In this talk, I discuss the commonalities and distinctions between fuzzy-trace theory and other dual-process approaches to reasoning, judgment, and decision making. The commonalities include the acknowledgment that adult reasoning encompasses alternative modes of processing: one that is analytical, quantitative, and operates on precise memory representations toward the verbatim end of a continuum and another that is intuitive, qualitative, and operates on gist representations toward the fuzzy end of the continuum (e.g., Reyna, Lloyd, & Brainerd, 2003). The detailed experimental and modeling data gathered under the rubric of fuzzy-trace theory (e.g., Brainerd, Reyna, & Mojardin, 1999; Reyna & Brainerd, 1995) provide additional, independent evidence favoring a general dual-process perspective (e.g., Evans, 2003, in press; Klaczynski, 2005). These dual-process data include paradoxical memory effects and troubling, but theoretically predictable, variability in human reasoning performance in a wide range of tasks, such as logical reasoning (e.g., difficulties with modus tollens reasoning in the Wason card problem; Falmagne, 1975; Reyna, 1991) and judgment and decision making (e.g., heuristics and biases in probability judgment; Gilovich, Griffin, & Kahneman, 2002; Reyna & Brainerd, 1991, 1994).

In the domain of memory, fuzzy-trace theory subsumes contradictory findings from both the constructivist (i.e. schema memory) and learning theory traditions. For example, it was shown in numerous experiments with different age groups that verbatim and gist memory representations are encoded, stored, and retrieved roughly in parallel, contradicting semantic integration predictions of traditional psycholinguistic theory. These dual representations account for schematic memory effects, such as false recognition in sentence verification tasks (Brainerd & Reyna, 2005; Bransford & Franks, 1971; Loftus, 1979) as well as seemingly conflicting findings that verbatim and gist memories can be accessed independently (Alba & Hasher, 1983; Reyna & Kiernan, 1994, 1995).

In the domain of reasoning, three assumptions accommodate the findings: (a) people encode both verbatim and gist representations for any meaningful stimulus (e.g., pictures, words, numbers, sentences, narratives, and events, all of which have been studied); but (b) they have a fuzzy-processing preference, which means that they rely on the least precise gist representations that can be used to accomplish a task (regardless of whether the task is called memory or reasoning); and (c) this tendency to operate on fuzzy memory representations increases with experience (e.g., with age from childhood...
to adulthood and, in adulthood, with increases in expertise; Reyna & Adam, 2003). Hence, fuzzy-trace theory is the only developmental theory that predicts that intuition develops into adulthood and represents an advanced form of mature reasoning (Jacobs & Klaczynski, 2002; Reyna, 2004; Reyna et al., 2003; Reyna, Adam, Poirier, LeCroy, & Brainerd, 2005).

Fuzzy-trace theory has been applied to diverse tasks, including classic Piagetian (e.g., class-inclusion, conservation, probability judgment), verbal reasoning (e.g., syllogistic reasoning, transitive inference, spatial reasoning, metaphorical interpretation), and judgment and decision making tasks (e.g., framing effects, hindsight bias, base-rate neglect, conjunction, and disjunction fallacies), as well as older findings from Gestalt theory involving transfer and learning theory involving transposition effects (see Reyna, 2005; Reyna et al., 2003; Reyna & Brainerd, 1995, 1998 for overviews; Wolfe, Reyna, & Brainerd, 2005). Fuzzy-trace theory has also been the source of new, counterintuitive findings, such as mere memory testing (non-suggestive recognition tests foster false memories of gist), false memory persistence (false memories are more consistent across memory interviews than true memories), non-numerical framing effects (removing numbers in decision scenarios increases framing biases), reflection (gain-loss) effects in early childhood, reductions in risk-taking preference from childhood to adulthood, developmental shifts from trading off risks and rewards in childhood to gist-based categorical thinking in adulthood, and selective processing effects that disconfirm expectancy based theories (e.g., prospect theory).

Results of process-level analyses of these tasks support both coherence and correspondence criteria for rationality, and support the further idea that these criteria are distinct (e.g., Reyna & Farley, press). That is, reasoners can excel in achieving good outcomes in the world, accurately discriminating reality (correspondence), but nevertheless evince failures of coherence (violations of internal coherence according to semantics, logic, or probability), and vice versa (e.g., Adam & Reyna, 2005; Reyna & Brainerd, 1994). These detailed, process-level analyses of tasks also support the claim that there are degrees of rationality (that map onto different underlying processes), and that goal achievement is not sufficient for rationality (i.e., that goals themselves are fair game in evaluating rationality; see also Doherty, 2003; Stanovich, 2005).

In addition to discussing the theoretical and empirical developments that underlie fuzzy-trace theory, I will also address findings from traditional dual-process tasks, such as matching in the Wason card problem (Evans, 2003), and differences among dual – process theories’ assumptions relating to memory representations versus processing, intuition versus association (Sloman, 2002), and the role of emotions in reasoning and decision making (Stanovich, 2004).


