepts one uses to interpret information can depend on the type of concepts that happen to come to mind at the time. (It can also depend on the activation of processes that stimulate the retrieval and use of these concepts.) In contrast, the use of global or detailed criteria at the inference stage is often determined by the amount of cognitive work that one is motivated to expend on the judgment or decision being made or on pursuing the goal at hand. Several factors analyzed by Förster and Dannenberg can influence this motivation, including the affective reactions that individuals experience and the relative importance attached to positive and negative consequences of a decision.

Both the accessibility of global and local concepts and the processes that underlie their use at different stages of cognitive activity can be determined by past experiences that increase the accessibility of these concepts and processes in memory at the time a situation to which they are applicable is encountered. The role of knowledge accessibility is evident throughout Förster and Dannenberg's analysis, both in explicating the carry-over of global and local processing from one situation to another and in examining the situational factors that give rise to these different types of processing. Theory and research on knowledge accessibility is reviewed in detail by both Förster himself (Förster & Liberman, 2007) and others (Higgins, 1996; Wyer, 2008) and need not be elaborated. However, a more specific application of knowledge accessibility phenomena to global-local processing may help to identify some additional questions for future research to examine.

The remainder of this commentary is devoted to this end. I first consider the effects of processes that underlie the "carry-over" effects discussed by Förster and Dannenberg, that is, the tendency for global and local

processing in one situation to affect judgments and decisions in other, unrelated situations. I then consider the situational factors that give rise to global and local processing. Finally, I speculate about the antecedents of chronic individual differences in this processing that have implications for the phenomena that Förster and Dannenberg identify.

### Carry-Over Effects

#### General Considerations

Perhaps the most provocative research reviewed by Förster and Dannenberg (this issue) surrounds the evidence that activating a disposition to process information globally or locally in one situation can have an impact on processing in a later, quite different cognitive domain. This evidence is consistent with a larger body of research on the effects of behavioral mindsets (Wyer & Xu, 2010) and procedural knowledge (Wyer et al., in press). As we point out in these articles, however, these effects can be governed by different processes.

On one hand, individuals' pursuit of a goal in one domain can activate more general concepts associated with the procedure of attaining it. These concepts, once accessible in memory, can be reactivated by a different goal to which they are applicable and, therefore, can influence the procedure that people select for use in attaining this goal as well. Wyer and Xu (2010) reviewed numerous examples. For instance, deciding which of two animals is larger, which requires a comparative judgment, can increase the likelihood of deciding which of two products for purchase upon leaving the experiment without considering the option of buying nothing at all (Xu & Wyer, 2007, 2008). Alternatively, answering a series of questions about animals, answers to which are all the same, can decrease the variety of products chosen in a later, multiple-choice decision task (Shen & Wyer, 2010).

In these examples, individuals were presumably aware of their use of the procedure but were unaware of the reason for choosing it rather than other, equally applicable alternatives. In other cases, however, procedures may be elicited automatically. The processes that govern these effects can be conceptualized in terms of the effect of "if [X], then [Y]" productions (Anderson, 1982, 1983; Smith, 1984), where [X] is a configuration of internal and external stimuli and [Y] is a sequence of behaviors that are activated and applied automatically when [X] is experienced, with little cognitive mediation and often without awareness. Thus, for example, individuals who have rank ordered stimuli from high to low in one situation (which requires a consideration of high values before low ones) are likely to focus their attention on high values rather than low values when they compute the average value of an array of

quite different types of stimuli, and this occurs without awareness of this attentional bias (Shen & Wyer, 2008). Or, leading participants to speak either quickly or slowly in the course of shadowing a speech affects the speed with which they complete a questionnaire in a later, unrelated task (Shen, Cai, & Wyer, 2010). In this case, individuals are quite aware of their rate of speaking in the speech shadowing task but are unaware of how fast they are working on the questionnaire.

#### Generalization of Global and Local Processing

Many of the effects reviewed by Förster and Dannenberg could involve either a procedure that is drawn from declarative knowledge or the use of a production, and it is not always clear which is the case. In a study by Macrae and Lewis (2002), for example, participants first performed the Navon (1997) letter task, in which they were exposed to a large letter composed of small ones (see Förster and Dannenberg, this issue, Figure 1). They were later more accurate in performing a face-recognition task if they had been primed to focus on the large letter in the first task than if they had been primed to focus on the small ones. Face recognition is facilitated by focusing on the whole rather than on individual features, and the disposition to use this strategy was apparently activated by attention to the whole rather than the parts in the preceding letter task. It seems likely that effect was governed by a production that was applied spontaneously in performing the face recognition task without awareness of its use.

In a study by Förster (2009), however, participants who had been exposed to the same priming conditions were later asked to compare two television shows. Participants generated more similarities and fewer dissimilarities if they had been asked to identify the large letter in the Navon task rather than the small one. The possibility that the effects are governed by a production cannot be completely discounted. However, it seems more reasonable to suppose that the effects were governed by processes analogous to those that underlie the effects of a behavioral mindset (Xu & Wyer, 2008) and described earlier. That is, identifying the whole rather than the parts in the course of performing the Navon task activated a more general goal concept of identifying a superordinate category with which procedure-based concepts pertaining to extracting similarities are associated. Consequently, these concepts, having become accessible in memory, were likely to be activated and applied in performing the comparative judgment task to which they were also relevant. To this extent, participants may have been aware of their disposition to identify similarities rather than dissimilarities without being aware of the reason they chose this strategy rather than the alternative.

In another study (Friedman, Fishbach, Förster, & Werth, 2003), participants were primed either to look at a map as a whole or to consider a specific detail. Later, they were asked to generate unusual uses of a brick or, in other cases, to generate unusual exemplars of a general category (birds, fruits, etc.). Participants who had been asked to consider the map as a whole, and thus used global concepts in processing it, generated more unusual exemplars than those who had focused on details, suggesting that they used relatively broader concepts as a basis for category membership. It seems reasonable to assume that participants were aware of the processing strategy they used to generate exemplars and the breadth of the categories they applied, but were unaware of the factors that gave rise to the selection of this strategy. However, the possibility that these effects were governed by a production cannot be discounted.

### Situational Influences on Global and Local Processing

Most of Förster and Dannenberg's review is devoted to the situational determinants of global and local processing. In conceptualizing these effects, they review a wide variety of potential determinants, including construal level, novelty, regulatory focus, affect, and social power. They consider the possibility that one or more of these factors provide the cognitive "glue" that binds the phenomena together. As they indicate, however, no single factor may do the trick.

In validating the effects of situational factors that give rise to global and local processing, Förster and Dannenberg show that the manipulation of a factor in one situation influences the type of processing that occurs in a quite different situation, as reflected in responses to the Navon letter task and other tasks that clearly require global or local processing. However, the different processes that underlie these effects are presumably similar to those that give rise to the carry-over effects discussed in the previous section. On one hand, exposure to stimuli in the first situation might activate more general procedure-related concepts that are stored in memory as part of declarative knowledge, and these concepts may later be reactivated and applied in the pursuit of a goal in a second situation. On the other hand, the concepts that are activated in the first situation, in combination with features of the second, could combine to form the precondition of a production that elicits global (or local) processing automatically in a later situation without any conscious cognitive mediation.

In principle, the effects of cognitive and motivational factors in one situation on the occurrence of global or local processing in a later situation could be mediated by either or both of these processes. In much of the research that the authors review, however, the

global and local processes in the second situation were inferred from attentional biases in the Navon (1997) letter task or similar activities. These biases are likely to occur without awareness. It therefore seems likely that although the global or local processing in the first situation may often have been conscious and deliberate, the effects observed were mediated by a production.

The situational and informational factors that give rise to global and local processing appear to be of two types. One set of antecedents pertain to characteristics of the information presented or the type of judgment to be made that predispose people to perceive they have more or less knowledge about the object of judgment and, therefore, to apply global or local concepts in comprehending the information about it and construing its implications. The second set of antecedents concern the *motivation* to engage in global or local processing in the course of making inferences.

### Effects of Amount of Knowledge

As Förster and Dannenberg suggest, people are likely to bring more general concepts to bear on judgments of stimuli they know little about, than of stimuli whose specific features are well known. These differences, however, may depend on people's *perceptions* of their knowledge about the stimuli being judged independently of their actual knowledge. In a series of studies by Förster, Liberman, and Shapira (2009), participants were led to believe that a task they were expecting to perform was either novel or one that many others had performed in the past. Participants used broader concepts in performing the task in the former condition than in the latter. Apparently, the *expectation* of novelty was sufficient to activate a global concept that they applied in the situation at hand, independently of the actual characteristics of the stimuli being judged.

Förster and Dannenberg further speculate that differences in the amount of knowledge that individuals believe they have about a stimulus can account for many effects of psychological distance predicted by construal level theory (Liberman, Trope, & Stephan, 2007). That is, individuals are likely to believe they know less about socially distant persons (strangers) than about proximal ones (friends) and to know less about physically distant locations than about near ones. Moreover, they may have less knowledge about the factors that surround a decision to engage in a future activity than about those that are relevant to a decision to engage in one immediately. Thus, they may apply more global concepts when they evaluate distal stimuli than when they evaluate proximal ones.

The implicit assumption that individuals apply concrete concepts when making judgments of proximal evaluations may need to be qualified, however. As Lazarus (1982, 1990; see also Fiske & Pavelchak, 1986) noted, judgments may often be a two-step

process. That is, individuals may spontaneously make a global appraisal of a stimulus and then, if the appraisal elicits negative affect or its implications deviate from expectations, they consider specific features of the stimulus more carefully in order to explain the basis for their initial reaction. A similar two-step process may be involved in many situations to which construal level theory is applicable. In fact, Kim, Park, and Wyer (2009) found that individuals spontaneously apply global criteria (i.e., desirability) in making decisions about engaging in an activity regardless of when the activity will occur. When the decision has immediate consequences, however, they take feasibility considerations into account *as well*. Judgments of stimuli that vary in social or geographical distance might be similar.

Be that as it may, the more interesting implications of these considerations are that the process of applying concepts at a given level of generality to stimuli in one domain appears to activate a procedure that generalizes to the comprehension of stimuli in other, unrelated domains, thus affecting the abstractness of concepts applied in these domains as well. This in fact appears to be the case (Fujita, Henderson, Eng, Trope, & Liberman, 2006; Liviatan, Trope, & Liberman, 2008; Schimmel & Förster, 2008).

### Motivational Factors

The use of global versus local concepts to comprehend information could often be guided by procedures that, although relevant to the task being performed, are applied without conscious awareness of the reason for doing so. However, the selection and use of global or detailed criteria for judgment at the inference stage of processing may be more deliberate. Two motivational determinants of global and local processing—*affect and regulatory focus*—are discussed in detail by Förster and Dannenberg. Although Förster and Dannenberg argue that these two factors are conceptually and empirically independent, the motivational influences of these factors on the use of holistic versus detailed processing are quite similar.

Individuals may typically not process information in any greater detail than they consider to be necessary to attain the goal at hand (Taylor & Fiske, 1978). Therefore, if they feel confident of the judgment they make on the basis of a global appraisal and foresee no negative consequences of applying this criterion, they may be unmotivated to engage in more detailed processing. The affect that individuals happen to experience in a particular situation may determine this confidence. As Schwarz (1990; Schwarz & Clore, 1996) has pointed out, inducing positive affect gives rise to the impression that the situation in which one finds oneself is unproblematic. Therefore, it induces a disposition to focus on positive consequences of one's behavior without con-

sidering the possibility of negative consequences that might also occur. Moreover, it can lead to more global processing rather than a consideration of details. Negative affect, on the other hand, is associated with negative behavioral outcomes and unpleasant situations, and the experience of it may therefore give rise to cautiousness and to a more careful attention to features of the situation in an attempt to avoid these consequences. Direct evidence that positive affect increases the breadth of concepts that individuals use to comprehend information was obtained by Bless (2001). At the inference stage, it is likely to increase the use of stereotypes as a basis for judgment (Bodenhausen, 1993) and to decrease sensitivity to the quality of arguments in a persuasive communication (Bless, Bohner, Schwarz, & Strack, 1990). Negative affect, on the other hand, may have the opposite effect.

The effect of regulatory focus (Higgins, 1997, 1998) on global versus detailed processing may be similar. That is, individuals who focus on positive consequences of their behavior without considering the negative consequences may feel confident and may be disposed to engage in holistic processes, whereas those who focus their attention on the possibility of negative behavioral outcomes may make a more detailed analysis of the situation in an attempt to avoid these outcomes.

The effects of affect and the effects of regulatory focus should nonetheless be distinguished. Although the affect one experiences may give rise to a promotion or prevention focus, a disposition to focus on positive outcomes rather than the avoidance of negative ones can be independent of the affect that individuals experience (Friedman & Förster, 2001). This disposition can then induce global versus local processing in situations that do not involve a concern with behavioral outcomes at all (e.g., the Navon letter task; Förster, Friedman, Özelsel, & Denzler, 2006; Friedman & Förster, 2001). This suggests that the pursuit of positive outcomes and the avoidance of negative ones can become associated with global and local processing strategies, respectively, and consequently can activate procedures that are applied in later situations without any conscious motivation to attain these outcomes.

In this regard, a second difference between affect and regulatory focus arises from the fact that the experience of positive and negative affect is inherently transitory, and thus its effects depend on situational factors that have recently elicited it. Differences in regulatory focus can also be situationally induced (Higgins, 1997, 1998). However, chronic individual differences may exist in the emphasis upon positive and negative consequences of one's behavior that could influence the tendency to engage in global or local processing independently of the affective reactions that individuals experience. This possibility is elaborated in the next section.

### Determinants of Chronic Dispositions to Engage in Global and Local Processing

The use of global and local concepts in comprehending information, and the processing of information at different levels of abstractness in the course of making inferences, obviously depend on the situation at hand. However, chronic individual differences are also likely to exist in the disposition to engage in global or local processing that generalizes over situations. The antecedents of these chronic differences may be worth considering.

In discussing the cultural determinants of global and local processing, Förster and Dannenberg (this issue) give a hint as to the nature of these antecedents. That is, Asians are typically characterized as collectivistic and define themselves in terms of the groups to which they belong, whereas North Americans typically characterize themselves as unique and independent of others (Markus & Kitayama, 1991; Triandis, 1989). Research by Peggy Miller and her colleagues (Miller, Wiley, Fung, & Liang, 1997) provides insight into the antecedents of these dispositions. She observed both Taiwanese and North American parents interact with their children in the course of telling stories about the child's misbehavior. The differences were rather striking. Taiwanese parents typically treated their children's behaviors as a reflection of inherent character deficiencies that needed to be corrected. Furthermore, they set themselves and others up as standards of excellence that the child was expected to emulate. In contrast, although North American parents considered their children's misbehavior as serious, they treated it as normal occurrences in the course of growing up without having implications for the child's basic self-worth. Furthermore, rather than setting themselves up as standards of virtue, American parents tended to acknowledge their own misdeeds at an early age, conveying that to err is human.

As elaborated elsewhere (Wyer, in press), these different socialization practices could induce two interrelated dispositions of relevance to the present concerns:

1. Asian parents' emphasis on their child's behavior in relation to others may encourage the children to think of themselves as members of a group with shared values and expectancies. By avoiding the use of themselves and others as standards of perfection, however, North American may encourage the children to see themselves as unique individuals.
2. Asian parents' treatment of misbehaviors as personality flaws that need to be corrected, coupled with their encouragement of the child to use others as standards of comparison, are likely to dispose their children to be particularly concerned about others' evaluations of their behavior and to avoid behaviors that would be viewed negatively by oth-

ers. This disposition could lead to an emphasis on avoiding negative outcomes in general (i.e., a prevention focus). In contrast, American parents' tendency to minimize the relevance of misbehavior to their children's self-worth may dispose the children to emphasize positive consequences of their behavior without thinking about its possible negative consequences (a promotion focus).

Thus, the effects of these different childrearing practices may become functionally autonomous and give rise to the cultural differences in adulthood identified by Triandis (1989) and Markus and Kitayama (1991). In the present context, this possibility has obvious implications. The tendency for Asians to think of themselves and others as members of a larger collective may give rise to a more general tendency to apply broad concepts in interpreting information. At the same time, Asians' disposition to avoid negative consequences of their behavior could lead to a chronic tendency to focus on negative consequences of a decision and to pay more attention to details. Thus, North Americans may engage in global processing to a greater extent than Asians do.

The more general implications of Miller's work, however, stem from the fact that although the different socialization processes she identified are characteristic of different cultures, they are not unique to these cultures. To this extent, they provide a more general conceptualization of the factors that give rise to chronic dispositions to process information globally or locally and that exert an influence independently of the situational factors that Förster and Dannenberg identified. In this regard, Oyserman and Sorensen (2009) conceptualized individualism and collectivism as cultural syndromes, or clusters of interrelated concepts and processes that are included in the knowledge of many societies but vary in their chronic accessibility. At the same time, the relative accessibility of these syndromes can be manipulated by stimulating individuals to think of "I" or "we" (Gardner, Gabriel, & Lee, 1999; Kühnen & Oyserman, 2002). Both chronic and transitory dispositions to engage in global or local processing could be manifestations of these syndromes.

### Concluding Remarks

The research summarized in this commentary and the discussion of its implications do not even begin to scratch the surface of the many phenomena addressed by Förster and Dannenberg in their article. However, by distinguishing between different types of procedural knowledge and its effect, and by separating the cognitive and motivational factors that influence the activation of this knowledge, a more general framework

is hopefully provided within which these phenomena can be conceptualized.

### Note

Address correspondence to Robert S. Wyer, Jr., Department of Business Administration, University of Illinois at Urbana-Champaign, 1206 S. Sixth Street, Champaign, IL 61820. E-mail: mkwyer@ust.hk

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COMMENTARIES

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