information do so in an analogous fashion on perceptual information as well, such that metacognitive processes (both verbal and visual) can be assumed to proceed in the same way, using the same principles.

A number of theorists (e.g., Schacter, 1994) have postulated that conceptual information is somehow fundamentally different from perceptual information. For example, Roediger (1990) has proposed that explicit tests of memory, though susceptible to changes in conceptual or semantic elaboration, are not typically sensitive to changes in perceptual or surface features. Likewise, theorists (e.g., Gernsbacher, 1985) have proposed that semantic information has a special status in memory, such that it is less likely to be forgotten than the superficial features of verbal information, such as syntax and modality. These assertions are open to debate. For example, Anderson, Badiu, and Reder (2001) were able to account for a wide variety of the findings traditionally used to argue for different decay rates for semantic versus syntactic information, assuming decay rates do not differ for any one type of information. Likewise, Reder and colleagues (Diana, Peterson, and Reder, 2002; Diana and Reder, 2002; Reder et al., 2002) have argued from the findings of numerous studies that perceptual and conceptual information behave according to the same principles, such that the effects of manipulations on both types of information can be accounted for using the same type of memory representation and the same processing assumptions. In fact, recent research (Arndt and Reder, 2003) has shown that perceptual information does have an impact on recognition judgments when it is linked to semantic information.

Early research by Reder and colleagues (see Reder, 1987) demonstrated that subjects can be made to feel they know the answer to a general knowledge question when terms from the question are primed. Perceptual features of an arithmetic problem can likewise influence one's assessment of whether the answer is known. Reder and Ritter (1992) found that unstudied math problems whose operands had frequently been presented in the same problem, but with a different operator, were likely to get a fast "Know it!" response, whereas studied math problems whose operands had merely been transposed ("B*A" instead of "A*B") were judged as unfamiliar. Although, in the former case, the answer was not known, whereas, in the latter, it was, participants' first impressions were influenced by the perceptual features of the problem.

These results can be interpreted in terms of a source of activation confusion (SAC) model (e.g., Reder and Schunn, 1996; Schunn et al., 1997). SAC models represent perceptual and conceptual information in a unified long-term memory network. If a word encoded at study is presented in a relatively unusual font, the representation for the font information is associated with the encoding episode in the same way that the semantic and orthographic information are. If the same font is used to present the word at test, both the word node and the font node will provide sources of activation to send to the episode node, thereby further raising its activation level and increasing the chances of passing threshold

for a recollection response (Reder et al., 2000, Reder, Donavos, and Erickson, 2002). An implication of the SAC theory is that no information is privileged. The only reason certain types of information seem less likely to be forgotten is that conceptual information is more easily elaborated and thus more easily reconstructed. Perceptual information, on the other hand, is more difficult to elaborate and therefore subject to interference from outside information (Anderson and Reder, 1979).

It is worth noting that in Reder, Donavos, and Erickson, 2002, perceptual cues, even those not relevant to the judgment task, were shown to influence the accuracy of a recognition judgment. Lists of words were presented, with some words being shown in unique salient fonts, and others in the same salient font. Participants were significantly more likely to recognize a previously presented word when they saw it in the same font at test as at study. Although the finding that a matching font from study to test aids recognition was not new (see, for example, Graf and Ryan, 1990), Reder and colleagues' varying the number of words that shared a salient font was. With this manipulation, they found that the number of other words presented in the same font at study modulated the effectiveness of re-presenting a word in the same font at test as at study. Or, as Arndt and Reder (2003) have suggested, a font becomes less distinctive and thereby a less effective retrieval cue if shared with many other words. Further, Reder, Donavos, and Erickson, 2002, contradicts the thesis that perceptual information is only influential in implicit memory tasks (see McDermott and Roediger, 1994; Richardson-Klavehn and Bjork, 1988). It also supports the proposal that perceptual and conceptual information are processed in the same way within memory, which it explains in terms of the same memory principles that Reder and colleagues used to explain verbal learning effects such as word frequency.

Source of activation confusion models theorize that any memory trace, whether semantic or perceptual, is subject to the same laws of memory and follows the same principles of decay, strengthening, and elaboration. Modeling efforts have lent support to the thesis that decay processes are the same for both perceptual and semantic information. SAC models generally maintain the same parameters when the equations are used to explain and predict results from various experiments. Cary and Reder (2001) modeled the experiments in Reder, Donavos, and Erickson, 2002, with a simulation that used the same parameter values for the representations of perceptual and semantic information (e.g., for spread of activation, decay, and strengthening). Thus SAC models, can account (qualitatively and quantitatively) for perceptual matching effects within a unified representational system of memory, using the same mechanisms and parameter values for perceptual and conceptual information.

On the other hand, the perceptual representation system (PRS; Tulving and Schachter, 1990), which is believed to have properties qualitatively different from those of semantic memory, predicts that perceptual information has a special area in memory, one separate from the area for semantic and conceptual information—