

METHODS FOR DETERMINING THE LOCUS OF CONTEXT EFFECTS IN JUDGMENT

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Abstract. Contextual effects are proposed to occur at any of five stages of processing: sensory encoding, lexical encoding, propositional/categorical encoding, dimensional analysis, and response translation. Methods for locating the effects of contextual stimuli on judgments within this five stage model are described. Response-oriented methods, which center on the type of responses made to contextual and target stimuli, appear best suited to determine whether these effects are located at the response translation stage. Process-oriented approaches, which either alter the sequencing of processes or introduce new judgmental operations, provide a finer grain analysis. Although more research is needed, the reviewed evidence indicates that contextual contrast for psychophysical judgment occurs during dimensional analysis and effects of priming on social judgments can occur during propositional/categorical encoding.

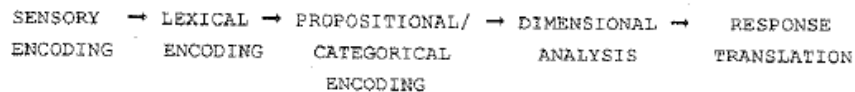
Context effects in judgment come in only two varieties, assimilation and contrast. This is because judgments are rendered on bidirectional scales so that the value of a target can only be displaced either towards values of contextual stimuli (an assimilation effect) or away from the values of contextual stimuli (a contrast effect). Although it would be convenient to assume that each of these two effects results from a single process, this assumption seems unreasonable on a priori grounds and has proven to be untenable on the basis of evidence from empirical studies. Thus, when a context effect is uncovered, the researcher is faced with the difficult problem of determining its underlying cause. The problem of locating the context effect within an information processing system is an important one because effects based on different processes have different implications concerning their generality and impact on other related judgments or choices, e.g., preference judgments.

This article presents a review of different methods used for locating context effects in judgment. I begin by presenting a general process model in which context effects may be located at one of five stages. I then review traditional response-oriented approaches and afterwards review more modern process-oriented

approaches for locating context effects. Although no single method can provide unequivocal evidence for the location of context effects, converging evidence from several different methods may do so.

A PROCESS MODEL FOR CONTEXT EFFECTS IN JUDGMENT

Processing of stimulus information is assumed to proceed sequentially through five stages:



At each stage relevant contextual information is input from memory, with the output of the process becoming part of the stimulus representation upon which subsequent processes operate. The three initial stages encode the stimulus into its core representation. These encoding processes occur automatically and are not directly tied to the judgment process. The latter two stages represent the process of forming a judgment and translating it into an appropriate response. These processes may be automatic or controlled, and their output does not directly alter the encoded core stimulus representation.

A full exposition of this model is beyond the scope of this article (for a more detailed account, see Wedell, 1989a). Instead, I briefly overview each of the five stages and provide illustrative examples. It is important to keep in mind that processing occurs sequentially so that any context effect occurring early in the sequence will influence processing at later stages. Methods for locating context effects attempt to draw a correspondence between the experimental procedures and a particular stage in the sequence of processing. Thus, obtaining a context effect with a given procedure implies that it occurs at the corresponding stage or earlier; whereas, elimination of a context effect implies that it occurs at a later stage.

1. Sensory Encoding

These processes provide the initial sensory encoding of stimulus information. Context effects occurring at this stage may be thought of as enduring perceptual illusions. A good example of

contrast occurring at this level is given by Locke's water basin problem: Room-temperature water in one basin will feel cool to a hand that has recently been immersed in a basin of hot water, but it will feel warm to a hand that has recently been immersed in a basin of cold water. This particular effect occurs in the peripheral nervous system where sensory cells respond in a relative rather than absolute fashion. Sensory-based context effects are not limited to the peripheral nervous system, but they must occur early enough in the central nervous system so that they directly alter the sensory configuration.

2. Lexical Encoding

These processes are responsible for defining the denotative meaning of a sensory configuration. The lexical code for a given sensory representation may be thought of as a location, or node, within an associative network, the meaning of the stimulus being represented by its connections with other nodes. If retrieval of the lexical code follows a process of spreading activation (Collins & Loftus, 1975), contextual stimuli can then influence what meaning is selected by increasing the activation of particular locations within the network. For example, the contextual set (inch, meter, yard) primes nodes related to measurement and hence increases the probability that the sensory representation "F O O T" is encoded as a unit of measurement rather than as a body part. This type of associative process may be considered to give rise to an assimilation effect whereby the meaning of the target stimulus is displaced towards the meaning of contextual stimuli. There are no theories of contrast effects occurring at this level.

3. Propositional/Categorical Encoding

For any given denotative meaning structure that results from lexical encoding, there may be many possible associated connotative meanings. The connotative meaning is represented in the model in terms of an elaborated set of propositions or categories that are coactivated, and hence associated, with the lexical node. For example, the same lexical node corresponding to "foot" as a body part will be retrieved regardless of whether the set of contextual stimuli consists of (massage, dance, tickle) or (locker room, fungus, itch); however, the elaborative meaning structure will differ. When

asked to judge the pleasantness of the concept "foot," subjects exposed to the first contextual set will be more likely to retrieve positively-valenced associates through connections with associated propositions than those exposed to the second set, and hence an assimilation effect should be observed. This type of associative-based assimilation effect has been studied most extensively in the social priming literature (e.g., Higgins, Rholes, & Jones, 1977). Although associative mechanisms imply assimilation, some researchers who describe "perceptual contrast" for judgments of nonsensory aspects of the stimulus appear to be arguing for a propositional/categorical based contrast effect (e.g., Manis, 1967). Martin (1986) has recently described a process model consistent with this view.

4. Dimensional Analysis

The judgment process may be conceived as locating the value of a stimulus along a specified dimension and communicating that location using a particular response language. Dimensional analysis refers to the first of these processes and uses as input the stimulus representation resulting from sensory, lexical, and propositional/categorical encoding. The output from this stage is conceived as the phenomenal impression of the stimulus along the specified dimension. Context effects occur at this level when the same encoded stimulus representation gives rise to different phenomenal impressions, depending on the set of contextual stimuli. A number of distributional theories of contextual contrast have been formulated at this stage (Helson, 1964; Parducci, 1983). These theories imply that values of contextual stimuli are retrieved at the time of judgment and that the subjective impression of the target stimulus is made relative to these values. Hence, \$100 may seem like a lot of money when the contextual set consists of mostly smaller amounts (\$10, \$15, \$45, \$65, \$110), but it may seem like a small amount when the contextual set consists of mostly larger amounts (\$65, \$110, \$185, \$190, \$210), even though the encoded representation of the stimulus may not differ under these two conditions. Because the output of the dimensional process becomes part of the stimulus representation, albeit a peripheral element, dimensional analysis may be thought of as a specialized form of propositional encoding, in which the proposition/category consists of the impression of the stimulus along the designated dimension.

Assimilation effects at this stage have sometimes been represented in terms of an averaging process (Anderson, 1981, pp. 230-248).

5. Response Translation

The second phase of judgment may be conceived as translating a subjective impression into the appropriate response language. Context effects occur at this stage when the same dimensional value gives rise to different responses, depending upon the set of contextual stimuli. One justification for the use of different responses for the same subjective impression under different contextual sets is that such a strategy may enhance communication. For example, it may be that one's subjective impression of the height of a 5'10" basketball player is the same as one's impression of the height of a 5'10" jockey; however, one may refer to the basketball player as short and the jockey as tall. Such a strategy may be helpful in communicating norms about the two different groups to the listener. Principles of communication such as maximizing discrimination among stimuli (Upshaw, 1969) and avoiding redundancy (Bradburn, 1982) are among the explanations given for response-based context effects.

RESPONSE-ORIENTED APPROACHES

A traditional approach for determining the nature of context effects is to gauge whether they depend on the how responses are elicited. Context effects that generalize across different response methods are thought to occur early in the processing sequence, at sensory, lexical, or propositional encoding stages. Context effects that are specific to a particular method of responding are thought to occur later in the processing sequence at dimensional analysis or response translation stages. Two basic types of response manipulations are possible: manipulations of (1) type of response made to contextual stimuli, and (2) type of response made to the target stimuli.

Responses to Contextual Stimuli

Some formulations of contextual processing have been stated explicitly in terms of category use. For example, contrast effects can result from the tendency to use categories equally often and

assimilation effects can result from a tendency to match category use to stimulus frequencies. More generally, the overt responses made to the contextual stimuli may be responsible for the context effects on the target stimuli. This hypothesis is easily tested by varying the nature of the responses made to contextual stimuli. A number of studies have investigated the effects of various methods of incidental exposure (e.g., no judgment, judgment on another dimension, etc.). Many studies have demonstrated that contrast effects do not depend on judging contextual stimuli on the same scale (e.g., Kenrick & Gutierrez, 1980; Parducci, 1956; Parducci & Wedell, 1986; Smith, Diener, & Wedell, 1989 -- although see Pepitone & DiNubile, 1976 for an exception). Similarly, assimilation effects have been repeatedly found when contextual stimuli are presented incidentally as in the priming literature (e.g., Bargh & Pietromonaco, 1982; Higgins, et al., 1977; Srull & Wyer, 1979, 1980; Wyer & Srull, 1981) or when contextual stimuli are not overtly judged as in the halo effect literature (Anderson, 1981, pp. 165-178). The fact that context effects do not generally depend upon overt judgments of contextual stimuli does not mean that these effects are not response based, but it simply eliminates certain classes of response-based theories.

Responses to Target Stimuli

Response control. Responses may vary in terms of the degree of conscious control a subject can exert on the response. Most overt verbal responses are potentially under the subject's full control. On the other hand, some physiological responses may be relatively immune to conscious intervention. Thus, context effects that have no impact on phenomenal experience should not be manifest for low-control response measures. Krupat (1974) conducted an experiment that measured apprehension using both verbal reports and physiological concomitants of apprehension. Subjects in a driver-simulation task viewed films that were either highly threatening or non-threatening before viewing an intermediate level target film. Both verbal and physiological measures demonstrated strong contextual contrast, suggesting that the locus of the contextual effect was at a phenomenal level, i.e., below the response-translation stage. Because physiological correlates are not well-defined for most judgment dimensions, the generality of this technique appears limited.

Scale definition. Krantz and Campbell (1961) argued that one could separate out response- and sensory-based components of context effects by manipulating the degree of scale lability. Their subjects made judgments of the lengths of lines using either a well-defined scale of inches or a loosely-defined 100-point rating scale. Contrast was observed for responses made on both scales, but was greater (as measured in standardized units) for the rating scale. Krantz and Campbell argued that these results suggested both a perceptual and a linguistic component to the effect. However, Anderson (1982, p. 11) has argued that the inference of a perceptual component to the context effect is unwarranted from this experiment. First, the magnitude of the context effect on the scale of inches was too great to be sensory-based (a difference of 4.5 inches between conditions). But more importantly, there is no force of logic to the argument that finding a significant context effect on a well-defined scale means that the effect is encoding-based. The method appears only useful in falsifying the hypothesis that an effect is sensory-based, that is, when no significant effect of context is found on one of the scales. Naturally, because this conclusion rests upon accepting the null hypothesis, its validity is directly tied to the power of the test to detect a significant difference.

Development of a well-defined scale need not be limited to the realm of psychophysical judgments. A general objective of behavioral assessment is to anchor categories to specific descriptions or stimulus examples so that different judges use the same standards. Although anchoring techniques have been generally successful in increasing reliability (see Bernardin & Beatty, 1984), there has been little evidence that they reduce the magnitude of contextual manipulations. For example, context effects on judgments of psychopathology have been reported to be of equal magnitude for anchored and unanchored scales (Arnhoff, 1954; Perrett, 1971), although a recent study has demonstrated conditions under which verbal anchors can partially reduce such context effects (Wedell, Parducci, & Lane, in press).

Scale constraints. When a subject is asked to express a judgment, the experimenter typically places constraints on how responses are to be made. For example, the experimenter may prescribe a set of ordered categories for the subject to use. Some response-based theories imply that context effects result directly from these response-scale constraints (e.g., Upshaw, 1969;

Volkman, 1951). To test this hypothesis, one may observe whether these effects occur when constraints are taken away. One way to lift constraints is to use an open-ended response format. In general, contrast effects have been demonstrated across a wide variety of response formats such as category ratings (Helson, 1964), magnitude estimations (Mellers & Birnbaum, 1982), open-ended written descriptions (Simpson & Ostrom, 1976), and cross-modality matching procedures (Manis, 1967).

Some exceptions to this finding do exist. Upshaw (1978) found that when judgments were made on two related scales, contextual effects were manifest only on the scale that was phrased in the language of the contextual manipulation. This finding suggests that the context effects were response based. The magnitude of context effects has also been found to depend on how many rating categories are prescribed by the experimenter for both psychophysical and social judgments (Parducci & Wedell, 1986; Wedell & Parducci, 1988). Although dependence of the context effect upon the number of categories suggests a locus at the response-translation stage, the results are also consistent with a model proposed by the researchers that locates the context effect at the level of dimensional analysis.

PROCESS-ORIENTED APPROACHES

Process-oriented approaches attempt to vary different features of the judgment task in order to determine whether a context effect occurs before or after a particular process. Traditional response-oriented approaches have been concerned with two broad classifications of effects, sensory- versus response-based. The more sophisticated, process-oriented approaches are capable of making finer distinctions among the different types of processes responsible for context effects. I distinguish two basic types of manipulations: Those that alter the sequencing of encoding and judgment processes, and those that alter the operations involved in the judgment process.

Sequencing Manipulations

Srull and Wyer (1980) investigated whether the assimilation effect found in social priming studies occurs during encoding or at a later stage of processing by manipulating the sequencing of

contextual and target stimuli. In their study, contextual stimuli were presented incidentally in a sentence unscrambling task. The unscrambling task occurred either before or after the presentation of the target stimulus, with the judgment of the target stimulus occurring last in both cases. Assimilation was found only when the contextual stimuli preceded the target and not when the order was reversed. This pattern of results supports an encoding interpretation of the observed assimilation effect: When the contextual stimuli preceded the target, they altered the propositional encoding of the stimulus information which was reflected in the later judgment; but when the target stimulus preceded the contextual stimuli, encoding could not be altered and hence no effect of context occurred. If the locus of the assimilation effect had been at dimensional or response translation stages, it should have occurred regardless of the order of presentation. Because the force of logic behind this test appears rather strong, it is surprising that this methodology has not been employed in testing context effects more generally.

Modeling Different Operations

Thus far, the various methods that I have discussed for testing the locus of context effects have not altered the basic form of the judgment task. For example, regardless of whether judgments of hostility are expressed on a 10-point rating scale or as an open-ended verbal description, the subject is still making a direct evaluation of the hostility of the target. It is possible, however, to vary the operations involved in the judgment task so that responses are not made directly to the dimension of interest but rather to the result of some operation that may build upon the dimensional judgment. If context effects occur early in the processing sequence, then they should affect judgments based on the entire set of operations. However, if context effects occur late in the processing sequence, the additional processes may operate on a context-independent stimulus representation and hence context effects may be absent for these elaborated judgments. I discuss three basic types of elaborated judgments, those resulting from comparative, composite, and chaining operations.

Comparative operations. Rather than judge a single stimulus along a dimension, one may be asked to compare impressions of two different stimuli along the same dimension. The comparative

response may be merely directional (i.e., greater than or less than), or an indication of something akin to psychological distance (i.e., not very different or very different), or a combination of the two (i.e., not very much greater than, etc.). The object of the test is to determine whether the comparisons are made using context-independent or context-dependent values of the stimuli. If context-independent responses are obtained, i.e., if comparisons of the same stimulus values remain constant under different contextual conditions, then there is a context-independent representation of the stimulus available and hence the context effect cannot be located at one of the encoding stages. On the other hand, finding contextual dependencies in the comparative judgments supports the notion that context effects alter the subjective impression of the stimulus and hence are not mere response translation effects.

The use of comparative judgment, of course, has a long history in psychology. A number of studies have demonstrated significant context effects for pairwise comparisons of psychophysical stimuli (Erlebacher & Sekuler, 1971, Helson, Michels, & Sturgeon, 1954, Massin, 1987); however, the stimuli employed in these studies were of low discriminability and the effects were small. To investigate whether the large contrast effects generally observed for highly discriminable psychophysical stimuli would be manifest in a pairwise judgment task, Mellers and Birnbaum (1982) had subjects rate the lightness of dot patterns presented singly or the difference in the lightness of dot patterns presented in pairs. They found that despite large contextual effects on ratings of single stimuli, pairwise ratings were independent of the contextual manipulations. This finding has been replicated and extended to pairwise dissimilarity ratings of multidimensional stimuli (Corter, 1988; Jones & Wedell, 1987). These results for highly discriminable stimuli imply that the large contrast effects typically observed in psychophysical experiments do not reflect a change in the underlying sensory encoding of the stimuli. However, these results by themselves do not distinguish between effects located at dimensional analysis versus response translation stages. For example, it is plausible that the subjective impression of the lightness of the dot patterns was context dependent when judged singly; however, because the underlying sensory impressions were not altered by the contextual manipulations, judgments of the differences for pairs were based on differences in the sensory representations of the stimuli rather than differences in their values resulting from dimensional analyses.

A general difficulty facing researchers who study context effects in judgment is that there are usually strong carry-over effects so that within-subject designs are often not feasible. However, manipulating the context within-subjects would be ideal in a comparative judgment task because one could directly assess the effects of different contexts on equivalent targets. A within-subject manipulation of context requires that the contexts can be isolated from one another and linked to a specific target. Such a design was illustrated earlier in the Locke water basin problem: The cold and hot contexts were isolated by being in different basins and were linked to separate but equivalent targets, the left and right hands of the subject. Thus, the demonstration of the same water temperature feeling warmer to one hand than to the other represents a strong phenomenological impression of a contextually induced difference. Manis, Nelson, and Shedler (1988) have developed a procedure that attempts to manipulate context within subjects for social judgments. In their task, verbal statements varying in their degree of psychopathology were attributed to patients from one of two hospitals. Thus, two different contexts were established, one for each of the hospitals. Subjects were then asked to make comparative judgments of the psychopathology of verbal statements, each attributed to patients from different hospitals. Their finding of strong contextual effects on the pairwise judgments implies that the context affected the subjective impressions of the stimuli.

Composite operations. In many instances we are asked to make judgments based on a set of stimuli rather than a single stimulus event. For example, a judgment of hostility may be based on a series of observed behaviors. Most relevant to the current discussion is whether context effects that occur for judgments of single stimuli will influence judgments of the composite. For example, judgments of line length show strong contextual dependencies, the same length is judged to be shorter when most lines are of longer length. Now consider the task of judging the average length of a set of several lines. One possibility is that this judgment will be based on the average of the context independent values of the lines. However, Birnbaum, Parducci, and Guifford (1971) demonstrated that the judgment of the composite set of lines was based on an integration of context-dependent stimulus values. Similar results have been demonstrated for judgments of loudness (Parducci, Thaler, & Anderson, 1968) and for judgments

of performance based upon composite test scores (Mellers & Birnbaum, 1983). These results suggest that the within-set context affected the subjective impression of the individual line lengths. Thus, when the results from composite and comparative judgments of psychophysical stimuli are taken together, they imply that the generally observed contextual contrast effects on these stimuli are located at the dimensional analysis stage: Comparative judgments demonstrating a context-independent component to the stimulus representation, but composite judgments suggesting a context effect on the subjective impression. This model of the judgment process can be represented by locating the difference operation after encoding but prior to the context-dependent dimensional analysis, with the additive operation occurring after dimensional analysis but prior to response translation.

Chaining operations. A defining feature of sequential processing models is that later operations use as their input the output from earlier operations. Thus, there is established a chain of operations, each building on the other. Comparative and composite judgments represent types of chaining operations that operate directly on the relevant dimension of judgment. However, other types of operations (e.g., those that guide behavioral tendencies, preferences, and choices) may use as input information from the contextually manipulated dimension even though they do not directly express values on that dimension. Studying the effect of contextual manipulations on these further removed operations provides insight into the locus of the context effect.

In a study measuring the effect of contextual manipulations on attitudinal responses, Sherman, Ahlm, Berman, and Lynn (1978) asked subjects to rate the importance of various social issues. The rated importance of the target issue, recycling, was higher when other issues were of generally lower importance, a contrast effect. The subject was then asked (in an ostensibly unrelated setting) to designate the number of hours she was willing to volunteer for a local recycling project. This behavioral measure may be conceived as reflecting an operation that chains onto the importance dimension, the greater the importance, the more hours volunteered. Only when subjects were reminded of their ratings of the recycling issue did the contrasted ratings of recycling correspond to the hours of volunteering. When no such reminder was given, volunteering showed the opposite trend. These results imply that the contrast effect did not occur at the encoding stage,

that is, the encoded attitude was not directly changed by the contextual manipulation. Instead, Sherman et al. argue that the results support a response-based interpretation of the contrast effect, although location at the dimensional analysis stage seems equally consistent.

Operations underlying preferences may also be viewed as chaining onto specific dimensions of judgment. For example, preferences for drinks that vary in their sugar concentration may be guided by a process that compares each drink's perceived sweetness to an ideal point on the sweetness dimension (Coombs, 1950). Risky, Parducci, and Beauchamp (1979) investigated whether contextual manipulations on the sweetness dimension would affect judgments of pleasantness of the different drinks. Judgments of the sweetness of different drinks showed the usual contrast effects, the same concentration of sugar being judged as more sweet when the set of contextual stimuli were of lesser sugar concentrations. If pleasantness judgments are guided by an operation that compares the sweetness of the target to an ideal sweetness level, the relevant question is whether the ideal point is located on a context dependent or independent scale of sweetness. Judgments of pleasantness were strongly affected by the contextual manipulation, regardless of whether subjects made sweetness ratings. Following an ideal-point model, the pleasantness ratings were single-peaked functions, with their peaks corresponding roughly to the middle category on the 9-point sweetness scale. These results argue strongly against a response-based interpretation of the contextual effect on sweetness. Furthermore, Risky et al. cite previous work on sweetness that implies the sensory representation of the target does not change under the different contextual conditions. Thus, converging evidence implicates the dimensional analysis stage as the locus of the contextual effect in this instance.

In a recent experiment, Wedell (1989b) has attempted to replicate the methodology of Risky et al. for judgments on a social dimension. Subjects either rated the neatness of hypothetical stimulus persons or rated how much they would like to have that person as a roommate. Strong contextual contrast was observed on the neatness ratings, however, preference ratings were influenced by the contextual manipulation only when directly preceded by the neatness rating. This finding, in a sense, conceptually replicates

that of Sherman et al. (1978) and once again implies that contrast effects on social judgments are not encoding-based.

Degree of preference can be expressed for single stimuli, or in a comparative judgment situation. Huber, Payne, and Pluto (1983) investigated whether choice preferences were affected by contextual manipulations on underlying dimensions. In their experiments, stimuli varied on two dimensions, e.g., beers that varied in rated quality and price. Subjects chose the most preferred beer from a set of three beers that defined the contextual set. Each set consisted of two beers whose values on each dimension differed but when combined resulted in roughly equivalent attractiveness, e.g., a moderate quality, low priced beer equated with a high quality, high priced beer. The third alternative was of lower attractiveness than the other two, but was constructed in such a way as to increase one of the alternative's values on a particular dimension via a contrast effect. Subjects' choices were significantly affected by the contextual manipulation. Because the context was manipulated within subjects, the context effect resulted in a preference reversal: the same subject chose one beer over the other in one contextual condition, but reversed this preference order when the context was changed. These results, combined with the fact that no overt judgments of the dimensional values were made, imply that the effect was not response-based. Furthermore, it is unlikely that this effect resulted from an encoding process because the stimuli were numerical and hence unlikely to be encoded differently.

The process of cross-modality matching may be viewed as directly chaining operations on one dimension to operations on another. Manis (1967) has argued that context effects found for cross-modality procedures are indicative of "perceptual" effects because the response-language component has been eliminated. Although it is true that elimination of context effects when using a cross-modality method implies a response-based effect, observation of contextual effects in cross-modality scales does not mean that the effect is necessarily an encoding one. For example, after establishing that difference ratings of the lightness corresponding to dots patterns were context independent, and hence not encoding-based, Mellers and Birnbaum (1982) demonstrated contextual dependence for difference ratings made across modalities (e.g., judgments of whether a circle was larger than a dot pattern was dark). This result suggests that although the difference operation for within modality comparisons occurs before

dimensional analysis, it occurs after dimensional analysis for cross-modality judgments for which the sensory representations are not commensurable. These results are consistent with locating contextual contrast for psychophysical judgments at the dimensional analysis stage.

A final example of chaining operations that I will discuss concerns the sequencing of opposing contextual processes. Wedell, Parducci, and Geiselman (1987) had subjects rate the attractiveness of faces presented in pairs. Between-pair context produced a contrast effect while within-pair context produced an assimilation effect. Because both assimilation and contrast were observed on ratings of the same target, it is possible to determine the priority of these processes. There are three possibilities: assimilation occurred first and its output was used as input for the contrastive process, contrast occurred first and its output was used as input for the assimilative process, or both processes occurred independently and used context independent values as input. Using an averaging model of assimilation and a range-frequency model of contrast, the only sequencing that provided an adequate fit to the data was to assume that contrast occurred first. This result implies that the observed within-pair assimilation was not an encoding effect but occurred either at dimensional analysis or response translation.

GENERAL IMPLICATIONS

Context effects are ubiquitous in psychophysical and social judgment. However, it has long been acknowledged that the same context effect can arise from different processes. Identifying what processes determine the context effect is especially important to understanding the implications of the effect for different modes of judgment and for related tasks. Traditionally, two levels of contextual processes have been identified, perceptual and linguistic (Krantz & Campbell, 1961). The model presented here describes five identifiable levels. An impressive array of methods have been developed for locating contextual effects within such an information processing system. Although any particular method typically does not uniquely identify the type of process involved, converging evidence from different methods can do so.

From the review presented here, there appears to be converging evidence that contextual contrast observed in psychophysical experiments occurs primarily at the level of

dimensional analysis. Assimilative effects found in priming studies apparently result from encoding processes, but there have been no studies to determine the locus of the contrast effects that are sometimes reported in priming studies (Herr, 1986; Martin, 1986). There is no evidence as yet to uniquely indicate an encoding-based contrast effect in social judgment, although some perceptual illusions appear to occur at this level (for exceptions see Girgus & Coren, 1982). What is needed now is not so much the development of more methods, but more coordination of the use of methods to uncover principles defining when different types of contextual processes will occur and how they interface with other processes.

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