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Contrasting Models of Assimilation and Contrast

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The placement of value on objects, actions, events, and individuals is a persistent and continuous human endeavor. We express these values in our everyday discourse when we say things like, "That movie was wonderful!" Such expressions communicate the contents of our mental world through categorical terms that relate relative magnitudes along implicit dimensions. The movie being referenced above is clearly valued more highly than movies assigned expressions such as "awful," "cheesy," or even "interesting" or "exciting." Indeed, it is because our expressions of value typically imply ordered sets of categories that psychologists have found it natural to collect data using category rating scales, which formalize these gradations of value and serve as a gateway into the mental life of the informant.

As with any measuring instrument, the issue of the validity of category ratings can be raised. Naturally, one can argue that these public expressions of private sentiment may be deliberately altered by the respondent, but this argument applies to any overt measurement procedure over which one has control. On a different front, S. S. Stevens argued against the use of rating scales because of their susceptibility to context effects (Poulton, 1979). The inclusion of contextual stimuli often results in the rating of a target stimulus being displaced toward contextual values (assimilation) or away from them (contrast), depending on characteristics of the task, stimuli, and judges. Stevens' concern centered on the degree to which assimilation and contrast effects reflect biases in translation of a true underlying value resulting from the response elicitation procedure rather than genuine changes in the mental representation of the target.

One empirical approach to evaluating this concern has been to examine whether contrast and assimilation are found across different response modes. Although the magnitude and direction of these effects are sometimes affected by specific response characteristics, such as the subjectiveness of the scale (Biernat & Manis, 1994; Krantz & Campbell, 1961) or number of categories (Parducci &

Wedell, 1986; Wedell & Parducci, 1988), basic context effects have proven extremely robust across response elicitation procedures. For example, context effects can be observed in physiological measures (Krupat, 1974), open-ended responses (Mellers, 1983; Simpson & Ostrom, 1976), and in the behavioral responses of animals (Crespi, 1944), implying that they often reflect more than a response or communicational bias.

Although manipulation of response mode is informative, a more enlightening approach to understanding contrast and assimilation is the specification of testable theoretical models that explicate the underlying processes. There is no shortage of such models; however, there is a need to delineate the degree to which these models make convergent or divergent predictions across different experimental manipulations. We believe that an examination of the basic constituent processes hypothesized by these models to produce contrast or assimilation will provide insight into the applicability of the models across different situations. It is important to emphasize that rather than look for a single best explanation of assimilation or contrast, we presuppose that several different processes can produce these effects. Consequently, what we examine in this chapter is how process accounts differ in their implications for the conditions producing these effects and the boundary conditions under which they operate.

OVERVIEW OF BASIC PROCESSES

Figure 2.1 presents a schematic diagram highlighting different processes operating in judgment. The boxes represent inputs and outputs while the circles represent processes. The external target is first submitted to automatic perceptual and semantic processing, which results in the establishment of a base representation. The base representation is then elaborated by memory processes and dimensional analysis to form the elaborated representation on which response selection operates to produce an overt judgment. Goals may play a key role throughout the processing of information; however, goals do not directly influence initial perceptual and semantic processes, as these are assumed to be automatic and primarily stimulus driven.[1] Although not pictured, context is assumed to be a potential influence of each of the four processes distinguished in Figure 2.1. Finally, the overt response is added to the elaborated representation as indicated by the dashed line.

A few instructive examples may clarify the distinctions being made with regard to contextual influences on processing made in Figure 2.1. The first place where context may influence processing is at initial perceptual and lexical encoding. Perceptual illusions are one example of context effects at this level. For example, when the same size circle is surrounded by larger circles, it appears smaller than when surrounded by smaller circles: the Ebbinghaus illusion. Or, if the recent context consists of words like “stream,” “river,” “sand,” and “shore,” then the term “bank” may be lexically represented as the land adjoining a river rather than a place to keep money. These kinds of low level contextual changes in the base representation undoubtedly take place, but they are generally not the locus of

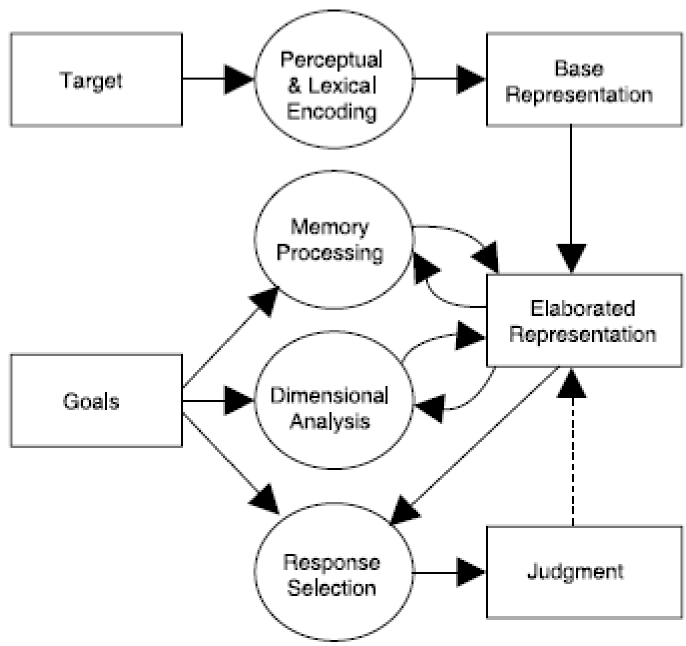

FIGURE 2.1 Basic processing model. Target information is assumed to be perceptually and lexically encoded to create a base representation. Further memory processing and dimensional analyses are used to create an elaborated representation on which response selection is based, with the overt judgment becoming a part of the elaborated representation. Goals moderate the processes determining the elaborated representation and response selection.

assimilation and contrast effects in most judgment situations of interest and will not be discussed further.

Our conceptualization then is that contrast and assimilation generally take place either at the level of the elaborated representation via memory processing or dimensional analysis, or they occur at the level of the overt judgment via response selection processes. The occurrence of these effects is likely to be moderated by goals states relevant to each of these processes. For example, if the goal is to discriminate between stimuli, then processes that lead to contrast may dominate. On the other hand, if an underlying goal is to generalize from contextual and target information, then processes that lead to assimilation may dominate.

The distinction between base and elaborated representations can be illustrated by the following example. Consider context effects on the evaluation of satisfaction with a fixed quantity of money, say $20. It is unlikely one will misperceive the $20 as $100 or $1. If one did, this effect would occur in the base representation. However, even if the base representation is fixed at $20, different evaluations are likely to occur based on elaborative processes. If the $20 is a gift from your aunt, your elaborative processing may include comparisons to gifts given to other nephews and nieces (a dimensional analysis process). If the $20 is near the bottom of this distribution of contextual comparison stimuli, then the elaborated inference is that your aunt is not particularly fond of you, which would likely lead to a reduced level of satisfaction with the $20. However, goal states may moderate the evaluation process. For example, if you are looking for reasons to support the hypothesis that your aunt favors you, you may reason that because she favors self-sufficiency, she is paying you a compliment by giving you less money than the others in your comparison set. Goals might also operate at the response selection level. For example, despite a low level of satisfaction with the gift, the communicational context of expressing your satisfaction directly to your aunt might lead you to say, “This is super!” an expression that is also added to the elaborative representation. In summary, the overt response may represent effects operating at the level of the elaborated representation or response selection, and these effects may be moderated by relevant goal states.

Accessibility of Base Representation

Note that in the $20 gift example described above, contextual effects did not occur at the level of the base representation ($20) but on the elaborated representation or on the response level. Presumably, as long as the base representation remains accessible, it may be used for context independent valuation purposes. However, studies of memory retention have demonstrated time and again that verbatim memory fades relatively quickly whereas memory for gist remains quite stable (Bransford & Franks, 1971). A consequence of the rapid forgetting of verbatim information is that even when context effects occur at the elaborated or response levels, they may have enduring consequences, for they represent the gist that remains after the verbatim information has faded. One illustration of this effect is the series of experiments by Higgins and colleagues (Higgins & Lurie, 1983; Higgins & Stangor, 1988) on the change-in-standards effect. These experiments demonstrated memory distortion of the retrieved representation a week after initial judgment was made, consistent with the idea of reconstructing the base information using the remembered judgments as gist encoding.

Another consequence of the distinction between base and elaborated representation is that the ability to ignore context may depend strongly on the type of stimuli being evaluated. For example, verbal stimuli so often used in social judgment experiments may be easier to maintain in the base representation than perceptual stimuli. Because of the rapid decay of perceptual information, reconstruction of these values from memory can show contextual effects within just a few seconds of the removal from immediate perception (Haun, Allen, & Wedell, 2005; Wedell, 1996). Thus, an important issue in gauging the impact of context is the accessibility of the base representation at the time of judgment. It is likely that in the majority of real-world social judgment situations, such as when we render a performance appraisal or an assessment of an individual’s character, the information in the base representation must be reconstructed from memory and hence is susceptible to influences of the encoding and retrieval contexts.

Two Fundamental Goals: Discrimination and Generalization

In Figure 2.1, goals are assumed to affect memory processing, dimensional analysis, and response selection processes. Although several types of goals may be considered during the evaluation of a target, two fundamental types are discrimination and generalization. Note that these goals are implicit in any categorization process. Categories are most useful when they distinguish dissimilar stimuli and cluster together similar stimuli. Discrimination facilitates treating stimuli from different categories differently, whereas generalization allows one to predict behavior of a target based on that of other category members. Naturally, it follows that an emphasis on discrimination will tend to lead to contrast and an emphasis on generalization will tend to lead to assimilation (Mussweiler, 2003). Figure 2.1 suggests that the consequent assimilation and contrast may arise out of these different goals via either memory processing, dimensional analyses, or response selection processes.

At the level of memory processing, the goal to discriminate may lead to biased encoding, in which common features receive little attention and unique features become the focus of encoding (Tversky, 1977). The resulting elaborated representation should overrepresent values that differ from contextual stimuli and hence lead to contrast effects. When given the task of choosing between alternatives, the discrimination goal is naturally enhanced and leads to a tendency to weight unique features of the subject of comparison rather than the referent, resulting in contextual shifts in preference (Houston, Sherman, & Baker, 1989). These effects may occur at encoding or retrieval.

Alternatively, generalization goals may be invoked at memory encoding or retrieval and hence lead to assimilation. The generalization goal might be elicited more or less directly by designating the target as a member of a contextual group, so that missing or ambiguous target information is encoded or retrieved as consistent with contextual group information, as in false consensus effects (Marks & Miller, 1987). In addition, the nature of the task may be an important determinant of use of discrimination versus generalization goals. As noted above, choice tasks are likely to enhance discrimination processes, as one looks to select the alternative that is discriminably better than the others. On the other hand, estimation tasks may be more compatible with a generalization goal. For example, in estimating the size of a spoon, it is not particularly helpful to know that spoons are not buildings and that they are not jewelry. These contrast categories are irrelevant and cannot be used very well in generating estimates for a particular spoon. On the other hand, recalling other members of the category “eating utensils” may well help generate estimates that are relevant. Biernat and colleagues (Biernat & Manis, 1994; Biernat, Kobrynowicz, & Weber, 2003) have shown that estimates along “objective dimensions” tend to elicit assimilation whereas ratings may elicit contrast. Perhaps the difference here is in the goals evoked by estimation and rating tasks. An important goal of rating tasks may be indicating differences among stimuli (Parducci, 1995), a discrimination goal.

In addition to memory processing, goals may affect dimensional analysis. Dimensional analysis refers to the processes that use the available information to produce a value for the target along the specified attribute continuum. Much of dimensional analysis can be conceived as the judgment function, in other words, as a rule for combining information. Such rules can often be represented algebraically (Anderson, 1981), with weights representing the attention given to each piece of information and values representing degree to which the information implies a valence toward one end or the other of the attribute continuum. One common combination rule is the additive rule. To the degree that contextual information is additively combined with the target information, assimilation will typically result, as when the average of the contextual set is additively combined with the target value. Alternatively, subtraction rules are used to reveal differences, so that if contextual information is used as a baseline from which target information is subtracted, contrast will generally result.

Although additive and difference rules may be specified at the level of dimensional analysis, it may be difficult to distinguish whether they apply alternatively to memory processes rather than judgment processes. For example, a fruitful and popular way to model memory retrieval is using global vector models of memory (e.g., Hintzman, 1986; Nosofsky, 1986). In these models, the actual memory trace is never recovered but rather the retrieved memory is the result of the summed activation of memory traces relevant to the retrieval cue or probe. Because activation of memory traces is driven by similarity, the remembered stimulus value will tend to shift toward the contextual set, producing assimilation. The additive rules describing these models apply to retrieval, but they can be used to explain judgment phenomena such as the use of the availability and representativeness heuristics (Dougherty, Gettys, & Ogden, 1999). Thus it is sometimes difficult to distinguish whether the contextual shifts in value are due to an integration process applied to the stimulus information during dimensional analysis or to an additive retrieval process. Subtractive rules, which form the basis of contrast effects, are somewhat more difficult to apply to memory retrieval models, although they could represent inhibition processes rather than activation processes. Conceptually, dimensional analysis processes are distinguished from memory retrieval in that they take the existing information and use it to infer a value rather than use it to retrieve other information that changes valuation. This distinction, however, is sometimes difficult to test empirically.

The final type of processing affected by discrimination and generalization goals is response selection. An example of assimilation produced in this manner is the response matching tendency found in detection and discrimination tasks. When provided with trial to trial feedback, judges tend to match their response tendencies to the base rates of the stimuli, producing assimilation. For example, when presented with 80% small squares and 20% large squares, the judge who is unsure which square was presented will tend to use the most common contextual response, “small” in this case. Interestingly, when feedback is not given, participants tend to use a response equalization strategy that results in contrast (Parducci & Sandusky, 1965). These response effects can be modeled in terms of the location of a response criterion parameter within the usual Thurstonian or signal detection model. Alternatively, the more dynamic and process-oriented random walk or diffusion models used in cognitive psychology conceive of response bias as a biased starting point in a random walk or diffusion process in which evidence is accumulated to respond in one way or the other (Link, 1992). In such models, the response criterion parameter of signal detection models is reflected in greater prior activation or priming of one response category over the others in the response process. For example, seeing so many unhappy faces primes the response category “unhappy” so that it is more likely to be activated by presentation of a neutral face (assimilation). Once again, it can be difficult to distinguish models of assimilation and contrast occurring at response selection from dimensional analysis or memory retrieval explanations. One possibility is to examine the generality of these assimilation and contrast effects across different response modes, such as judgment, choice, matching, magnitude estimation, etc. The greater the generality, the less likely the effect is due to biases specific to a particular response mode. Another possibility exists if response bias is examined within the context of these diffusion or random walk models (Busemeyer & Townsend, 1993), which make specific predictions of how bias is related to deliberation time. In particular, these models predict that response bias effects will be greatest with short response deadlines and will be reduced or eliminated if the deliberation time is extended.

Summary of Processing Considerations

The process model of Figure 2.1 distinguishes various ways in which context can be integrated into memory processing, dimensional analysis, or response selection to produce contrast or assimilation effects. Consideration of process models of these effects is important in delimiting the conditions under which these effects will occur. Goals are assumed to be an important moderator of these effects, as goals can change how target information is encoded, retrieved, analyzed, or responded to in relation to contextual information. In the sections that follow, we use this framework to better understand different models of contrast and assimilation and potential tests of the applicability of these models.

CONTRASTING MODELS OF CONTRAST

We distinguish two general approaches to explaining contrast effects as (1) scaling models or (2) situation specific models. Scaling models describe general principles responsible for mapping the judgment scale to the set of target and contextual stimuli, whereas situation-specific models typically posit processes that produce contrast for the specific relationships between target and context, task or setting. Scaling models are often formally developed mathematical models of judgmental principles specifying dimensional analysis, whereas situation-specific models focus more on processes that can shift the valuation of a specific stimulus in a specific context under specific task conditions. The two approaches generally lead to different methods for studying contrast effects. Scaling approaches use several target and contextual stimuli to test model predictions for patterns of responding, whereas situation specific models focus on stimulus and task variables that moderate the effects of the contextual manipulation. In this section we first discuss scaling models and then proceed to situation-specific models.

Scaling Models of Contrast

Scaling models of contrast have often used psychophysical judgment as a foundation for model development. This is because the simple nature of the stimuli gives the experimenter a high degree of control in testing these models. Helson's (1947, 1964) adaptation-level (AL) theory was an early and highly successful model of judgment that explained basic contrast effects. According to AL theory, the organism is constantly adjusting to its changing environment by using new experiences to modify its representation of environmental categories of stimuli. Essentially, AL theory is a prototype model in which categories of stimuli are represented by a single value that stores a type of running average of the organism's relevant experiences. Helson (1964) posited three factors that determine the AL: (1) the average (or geometric average) of recent experiences (i.e., the contextual set of stimuli), (2) the relevant background stimuli (e.g., the size of the lighted screen in a size judgment task), and (3) a residual value that represents the prototype the organism has previously established. Because psychophysical stimuli, such as tones varying in intensity or squares varying in width, do not have well established residual values, the AL for such experiments should be largely determined by the experimental set of stimuli (and background features). AL theory proposes that the judgment of stimulus *i* in context *k* can be characterized as a linear function of deviations from the AL as follows:

$$J_{ik} = a + b(S_i - AL_k) \qquad (2.1)$$

where *a* and *b* are scaling constants, S_i is the context independent scale value of stimulus *i*, and J_{ik} may be considered the mean rating of stimulus *i* in context *k*. Contrast occurs essentially due to assimilation of the AL toward the mean of contextual stimuli. Hence, presenting low valued stimuli pulls down the AL so that subsequent target stimuli are displaced upward relative to control conditions. The basic version of the AL model presented in Equation 2.1 implies that the contextual manipulation should have a uniform effect on target stimuli, since the effect is produced by changes in a single value, the AL.

Volkmann (1951) offered an alternative explanation of contrast in his range theory based on characterizing the category described by contextual and target stimuli in terms of the two extreme values defining the range of variation for that category. The basic range model is expressed as follows:

$$R_{ik} = (S_i - S_{MIN,k})/(S_{MAX,k} - S_{MIN,k}) \qquad v \qquad (2.2)$$

where $S_{MAX,k}$ and $S_{MIN,k}$ are the maximum and minimum valued stimuli evoked by the contextual set and R_{ik} is the "range" judgment of stimulus *i* in context *k*. In psychophysical experiments, the range is assumed to be strongly tied to the experimental stimulus set. Thus, contrast is produced by inclusion of a low valued contextual stimulus that lowers the subjective minimum and hence displaces judgments of targets upward. Note that range theory brings to prominence the subjective endpoints. Some support for the special significance of end stimuli can be inferred from experiments showing heightened discriminability for stimuli near endpoints along with better memory for those stimuli (Estes, Allmeyer, & Reder, 1976).

The testability of both AL and range models derives in part from their very sparse representation of the stimulus context, either defined as a moving average or defined by endpoint values. While predictions from both models provide good approximations to a variety of contextual manipulations, they have not withstood more rigorous testing (Parducci, 1965), implicating the need for a more complex representation of the context. Range-frequency (RF) theory (Parducci, 1965, 1995) assumes a representation of the stimulus context more akin to exemplar model models of categorization in which multiple individual stimuli are relevant. While the range principle of the theory is identical to that of Volkmann's (1951) theory, the frequency principle introduces a new idea, namely, that stimulus value may be derived from the stimulus rank. Judgments of the stimulus based strictly on the frequency principle can be characterized by the following equation:

$$F_{ik} = (\text{Rank}_{ik} - 1)/(N_k - 1) \tag{2.3}$$

where N_k represents the maximum rank and 1 represents the minimum rank in the contextual set and F_{ik} is the "frequency" judgment of stimulus *i* in context *k*. Unlike models of Equations 2.1 and 2.2 in which judgments are linearly related to underlying scale values, the frequency principle produces nonlinear transformations based on the cumulative frequency function. Thus, for example, a bimodal contextual distribution produces a function with two inflection points. RF theory proposes that judgments are well described by a compromise between range and frequency principles as described in the following equation:

$$J_{ik} = C_{MIN} + (C_{MAX} - C_{MIN})[wR_{ik} + (1 - w)F_{ik}] \tag{2.4}$$

where R_{ik} and F_{ik} are defined in Equations 2.2 and 2.3, *w* is the relative weight of the range principle, C_{MAX} is the value assigned the highest response category and C_{MIN} is the value assigned the lowest response category. Numerous tests of RF theory in both social judgment and psychophysical judgment domains have demonstrated its ability to explain contrast effects and its superiority over AL and range models in psychophysical domains (Birnbaum, 1974; Parducci, 1965; Parducci & Wedell, 1986; Wedell, 1996), social domains (Smith, Diener, & Wedell, 1989; Wedell & Parducci, 1988), and applied domains (Niedrich, Sharma, & Wedell, 2001; O'Reilly, Leitch, & Wedell, 2004; Wedell, Parducci, & Lane, 1990).

Rather than going into further details of variations of these models, we concentrate in this chapter on interpreting these scaling-based contrast effects. With reference to Figure 2.1, we might ask are these effects occurring at response selection or earlier, and if earlier, what processes are involved? AL theory was conceived by Helson as a general theory of perception and thought, not tied to the response scale. Within our framework, the AL would be retrieved and updated automatically in memory and then used during dimensional analysis so that the elaborated representation includes the deviation from the AL. Volkmann's (1951) range theory would seem to lend itself more easily to a response-based interpretation. The idea would be that, to effectively communicate variations, we need to anchor the end response categories with the relevant end stimulus values. Thus, when describing a height of 6 feet as "tall" for an adult but "short" for a building, we are communicating the relationship of the stimulus to the endpoints defining the category. It is unclear though whether these effects are operating simply on response selection or if they alter subjective impressions stored in the elaborated representation.

RF theory, like range theory, is ambiguous with respect to where in the processing system these effects may take place. The earlier formulations of the model describe these effects strictly in terms of response selection (Parducci, 1965). Hence, the frequency principle is a bias to use categories equally often and the range principle is a tendency to match the response range to the stimulus range. However, like Helson (1964), Parducci (1968) has argued that these relativistic judgments are operating to some degree at the representational level, as when he argues that RF theory predicts that greater overall happiness is tied to a negatively skewed distribution of events. This formulation of the frequency principle suggests that values are tied to relative ranks and the proportion of the range falling below the target. Thus, the theory posits that the affective reaction to receiving $20 is much more positive when the distribution of expected values is positively skewed and ranges from $3 to $22 than when it is negatively skewed and ranges from $10 to $30.

Although Parducci and Wedell (1986) found conditions under which altering the response scale altered the degree of contextual effects observed, there are several lines of research that are consistent with these effects taking place at dimensional analysis so that they are not tied simply to response selection. The most powerful evidence to this end is gleaned from experiments in which the task is changed to examine whether evaluations of differences or combinations reflect implicit RF scaling of stimuli. For example, Wedell (1996) asked participants to judge the similarity of dot patterns that varied in numerosity and were drawn from either positively or negatively skewed distributions. When the pair of dot patterns being evaluated was on the screen at the same time, there was no evidence of disordinal context effects, consistent with the idea that participants compared the context independent base representations directly. But when one of the dot patterns had to be held in memory for just a few seconds, large disordinal context effects were found that were well described by a model that assumed the RF values of the stimuli were being compared. This research then suggests that RF valuation is used to encode information into memory for additional comparison.

More generally, the finding of disordinal effects of context, such as when preferences are reversed with context, is particularly important in distinguishing between effects occurring at the level of response selection and those occurring earlier, at dimensional analysis or memory processing. This is because response selection models typically require that the ordering of magnitudes is preserved even though the relative differences in magnitudes may vary. Thus, response bias explanations are consistent with situation in which Person A is judged moderately aggressive and Person B is judged aggressive in one context but in another context Person A is judged aggressive and Person B is judged extremely aggressive, as order is preserved. Response selection processes generally cannot account for a situation in which the context results in Person A now being judged aggressive and Person B being judged only moderately aggressive, a disordinal context effect.

In this vein, research on how values from different dimensions (such as rent and square footage of apartments) are combined shows that disordinal effects of distribution on preference are well modeled by assuming RF values along the different dimensions are combined rather than base representation values being combined (Cooke & Mellers, 1998; Mellers & Cooke, 1994). For example, Mellers and Cooke (1994) asked participants to judge the attractiveness of apartments on the basis of monthly rent and distance from campus. When the range of rent was narrow (and the range of distance was wide), the difference between a $200 apartment and a $400 apartment seemed large. In this case, a $200 apartment that was 26 minutes from campus was preferred over $400 apartment that was 10 minutes from campus. However, when the range of rent was extended (and the range of distance was narrow), the difference between these two apartments seemed small in terms of rent. Here, demonstrating disordinal preference effects, the $400 apartment that was 10 minutes from campus was now preferred over the $200 apartment that was 26 minutes from campus.

Furthermore, modeling of attractiveness judgments has demonstrated that underlying RF processes may be partially responsible for preference reversals in choice and attractiveness judgments of alternatives that include decoys (Pettibone & Wedell, 2000; Wedell & Pettibone, 1996) and also with binary choice under different contextual sets (Simonson & Tversky, 1992; Wedell, 1998). Decoy effects in choice occur when adding a third (decoy) alternative to a choice set alters the preference ordering between the members of the other sets. For example, Wedell (1991) reported that participants preferred Car A (100 ride quality/27 miles per gallon) 69% over Car B (80 ride quality/33 miles per gallon) when the decoy alternative was Car C (100 ride quality/21 miles per gallon). However, Car B was preferred 80% over Car A when the decoy alternative was Car D (60 ride quality/ 33 miles per gallon). Note once again that this type of reversal of ordering of preferences for alternatives implies a change in the representation of the alternatives as elaborated by contextual comparison.

These demonstrations of the strong effects of implicit RF scales on subsequent comparisons imply that RF effects are not simply response based but must operate in some way on the elaborated representation. Wedell (2000) has suggested that the underlying mechanism may be that scales represent how attention is distributed across the subjective range. This interpretation is supported by demonstration of greater discriminability for reduced ranges and in areas of the range where stimuli appear most densely packed (Luce, Nosofsky, Green, & Smith, 1982; Wedell, 2000). When the range is extended, then the fixed attentional resource is distributed across a wider range of values so that the same stimulus difference is less easily discriminated. Similarly, when stimuli are packed closely within a subrange, frequency values reflect the increased attention directed toward that portion of the subrange resulting in enhanced discrimination. Because increased discrimination corresponds to decreased similarity, this mechanism is consistent with the findings of Wedell (1996). Additional research is needed to better understand the link between attention and scale values, but this interpretation allows us to better understand how the elaboration process may direct processing of stimulus values through an attentional mechanism.

Despite the evidence for implicit scaling effects operating through dimensional analysis rather than response selection, there can be no denying that there are systematic response based effects that may contribute to contrast. Baird (1997) and Haubensak (1992) have each developed theories that attempt to explain the basic RF effects in terms of sequential response strategies. In these models, the scaling effects arise from systematic sequential dependencies resulting from the manipulation of distribution. For example, one type of sequential rule would be to use a higher category than assigned to the previous stimulus in the series when the magnitude of the current stimulus is perceived to be greater, and conversely to use a lower category when the magnitude is perceived to be less. In a positively skewed distribution with a preponderance of low valued stimuli, moderate valued stimuli will be assigned higher ratings following this strategy than when they are rated within a negatively skewed distribution (with a preponderance of high valued stimuli), These models are worthy of investigation as they address sequential effects and may explain some of the variance attributed to distributional contrast. However, one clear reason to argue against these models providing a full explanation of contrast effects in scaling is that these effects occur when the same set of stimuli is rated in the same order by participants in different distributional conditions, with incidental exposure to the distribution (Parducci & Wedell, 1986; Smith et al., 1989). Thus, a complete judgment model fully explaining sequential and distributional effects has yet to be developed.

Finally, the foregoing review has emphasized the evidence supporting the idea that contrast reflects dimensional analyses processes described by range-frequency theory that alter the elaborated representation of the stimulus and can serve as input for other types of processes (such as similarity judgments). However, this does not mean that the adaptation-level characterization does not have applicability in some of these tasks. A good example of this is a study in which Wedell (1995) had participants judge which of two squares was larger than the other. Squares were either red or blue, with one set's range being shifted down relative to the other. Consistent with results using magnitude estimations, squares from the wide distribution were judged smaller than the same sized squares from the narrow distribution. Wedell manipulated the distributions of the squares from each distribution to determine if this effect could be attributed to AL effects, RF valuation within each distribution of squares, or a tendency to utilize response equalization. For example, in one condition the means or ALs of the two distributions were held constant but the proportion of responses clearly favoring each distribution differed so that context effects could be attributed to the tendency to equalize responses. In another condition, the ALs differed but the proportion of responses clearly favoring each distribution was the same so that context effects could be attributed to the tendency to evaluate each stimulus relative to the respective AL. In other conditions, ALs and response proportions favoring the distributions were held constant but stimulus ranks within the distributions were varied so that context effects could be attributed to an implicit RF valuation. The pattern of results supported attributing context effects to both AL valuation and response equalization, but not to RF valuation within distributions. This pattern of results does not overturn the large body of evidence supporting the RF over the AL model in predicting rating data, but it does suggest that different experimental paradigms may lead to different scaling processes being invoked.

Situation-Specific Models of Contrast

The scaling models described above assume that contrast is a natural consequence of the dimensional valuation process based on how the target relates to characteristics of the distribution of contextual stimuli. Alternative formulations of contrast appear to be less general and more focused on the judge's perception of specific aspects of the stimuli or task setting. Among the first theorists to proffer a situation specific model of contrast were Sherif and Hovland (1961), who cited psychophysical judgment data that suggested that when the target was close in value to the contextual stimulus its value tended to be assimilated rather than contrasted. They primarily applied their social judgment theory to situations in which one's own attitude served as an anchor point and evaluations of other attitudinal positions were either assimilated toward or contrasted away from one's own attitude, depending on similarity or overlap with own attitude. However, subsequent research on the effect of the self as anchor has convincingly demonstrated that these effects are primarily due to greater polarization of judgments for those with extreme attitudes rather than assimilation and contrast (Judd & Harackiewicz, 1980; Judd & Johnson, 1984; Lambert & Wedell, 1991). Polarization, according to accentuation theory (Eiser, 1990; Taijfel, 1957), implies that those with extreme attitudes tend to push values toward one end of the continuum or the other, a pattern that looks like assimilation and contrast. However, polarization is based on affective reactions to positions. When Lambert and Wedell (1991) separated effects of own attitude and affective involvement, own attitude served only to produce contrast (unless the target was ambiguous, in which case assimilation occurred).

Although the original formulation of Sherif and Hovland's (1961) model has been placed in doubt, subsequent models have demonstrated the utility of considering overlap between target and context in determining contrast versus assimilation. Herr and his colleagues (Herr, 1986; Herr, Sherman, & Fazio, 1983) varied how extreme a contextual prime was relative to the target being judged. They found that extreme primes produced contrast, but moderate primes produced assimilation. In explaining these effects, Herr (1986) argued that participants initially search for a categorical match. If the contextual prime overlaps with the target, then a match is found and the value of the contextual prime is generalized to the value of the target. When there is no match, then the retrieved extreme prime serves as a contextual anchor and typical scaling based contrast is found.

Thus, this conception of the judgment process implies that the scaling-based contrastive process is used unless there is sufficient overlap with the prime. However, an alternative interpretation of these findings is that primes that are not remembered lead to assimilation, whereas primes that are remembered are used as standards for scaling based contrast (Lombardi, Higgins, & Bargh, 1987). Because extreme primes are more memorable, they are more likely to lead to contrast. In both of these interpretations, the situation specificity appears to relate to the occurrence of assimilation effects, whereas the contrast effects described are consistent with scaling based contrast.

A more conceptually distinct type of contrast process from scaling based contrast appears in models that focus on the participants' awareness of the potential biasing effects of context. These models view contrast as an effortful, corrective process that operates either at memory processing or response selection. Martin (1986) was among the first to investigate this situation using his set/reset model. Across three studies, Martin used a blatant priming task with a completion versus interruption procedure to manipulate the extent to which individuals engaged in thought perseverance. He found evidence of contrast only in the task-completion condition, but not in the task-interruption condition, even though he held constant the temporal distance between the priming task and the impression formation task. Thus, judges found it more difficult to avoid the use of the primed concepts when they continued to think about the prime (i.e., in the interrupted-task condition) than when they stopped accessing the concept at the priming task (i.e., the completed-task condition).

Martin (1986) concluded that the contrast effects observed in the completedtask conditions were likely to have resulted from participants actively inhibiting the conceptual category related to the priming task. He argued that scaling models could not easily explain the effects he observed, since participants across the interrupted-task and the completed-task conditions were exposed to the same priming stimuli and rated the same target stimulus on the same response scales. Martin also observed contrast effects on both prime-related and prime-unrelated dimensions. This finding argues against a simple effect on response selection, which would be expected to be more specific to the dimension being evaluated. Instead, it is consistent with shifts in the elaborated representation, perhaps due to biases introduced by inhibition of prime-related conceptual categories, which in turn affected the inferences generated for the target and the subsequent evaluative implications. In Martin's study, when two primed concepts were consistently favorable, participants developed a clear evaluative as well as a clear descriptive concept of the stimulus person, and contrast was observed on both the primerelated and the prime-unrelated dimensions. However, when the primed concepts were evaluatively inconsistent, a neutral general evaluative person concept was formed, and contrast was observed only on the prime-related dimensions.

An important difference between the contrast observed by Martin (1986) and scaling based contrast is the effortfulness of the process. Scaling-based contrast appears to occur quickly, with little effort (Parducci & Wedell, 1986). However, the reset process that Martin postulated requires cognitive resources applied to suppression of the relevant conceptual category. Martin, Seta, and Crelia (1990) demonstrated the resource intensive nature of this process by showing that contrast did not occur when participants were (1) distracted, (2) given social loafing instructions, or (3) low in need for cognition.

Related to the idea of an effortful process guiding contrast are accounts that posit contrast results from a correction process. Wegener and Petty’s (1995) flexible correction model suggests contrast may sometimes arise from a correction procedure in which the judge perceives potentially biasing assimilation effects and is motivated to adjust responses to the target in a direction opposite to that of the perceived bias and in an amount commensurate with the perceived amount of bias. The flexible correction model places importance on two factors: (1) motivation to correct and (2) application of naïve theories about the direction and the magnitude of bias introduced by the contextual factors. One key aspect of the flexible correction model is that it assumes that corrections are aimed at removing the perceived bias rather than the actual bias. Thus, the model suggests that correction processes may operate even when the person’s belief about bias differs from the actual level of bias in the judgment setting. Unlike the set/reset model (Martin, 1986; Martin et al., 1990), which assumes that assimilative biases are default outcomes and that contrastive effects are due to effortful inhibition, the flexible correction model assumes that either assimilation or contrast can be the perceived biasing effect of a context and that either form of bias can be corrected. Using a context for which participants held a contrastive theory, Wegener and Petty found that both blatant and subtle prompts to consider possible effects of the context on target ratings led to corrections of target ratings in a direction toward (rather than away from) the context. A second way in which the flexible correction model differs from the set/reset model is that the correction appears to occur at the level of response selection. Thus, rather than inhibit a conceptual category and hence alter the elaborated representation, the judge appears to acknowledge the potential bias and simply adjust response in an opposite fashion to counteract the perceived bias.

Summary of Contrast Models

The models outlined above suggest several major distinctions that can be made concerning processes guiding contrast. Scaling-based models for the most part suggest that contrast is a natural consequence of the judgment process and requires minimal resources to produce these effects. While scaling models often include a response selection process that may account for some part of the contrast effect, they may also be formulated as occurring through dimensional analysis that alters the elaborated representation. The best evidence for scaling-based alteration of the elaborated representation is that changes in implicit scale values can be shown to affect tasks that build on these, such as multiattribute-based attractiveness evaluations, similarity evaluations, and choice (Cooke & Mellers, 1998; Mellers & Cooke, 1994; Pettibone & Wedell, 2000; Wedell, 1996, 1998; Wedell & Pettibone, 1996). For example, when considering two apartments that differ in price and location, implicit contextual comparison along each price dimension can make the relative difference in price seem large or small and thus alter which apartment is judged more attractive or chosen over the other. These implicit comparisons operate within our framework at the level of the elaborated representation through contextually dependent dimensional analysis as exemplified by range-frequency processing.

In contrast to scaling models of contrast, situation specific models describe factors mediating when contrast will occur. One class of these models focuses on the overlap of features of target and contextual stimuli (Herr, 1986; Sherif & Hovland, 1961), with contrast occurring when stimuli are dissimilar but assimilation occurring when the target is similar to the contextual stimuli. These models are consistent with scaling-based contrast effects, but describe conditions that limit the applicability of contextual stimuli as standards of comparison. A second class of models posits that contrast may arise out of effortful expenditure of cognitive resources. Martin's (1986) set/reset model places the effortful processing at inhibition of conceptual categories, a memory process that biases the construction of the elaborated representation away from the contextual values. Wegener and Petty's (1995) flexible correction model also assumes effortful processing, but it implies the effect occurs at during response selection. Key to contrast occurring via flexible correction is that the judge is motivated to be unbiased and has a naïve theory that judgments will be biased in an assimilative direction.

CONTRASTING MODELS OF ASSIMILATION

In considering different models of assimilation, we will examine three basic experimental paradigms. The first of these we refer to as the priming paradigm, in which contextual stimuli are typically presented to judges in an unrelated task prior to the judgment of the target. The second of these we refer to as an estimation paradigm in which contextual information is presented during a task in which the judge must estimate the value of the target on some dimension. The third we will refer to as the ideal-point judgment paradigm, in which participants must evaluate stimuli on a scale that is related to the underlying dimensions of variation by a single peaked function. This last paradigm has not been explored extensively in social psychology.

Assimilation in Priming

Priming studies examine how activation from one stimulus affects the subsequent processing of another stimulus and have been used extensively in cognitive psychology to understanding effects of spreading of activation in associative networks (Collins & Loftus, 1975). In social judgment paradigms, priming generally consists of presenting traits, behaviors, or exemplars related to an evaluative concept in a task prior to the evaluation of a stimulus that is ambiguous with regard to the concept. Spreading activation models imply priming will produce assimilation, in that the semantic overlap between the prime and the target should be more likely to be activated and so evaluations of the target will be shifted toward the value of the prime. Higgins, Rholes, and Jones (1977) reported one of the first social

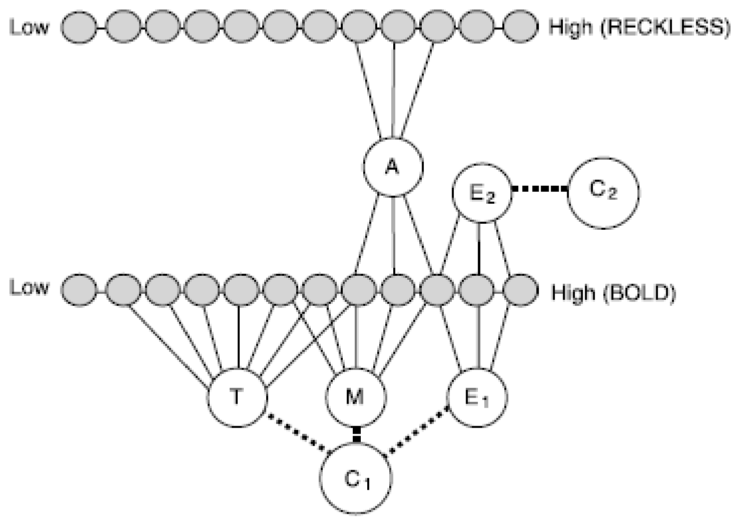

FIGURE 2.2 Diagram of conditions mitigating assimilation and contrast. Nodes indicate locations along trait dimensions “bold” and “reckless.” The ambiguous (A) target has links to both. The typical target (T) has a distribution of values along one dimension, with the moderate (M) prime sharing some of these and the extreme primes (E1 and E2) not overlapping with T. Categories C1 and C2 show how highlighting categorical relevance may mediate effects.

judgment priming studies in which participants were exposed so socially desirable traits (adventurous, self-confident, etc.) or corresponding socially undesirable traits (reckless, conceited, etc) and later asked to judge a hypothetical person based on a verbal description that was ambiguous with respect to these traits. The results clearly showed that participants were likely to use the recently activated concept to interpret the ambiguous description. The basic paradigm used by Higgins et al. is shown in the top part of Figure 2.2. The ambiguous description (A) has links both to high levels of the traits “reckless” and “bold,” indicating that it can be interpreted consistently with each trait. When one trait has been recently activated, it remains in a higher state of accessibility so that the links to that trait are more likely to be accessed and used to disambiguate the stimulus within the elaborated representation. Because activation of competing concepts is assumed to be all or none, the priming of one concept gives it a head start in the race toward activation, consistent with diffusion models of category activation (Nosofsky & Palmeri, 1997).

Other researchers have developed stimuli within the priming paradigm that vary in their implications along a given trait dimension, so that the target is ambiguous with respect to its extremity along this trait dimension. For example, Srull and Wyer (1980) developed a paradigm in which participants sorted behavior reflecting hostility in an unrelated task and then rated a hypothetical target person based on a description that was ambiguous with respect to hostility. This paradigm is depicted in the lower half of Figure 2.2, with the target (T) supporting both high and low implications along the trait dimension. The activation of the high levels of the trait then make it more likely that implications consistent with high levels of the trait are accessed in memory and made part of the elaborated representation. An important aspect of their study is that they manipulated whether the prime occurred prior to the ambiguous target or after its presentation. Priming effects occurred only when the target was preceded by the prime, implying that the effects were tied to memory encoding rather than retrieval or response bias. Herr and colleagues (Herr, 1986; Herr et al., 1983) pioneered the use of exemplars as primes. Once again, the target in those studies might be represented as having a wide dispersion of possible interpretations with respect to the trait, as in target (T). Exemplars varied in extremity, being moderate (M) or extreme (E_1) with respect to the trait. In those experiments, moderate primes produced assimilation, but extreme primes produced contrast. As depicted in Figure 2.2, moderate primes may overlap enough with the target to produce coactivation of shared values and hence increase the likelihood that these interpretations are included in the elaborated representation. The lack of overlap with the extreme prime presumably leads to an unbiased valuation of the target. However, the extreme prime is then used as a standard of comparison, producing contrast. Because spreading activation does not produce contrast, the most reasonable interpretation of the contrast effect is consistent with the proposition that the judge must remember or be aware of the extreme prime for contrast to occur (Lombardi et al., 1987; Strack, Schwarz, Bless, Kubler, & Wänke, 1993).

Other researchers have explored the priming paradigm with exemplars and traits more extensively to determine when these may lead to assimilation or contrast. Stapel and colleagues (Stapel, Koomen, & van der Plight, 1996; Stapel, Koomen, & Velthuijsen, 1998; Stapel & Winkielman, 1998) have suggested that determining factors include context–target similarity, extremity, relevance, and distinctiveness. Note that in the experimental paradigms these researchers investigate, the prime is often presented in the prior trial or instructional set so that it is likely to be remembered. Within this framework, the role of context–target similarity and extremity may be conceived as reflecting similar mechanisms in line with our discussion of the work of Herr and colleagues. When contextual stimuli are extreme, they likely share little overlap with the target and hence spreading-activation-based assimilation is not possible. Further, extreme stimuli are more likely to be remembered and used as a comparison standard producing contrast. These relations are captured in Figure 2.2 using the target (T), moderate prime (M), and extreme prime (E_1) representations.

Relevance is often defined as shared category membership between the target and contextual stimulus (Stapel et al., 1996, 1998; Wänke, Bless, & Igou, 2001). Stapel et al. (1998) demonstrated that contrast and assimilation and contrast effects emerge as a result of manipulations of relevance. They showed that assimilation results if the primed exemplar and the target belong to different categories (i.e., the exemplar is irrelevant), whereas contrast results when the primed exemplar and the target belong to the same category (i.e., the exemplar is relevant). In their study, judgments of the target (e.g., a new restaurant) were assimilated towards an irrelevant exemplar (e.g., a specific clothing store). On the other hand, judgments of a new restaurant were contrasted away from another restaurant. In Figure 2.2, the same category extreme exemplar (restaurant) is represented as E_1 and it is linked to the target T through a shared category (C_1). The contrast finding in this case is consistent with the use of remembered nonoverlapping exemplars as standards for comparison. The alternate-category extreme exemplar (clothing store) is represented in Figure 2.2 by E_2, which is linked to category C_2. The lack of contrast in this case would seem to be due to the contextual set being filtered by category relevance, as depicted in Figure 2.2 and consistent with research on contrast (Brown, 1953; Zellner, Rohm, Bassetti, & Parker, 2003). The occurrence of an assimilation effect for E_2, however, is somewhat more difficult to explain within our framework. If overlap is necessary for assimilation based on spreading activation, then E_2 should not lead to assimilation when it is discounted as a comparison standard. On the other hand, what may be occurring is that the irrelevant exemplar activates the trait concept, which serves to more diffusely activate values along the trait continuum (more so for high than low values). This idea is consistent with the distinctiveness notion raised by Stapel and colleagues (Stapel et al., 1996, 1998), in which exemplars have distinct boundaries and can produce contrast but traits are indistinct and therefore are likely to lead to assimilation. Further research is needed to determine the nature of assimilation involved.

Assimilation in Estimation

One type of task in which assimilation effects are often found is estimation. In estimation, one is typically attempting to assign a value to the stimulus that represents some objectively measurable aspect of the stimulus. Thus, one may estimate the size of a square by reproducing it or describing it in inches. While estimation may share similar processes with judgments of value, it also differs in that it can be viewed as having a strong memory retrieval component since its object is often to accurately reproduce one's memory for a stimulus value or event (e.g., estimating the number of countries in the UN from Africa may be conceived as a recall task in which memory is probed for the different countries from the different continents). Estimation tasks generally require individuals to describe the value of a stimulus after exposure to relevant or irrelevant stimuli. Individuals respond to this task by searching their memory and making a dimensional comparison between the target stimulus and the stimulus serving as anchor. Alternatively, when no anchor is provided, individuals may estimate the value of a stimulus by making a memory comparison with other category members.

In social judgment, contextual effects in estimation have been most thoroughly examined in the anchoring paradigm. The classic anchoring paradigm involves judges making two consecutive judgments, a comparative, and an absolute judgment, in reference to the same target. Tversky and Kahneman (1974) first asked participants to make a comparative judgment that was to assess whether the percentage of African nations in the United Nations was higher or lower than an arbitrary number serving as an anchor and found that estimates were influenced by the initial comparison in an assimilative manner. They interpreted anchoring effects as being the result of insufficient adjustment from an irrelevant value.

What is not clear from their analysis is the locus of this effect. It could occur at the response selection level, or it could occur during memory retrieval. Both interpretations are possible based on spreading activation models.

A response selection interpretation could be made along the lines of spreading activation along the response scale: Consideration of one response makes associated responses more active so that these values have a head start and thus are more likely to be selected. However, a similar argument can be made at the level of memory retrieval operating on the elaborated representation. The anchor value resides in memory so that when memory is searched for potential estimates, the retrieved value is likely to be biased toward the activated values in memory (consistent with global vector models of memory such as described by Hintzman, 1986, in which all memory traces contribute to the remembered stimulus as a function of their similarity to probe or memory cues). One difficulty in distinguishing between these interpretations is that the memory representation and responses are on the same scale. Mussweiler and Strack (2001) decoupled response-level numerical anchoring effects from semantic anchoring effects taking place at memory retrieval level by using a manipulation that included different scales with similar semantic implications. We will return to their view shortly.

Evidence favoring a response selection interpretation can be derived from sequential effects in judgment. In absolute identification tasks as well as rating tasks, the response to the current stimulus is assimilated toward the response of the prior stimulus, referred to as first order assimilation (Ward & Lockhead, 1970). According to the memory-based interpretation, the memory for the stimulus on the last trial may be confused with memory for the stimulus on the current trial, producing a distorted memory representation in line with assimilation. However, one argument against this interpretation and in favor of a response selection interpretation comes from studies in which no stimuli are presented and the participant simply guesses which stimulus is currently being presented (Wagner & Baird, 1981; Ward & Lockhead, 1971), often with the cover story that this is an ESP study and the task is to guess the next stimulus value. First order assimilation is again observed, even though there is no current stimulus to search for in memory and there is no prior stimulus to search for either. It is difficult to attribute these effects to biased memory search based on exposure to anchor stimuli, because there were no stimuli presented. Thus, the first order assimilation effects observed appear to be the result of the recent activation of a response category increasing the likelihood of using similar that category or similar categories on the subsequent trial.

Alternatively, evidence for memory distortion may derive from more recent conceptualizations that attribute the results observed in the standard anchoring paradigm to a mechanism of increased accessibility of anchor-consistent information (Mussweiler & Stack, 1999, 2000, 2001; Strack & Mussweiler, 1997). These accounts suggest that individuals solve the comparative task by testing the possibility that the target is equal to the anchor value on the judgmental dimension. In doing so, individuals may employ a hypothesis-consistent testing strategy and generate semantic knowledge that is consistent with the anchor. Support for this view is provided by a study in which Mussweiler and Strack (2000) asked participants to compare the average price of a German car to either a high or a low anchor value

40,000 vs. 20,000 German Marks). Subsequent to the comparative judgment, they assessed the accessibility of the target knowledge with a lexical task. Participants made a series of lexical decisions with respect to target words associated with expensive (e.g., Mercedes, BMW) or inexpensive cars (e.g., VW). They found that response latencies for the type of words depended on the anchoring condition, judges being faster recognizing words associated with expensive cars after a comparison with a high rather than low anchor, supporting selective accessibility.

More integrative views of anchoring suggest that anchoring consists of different processing stages that involve different mechanisms. Wilson, Houston, Etling, and Brekke, (1996) suggest that numeric influences may be limited to the initial stages of determining an appropriate comparison standard, whereas semantic processes take place at later stages. Mussweiler and Strack (2001) investigated whether semantic and numeric processes influence absolute estimates in an additive manner and found that numeric influences were only limited to situations in which the semantics of anchoring could not operate. For example, they found that anchors with extremely different absolute values (e.g., 5100 m vs. 5.1 km) but with similar semantic implications (e.g., both the comparative and the absolute judgments were related to the height of the highest elevation in the Ural) produced similar estimates. In contrast, the numeric effect of anchors expressed in different measuring units was limited to situations when semantic influences could not operate because the activated semantic knowledge was held inapplicable to the judgment (i.e., the comparative judgment was concerned with the highest elevation in the Ural, while the absolute judgment with the number of languages spoken in the world). These results appear to place the memory-based interpretation on a solid footing.

Assimilation in Ideal-Point Domains

Clyde Coombs (1964) provided a useful distinction between dominance and idealpoint judgment domains. For dominance judgments, differences in ratings reflect differences in magnitudes along a dimension. For example, a person rated as “very aggressive” exhibits greater aggression than one rated as “moderately aggressive.” Ideal-point domains represent preference or attractiveness evaluations, with value determined by proximity to the ideal valued stimulus. An important consequence of this analysis concerns the relationship between dominance judgments of values along a given dimension and corresponding preference judgments. Only when the ideal is located at one extreme or the other, will these judgments be monotonically related to one another; otherwise, preference judgments will form a single peaked function relative to the dominance judgments. This single peaked function is the classic form of attitudinal endorsements found in the social psychology literature (Sherif & Hovland, 1961). Individual differences are reflected in different ideal point locations so that the preference ordering of stimuli will differ for those holding different attitudes (or ideals).

The research on assimilation and contrast effects that we have reviewed has focused on dominance judgments. Even when that research has examined preference or attractiveness relations, the underlying ideal-point structure has typically been obscured so that shifts in ideal-point could not be examined. For example, Wedell (1994) demonstrated basic contrast effects in liking judgments of individuals described in terms of personality traits scaled along a liking dimension. Very different effects of context are expected for ideal-point domains in which liking or attractiveness is a function of an underlying ideal-point domain. These differences in context effects for dominance and ideal-point domains are illustrated in Figure 2.3, where the target stimuli are represented by enumerated black circles. For dominance judgments, assimilation or contrast can be represented by shifts in the rating scale along the vertical (or response) axis, as shown in the left panel of Figure 2.3. Thus, if stimuli are low in value as shown, a higher rating for Target 1 reflects a contrast effect and a lower rating for Target 1 reflects an assimilation effect. In illustrating these types of contrast effects, Wedell and Pettibone (1999) have shown that a target stimulus presented in a context of generally narrow facial features was rated as having moderately wide features, while the corresponding target stimulus in a context with generally wide facial features was rated as having moderately narrow features. As shown in the right panel of Figure 2.3, assimilation of ideals is reflected in the rating function shifting along the horizontal axis in the direction of the values of contextual stimuli and contrast of ideals is reflected in a shift away from contextual stimuli. In the case of assimilation of ideals, Target 1 would be viewed as

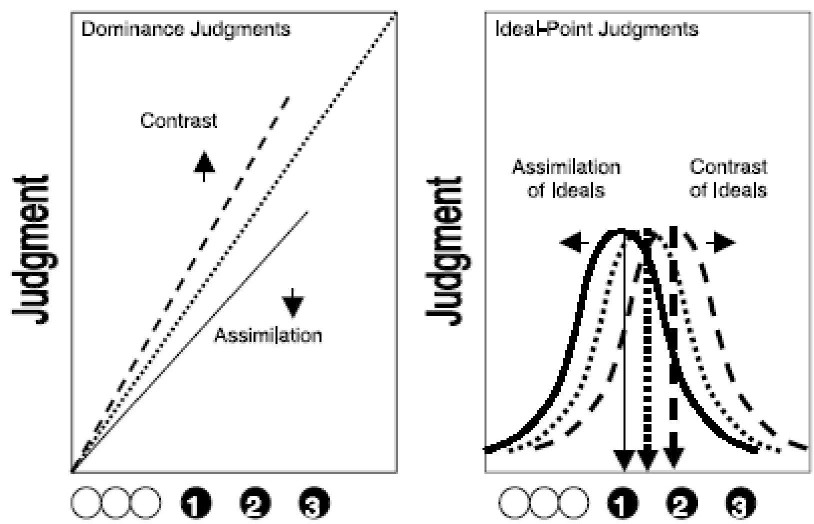

FIGURE 2.3 Illustration of contrast and assimilation. The left panel describes the situation for dominance judgments in which the inclusion of the contextual values (open circles) can lead to a displacement of responses to target stimuli (filled circles) away from the responses assigned to contextual stimuli (contrast, illustrated by the dashed line) or toward those responses (assimilation, illustrated by the solid line). The right panel describes the situation for ideal-point judgments in which inclusion of contextual stimuli may displace the ideal defining the peak of the attitude function toward contextual values (assimilation) or away from them (contrast).

more attractive than Target 2 in a context of mostly low stimulus values. However, in a context of mostly high stimulus values a reversal of preferences would occur such that Target 2 would now be rated higher than Target 1. In their study, Wedell and Pettibone (1999) showed that different ideal points are formed for contexts of faces with mostly narrow or wide features. Specifically, in the narrow context, the preferred face had narrower features than in the wide context (an assimilation of ideals). An important consequence of assimilation and contrast of ideals is that these contextual effects result in large preference reversals, and so they cannot be easily dismissed as an ordinal shifts in response mapping to stimulus values. Once again, because response selection models of context effects require preserving the ordering of stimuli along the judgment dimension, the disordinal effects on preferences represented by ideal point shifts must be explained at the level of the elaborated representation through dimensional analysis or memory retrieval processes.

The typical result of contextual manipulations is that contrast on dominance domains is accompanied by assimilation of ideals on preference related judgments. For example, Riskey, Parducci, and Beauchamp (1979) manipulated the distribution of sweetness of drinks and found the most preferred drink shifted toward the mean of the contextual distribution. Wedell and Pettibone (1999) demonstrated similar assimilative shifts in ideals for ratings of the pleasantness of facial configurations in both judgment and choice. Although understudied, the assimilation of an ideal point appears robust, affecting preferences in the domains of architectural features (Baird, Cassidy, & Kurr, 1978), musical tempos (Holbrook & Anand, 1990), taste (Riskey et al., 1979), consumer products (Cooke, Janiszewski, Cunha, Nasco, & de Wilde, 2004), schematic faces (Wedell & Pettibone, 1999), and human body images (Wedell, Santoyo, & Pettibone, 2005).

One intriguing feature of these effects is that they cannot be dismissed as response bias, as they reflect disordinal shifts in the preference ordering among stimuli. In general, response biases tend to be limited to monotonic shifts of scale. What then is the mechanism for producing these effects? Essentially, two main mechanisms have been proposed. The judgment-mediated model (Cooke et al., 2004; Wedell & Pettibone, 1999) proposes that these shifts of ideals reflect underlying contrastive shifts in the dimensional scales of valuation (i.e., for the dominance judgments). Thus, for example, the ideal nose width might be one that is perceived to be moderately wide. Introducing a series of faces with narrow noses then shifts the valuation of nose widths upward (a scaling-based contrast effect) so that the width perceived as ideal or moderately wide is narrower (an assimilation of ideals). In support of this model, Wedell and Pettibone (1999) found moderate-sized correlations between contrast effects on width ratings and the assimilation of ideals on pleasantness ratings for manipulation of dimensions such as nose width or eye gap.

An alternative explanation is in terms of a memory-based mechanism. Here, the ideal for a given category of stimuli is assumed to reflect the prototypical value or average value in memory. The idea that the average of exemplars is closest to the ideal is consistent with research that finds the average of faces is more attractive than the constituent faces (Langlois & Roggman, 1990). According to the prototype-mediated model, introducing a series of faces with narrow nose widths shifts the prototype for this category toward these values so that the ideal nose becomes one that is narrower. Because the prototype-mediated model proposes that shifts of ideals arise from a different mechanism than contrastive shifts on underlying dimensions, it should be possible to dissociate these effects. Pettibone (2000) showed just such a dissociation in a study in which context was manipulated within subjects. Although both effects were obtained, their correlation typically was very low and nonsignificant. Wedell et al. (2005) have also showed this type of dissociation between ratings of width and attractiveness of body images, for at least one subgroup of their sample. Women who were dissatisfied with their own body image showed comparable contrast effects on judgments of widths of images but showed no contextual effects on the ideals, preferring the same narrow width in both positively and negatively skewed conditions. Although the judgmentmediated model may have some merit, to this point the evidence seems more supportive of different mechanisms guiding contrast on dominance ratings and assimilation of ideals.

We believe that the examination of context effects in ideal-point domains such as attitude endorsement is an important area that requires more extensive research. Thus far, these effects have been produced using perceptually based stimuli. It is an open question whether similar effects may occur for attitudes that are supported by a propositional structure (such as attitudes regarding gun control, abortion, etc.). Further investigation is needed into the conditions producing this type of assimilation of ideals. Pettibone (2000) demonstrated some limits on the generality of these effects that depended on the how contextual information was learned. On the other hand, Karpick (2004) has demonstrated that shifts in ideals occur under a wide variety of conditions, supporting the idea that the process may reflect a fairly automatic memory process.

CONCLUSIONS

In this chapter we have attempted to indicate how models of contrast and assimilation differ in terms of their conceptions of the processes involved. We believe it is useful to delineate the difference between base and elaborated representations. The base representation may provide a basis for context independent processing, but this representation is often fragile so that the context-dependent elaborated representation will often serve as the basis for further cognitive and affective processing. We further distinguish three types of elaborations: context-influenced memory processes, context-influenced dimensional analyses, and context-influenced response processes. A key determinant of contrast versus assimilation may be the goals the judge is operating under. Many tasks emphasize discrimination of stimuli, which leads to processes that produce contrast through changes in memory processing, dimensional analysis and response selection. Alternatively, tasks that emphasize generalization of contextual information to the target lead to processes that produce assimilation, again at these different levels. Specification of models in terms of goals and processes should lead to clearer tests of such models.

Finally, we note that an understudied area in contextual valuation is the effect of context in ideal-point domains. To date, studies show that for perceptual stimuli, preference is highly dependent on context. Because the ideal-point structure reflects basic attitude endorsement functions, it would seem imperative that more research examining the generality of these effects to typical attitudinal domains and processes should be conducted in the future.

NOTE

1. Within our framework, we maintain that goals do not play a direct role in the initial perceptual and semantic encoding of a stimulus, as these are primarily bottom- up stimulus-driven processes. Although research by Bargh and his associates (Bargh, 1990; Chartrand & Bargh, 2002) has clearly demonstrated how goals may be automatically activated and have pervasive effects on stimulus processing, we believe that these effects by and large are directed toward what we refer to as the elaborated representation through changes in attention or memory retrieval processes, or possibly directed toward response selection mechanisms. When goals do affect the initial perceptual or semantic encoding of a stimulus, we believe these effects are mediated through priming knowledge structures, and it is these knowledge structures that ultimately affect encoding. For example, Aarts, Dijksterhuis, and de Vries (2001) found that individuals who were thirsty and thus had a primed goal to drink were quicker to recognize goal-related words such as *beverage* and *quench* than were control participants. We would argue that rather than the goal directly affecting lexical access, the goal led to the activation of related semantic structures and it is the activation of these that affected lexical or perceptual encoding.

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