

# Moral Schemas and Tacit Judgement or How the Defining Issues Test is Supported by Cognitive Science

DARCIA NARVAEZ & TONIA BOCK

*University of Notre Dame, USA*

*ABSTRACT Ideas from cognitive science are increasingly influential and provide insight into the nature of moral judgement. Three core ideas are discussed: modern schema theory, the frequency of automatic decision-making and implicit processes as the default mode of human information processing. The Defining Issues Test (DIT) measures the beginnings of moral understanding, which are largely non-verbal and intuitive, in contrast to the Moral Judgement Interview (MJI), which measures the highest level of verbal understanding. The positive attributes of the DIT and its conceptualisation of moral judgement schemas are more apparent in a time of increasing respect for implicit knowledge and processing. The DIT offers a means of measuring moral judgement that fits with current views in cognitive science. Although the MJI and interview techniques generally are worthwhile for measuring production competence, the DIT is better able to measure understanding at the level that drives most decisions for most people.*

Historically, philosophy has described moral judgement as conscious and deliberative decision-making. Consequently, studies of moral judgement usually focus on testing conscious, thoughtful reasoning about moral dilemmas (e.g. the Moral Judgement Interview [MJI], Colby, Kohlberg *et al.*, 1987; Moral Competence, Lind, 1995; Sociomoral Reflection Measure [SRM], Gibbs & Widaman, 1982), distributive justice (Damon, 1975; Enright *et al.*, 1981) and particular non-development distinctions in moral judgement (e.g. “domains,” Turiel, 1983; “culture,” Shweder, 1991; and “orientation,” Lyons, 1982). Common to all these methods is the need for the participant to give a verbal rationale for a decision (orally, as in the MJI, or in writing, as in the SRM). It is assumed that participants make their moral judgements reflectively, that they are able to articulate them, and that the method can be “error-free” (Kohlberg, 1976). Participant verbalisations are purified of specific content and scored for evidence of underlying cognitive structures.

In this context, the Defining Issues Test (DIT) has always stood out as a measure “apart”. Spawned from research in moral comprehension (Rest, 1973), the

DIT originated as a cognitive-developmental tool that measures stage shifts in the upper half of Kohlberg's stage hierarchy. From the outset there was concern that the DIT did not really measure moral judgement structures because it did not ask respondents to produce an answer in their own words and because it hopelessly wedded content with structure. Nevertheless, research with the DIT has been fruitful and has provided solid and broad evidence for its ability to measure moral judgement development (Rest *et al.*, 1999) [1]. In fact, it provides more empirical support for the higher end of Kohlberg's stage model than Kohlberg's own measures. That is, unlike other measures of moral judgement, the DIT finds widespread postconventional reasoning. In contrast, the MJI finds little evidence for Stage 5 thinking and virtually none for Stage 6, threatening the validity of Kohlberg's enterprise. What accounts for the evidence that the DIT is more supportive of the stage-theory than Kohlberg's own measure? Our explanation is the following. The DIT does not measure the more competent end of the "zone of proximal development" in which verbal articulation of one's perspective is required. To obtain a high score on a measure requiring verbal production such as the MJI one must be able to explain one's reasoning logically and coherently, an ability that is facilitated by training in moral philosophy, but not necessarily by everyday life. The DIT tests the other, less competent, end of the "zone", that which is apparent when assistance (such as words on a page) is available. Whereas the MJI measures explicit verbal knowledge, the DIT measures recognition knowledge, a type of tacit knowledge. Is one method better than the other? We believe that new constructs from cognitive science can direct our examination of this question and can help point out the merits of each approach.

The study of human cognition in the 20th and 21st centuries offers many tools for measuring and understanding differences in morality and moral judgement. Three interwoven, core ideas emerging in cognitive science have particular implications for research in moral judgement.

First, cognitive science makes the assumption that an individual processes or interprets experience according to organising, conceptual structures in the mind that have developed from and are influenced by experience (e.g. Piaget, 1932/1965; Rumelhart, 1980; Fiske & Taylor, 1991). These conceptual structures, which are often called *schemas*, function as interpreters of stimuli. Although it may feel phenomenologically as if one experiences pure, raw "reality", everything perceived is interpreted by pre-existing mental structures (Wenger & Wheatley, 1999; Hogarth, 2001). In fact, no one can understand experience without such mental structures or schemas (Neisser, 1976). Not only perception, but decision-making and reasoning are supervised by pre-existing schemas (Gigerenzer *et al.*, 1999). Further, the vast majority of human responses, including moral judgements, are based on schemas (Bargh & Chartrand, 1999). We discuss schema theory in more detail later.

Secondly, many cognitive processes, including decisions, occur automatically without awareness (Reber, 1993). For example, schemas are activated without intention or conscious control (Hasher & Zacks, 1984). Some schemas may be activated chronically due to several factors, including frequency of environmental cues (Higgins & King, 1981). For example, in the United States, local television

news stations highlight the types of local crimes that are more likely to be committed by individuals with lower socio-economic status, showing photographs of the accused. Many of these individuals are black. Consequently, when a typical citizen is asked to think about a criminal, a black person “pops” into his or her mind, even though the statistical evidence shows that more crimes are committed by “whites”, and that white males tend to be more violent. Like it or not, the schema fostered by local news is activated beyond personal control. Many schemas operate automatically like this. Automatic processing is understood to be characterised by some combination of the following: involuntariness, autonomy, existence outside of awareness, unintentionality (initiated with or without intention), and effortlessness—requiring little if any working memory resources (Bargh, 1989; Uleman & Bargh, 1989). Many daily actions and responses have a majority of these characteristics.

Thirdly, there is now a greater regard for the implicit processes and application of tacit knowledge in human decision-making that occur outside the awareness of the cogniser (e.g. Bargh, 1989) and beyond the participant’s ability to verbally articulate (e.g. Kihlstrom *et al.*, 1996). Individuals have, use and are influenced by a great deal of knowledge without awareness (Reber, 1993; Hogarth, 2001). Various psychologists have pointed this out throughout the history of psychology, even in its early days (Helmholtz, 1867; Carpenter, 1874; Ebbinghaus, 1885) as have philosophers (e.g. Polanyi, 1958; von Hayek, 1962). Polanyi often noted that people “know more than they can say”. A person may not be able to explain what she knows to another, but neither can the person explain it to herself. Polanyi’s point now has substantial psychological support (see Reber, 1993; Sternberg, 1999; Keil & Wilson, 2000). Evolutionary psychology has postulated that the human mind has evolved with numerous domain-specific modules (task-specific cognitive abilities) whose activation is automatic and does not require the conscious mind (e.g. Tooby & Cosmides, 1990). In fact, these broad-based implicit processes are considered to be primary—that is, they are the *default operations* of the mind—whereas consciousness and phenomenological awareness are relatively recent developments (Reber, 1993). Evidence is mounting for the heavy reliance on automatic, implicit cognitive processes and schemas in human behaviour (Reber, 1993).

Research on implicit decision-making calls into question the privileged place of interview data (dependent on conscious understanding) over recognition data (dependent on implicit understanding, as in the DIT). In fact, the current emphasis on the importance of tacit knowledge and consciously inaccessible decision making places the DIT in a new light. Rest (1979) has always claimed that the DIT measures tacit knowledge. Sternberg and Horvath (1999) define tacit knowledge as domain-specific “procedural knowledge that guides behaviour but is not readily available for introspection” (p. 231). The DIT all along has been tapping into the kind of knowledge that drives most of human behaviour (Bargh & Chartrand, 1999; Hogarth, 2001). In the following discussion we focus on the nature of this knowledge and its relation to research in moral judgement.

## The Nature of Schematic Processing

The notion of schemas is one that has driven research in cognitive psychology for decades. Piaget described schemas as cognitive structures that organize an individual's operational activities (Piaget, 1970). Classic schema theorists (e.g. Rumelhart, 1980; Taylor & Crocker, 1981) describe schemas as general knowledge structures residing in long-term memory. In order to determine how the human mind understands anything, including morally relevant stimuli, we must know the form and function of schemas generally.

### 1. What are Schemas?

Schemas are sets of expectations, hypotheses and concepts that are formed as the individual notices similarities and recurrence in experience (Neisser, 1976; Rumelhart, 1980). For example, the toddler learns that certain behaviours agitate the parent, some of which result in discomfort (physical and/or emotional) for the child. Other behaviours elicit praise from the parent. With repeated experience, the child begins to expect the particular matching reaction of the parent when the behaviour is exhibited. If the parent, for example, shows the opposite reaction, the child will be very confused as this does not fit with the schema that has developed from previous experience.

Modern schema theorists have provided more concrete descriptions of schemas. Derry's (1996) Cognitive Schema Theory (CST) outlines a hierarchy of schemas: (a) *memory objects* (specific small units of related characteristics), (b) *cognitive fields* (an activated set of memory objects) and (c) *mental models* (an overall meaning structure of a particular situation or experience). According to Cognitive Schema Theory, we might say that those with more complex moral judgement have a larger and better organised set of *memory objects* that can be activated within multiple *cognitive fields* and form part of complex *mental models*. Although research would need to determine the architecture in actuality, we can speculate about a mental model for the dilemma, "Heinz and the drug". Such a mental model might include cognitive fields for marriage, stealing, human rights and so forth. Each of these cognitive fields would be comprised of memory objects. For example, "marriage" might include memory objects like "marriage duties" and "love". The memory object, "marriage duties" might consist of related characteristics such as "faithfulness" and "commitment". There may be many layers of memory objects and cognitive fields that comprise a mental model. An expert will have layer upon layer of interrelated schemas about the "Heinz and the drug" dilemma. The expert has more complex and elaborate mental models that can be activated in any number of ways because the architecture is so rich and interrelated. Those with lower levels of moral judgements have a more limited set of possible activations (fewer memory objects, cognitive fields and mental models). In terms of mental architecture, the expert has castles of knowledge while a novice may have a bare foundation.

Schemas involve multiple brain systems (e.g. visual, motor, language) and cognitive processes (Kesner, 1986; Hogarth, 2001). Schemas can involve one kind

of system, for example, procedural knowledge (e.g. how to introduce one friend to another) or declarative knowledge (what morality means), or a combination of systems. Schema application can involve different types of reasoning (Ericsson & Smith, 1991), such as analogical and/or intuitive reasoning (Hogarth, 2001); different types of processing such as linear and/or parallel processing (McClelland, 1995); different levels of awareness such as subconscious and automatic or conscious and controlled (Uleman & Bargh, 1991); and different types of knowledge (declarative, procedural). Essentially, a schema is a goal-orientated cognitive mechanism that operates in one or more of these systems (Neisser, 1976). Much like expertise in parking a car, expertise in a moral judgement schema probably necessitates both kinds of knowledge (procedural: how do I think about this problem? and declarative: what codes do I apply?), dual forms of reasoning (analogical: what is an objective, logical response? and intuitive: this reminds me of ...), and processing (linear—what do I do next—and parallel). For example, applying a principle to a dilemma is an example of analogical and linear reasoning whereas making a decision “because it feels right” is based on automatic, parallel processing often described as intuition (Hogarth, 1999; Hammond, 2000).

## *2. How do Schemas Work?*

Schemas operate constantly in the mind, being evoked (or “activated”) by current stimulus configurations that resemble the stimuli that created the schema in the first place (Rock, 1997). To return to our previous example, the local news may discuss a criminal without using a picture, yet the report may evoke the picture of a black man in the perceiver because of previous similar stories which were presented with pictures of black men. The “criminals are black” schema is activated by familiar stimuli without need for conscious control. When the postconventional moral schema is activated, cognitive structures about equality and social justice and the procedures to promote them are also activated. The person who is concerned about being racist will probably have developed skill in deactivating the “criminals are black” schema and will consciously activate schematic knowledge that counters such a conclusion (Devine, 1989; Fiske, 1989).

## *3. How are Schema Elements Connected?*

Hierarchical level (i.e. mental model, cognitive field, memory object) is not the only thing that varies among schemas. Marshall (1995) describes schemas as basic storage devices represented by a tightly organised network structure of memory objects whose relations vary by types (positive or negative) and degrees (strong or weak) of relations. The degree of connectivity among constituents and subconstituents determines the strength and accessibility of a schema. The type of connectivity determines what group of concepts will be activated (positive relation) and which will be suppressed (negative relation). For example, when a person has an activated postconventional schema, she or he is less likely to have an activated

personal interest schema (see below and Rest *et al.* (1999) for a complete description of the postconventional and personal interest schema).

#### 4. *Why are Schemas Important?*

Schemas are essential to human understanding because they serve so many functions (Neisser, 1976). A schema consists of a representation of some prior stimulus phenomenon that organises or guides the application of prior knowledge to new information (sometimes referred to as “top-down” processing) (Bower & Cirilo, 1985). Schema guidance is expectation-based processing that attends to the unusual (Mandler, 1984). Schema guidance is, in effect, goal-based concurrent processing; as the stimuli are sensed, they are filtered through the activated schema kaleidoscope (Rock, 1997). Information is “chunked”, inter-related and evaluated (Fiske & Taylor, 1991). Missing or new information is quickly perceived and drives attention (Pashler, 1998). For example, consider the following text: “Harry walked in. He looked at the prices. He ordered”. It is difficult to understand what is going on because several schemas compete to interpret an ambiguous situation. What schema should be in operation—visiting a restaurant, shopping at a warehouse appliance store, or patronising a barber shop? The reader needs further information such as “He enjoyed his meal”. This information informs us that he was at some kind of restaurant, but it is still unclear what kind of restaurant. Our schemas guide us in asking the right question: does he pay after his meal (sit-down restaurant) or before (fast-food restaurant)? Another sentence follows: “He cleared his table and left”. Now we can put all the parts together into a “fast-food-restaurant” schema and fill in the blanks: he ordered *and paid*, sat down *and ate*, cleared his table and left.

Schemas likely operate in important ways during moral behaviour, by inter-relating different stimuli, filling in missing information, guiding attention and directing problem-solving. Moral schemas can be described as general knowledge structures used in social cooperation. Moral schemas are built from experience in social interaction. They are constructed automatically from the brain noticing the elements in the socially relevant environment that covary and the cause–consequence chains that obtain from particular actions. Schemas decrease the amount of processing needed for encountered stimuli and are considered to be part of every encounter with the environment (Mandler, 1984).

#### 5. *How are Schemas Activated?*

Schema structures that parse incoming sensory data are themselves unconscious and are activated automatically when their patterns match the pattern of incoming data (bottom-up activations) (Marcel, 1983; Mandler, 1984). The perceived regularities may or may not activate linguistic centres and, as a result, may or may not be accessible for verbal description (diSessa, 1982; McCloskey & Kohl, 1983). As Keil and Wilson (2000) point out, individuals are often able to understand something without being able to explain it to others. The inability to articulate understanding is not a matter of forgetting—because the correct explanation is recognisable—

rather, the individual has not learned to put the understanding into words. This can be seen when a world-class athlete who is asked to coach a youth team fails miserably due to the inability to translate phenomenal execution skills into verbal instructional skills. Why does this happen? Should not an adult be able to explain what he or she knows how to do? Keil and Wilson distinguish between a basic explanatory set of schemas, present even in infants, and more advanced explanatory schemas that include statements of principles and are evident through verbal performance. Keil and Wilson's theory can help explain the disparity in findings between the MJI and the DIT. The reason that individuals who display postconventional thinking on the DIT but may not do the same on the MJI may be that the person has not put their understanding into words. Understanding is "a cognitive state that remains largely implicit but that goes beyond merely being able to correlate variables" (Keil & Wilson, p. 97). The only way to move beyond shallow verbal explanations is to learn the intricacies of a theory (e.g. moral theory), as do experts.

The schemas of an expert are more easily activated by features of a problem than the schemas of a person with intermediate knowledge (e.g. Patel & Kaufman, 1993). After the solution schema is activated, the expert will evaluate further information, searching for confirmation of the initial hypothesis. In contrast, the person with intermediate knowledge generally requires much more information before generating a solution schema and generates multiple solution schemas (hypotheses) without the ability to evaluate them. The specific nature of what memory objects, cognitive fields and mental models are activated, how they are activated (e.g. what kind of stimulus) and when (e.g. in what contexts) are areas ripe for research in moral judgement.

#### 6. *Can a Particular Schema Change?*

Schemas are noted for their flexibility and changeability (Neisser, 1976). No instantiation of a schema is identical to another (Hogarth, 2001). With each instantiation, the schema is altered through assimilation of and accommodation to new experience—integrating new information or modifying the strength of relations among memory objects (Derry, 1996). Schemas change in size, relation to other schemas and in the strength of internal relations.

Studies of expertise such as Gijsselaers and Woltjer (1997a) note that when solving domain problems novices have superficial knowledge of problems (e.g. a label for the problem). Their representations of problems are stable in test–retest studies. After some initial study, beginners acquire bits and pieces of knowledge. Intermediates are able to appropriately structure and identify features of the problems. Only experts are able to identify effective ways to solve the problem. Yet because of their vast knowledge, experts are flexible in how they represent the problem—making slight changes or adding new subcategories when sorting domain problems in test–retest conditions (Gijsselaers & Woltjer, 1997b). These patterns support Rumelhart and Norman's (1988) view that schemas change with the accretion of new knowledge (e.g. the increased knowledge depth of the intermedi-

ates), and the tuning and reconstruction of prior schemas (e.g. experts' slightly changed representations of problems).

In sum, schemas are powerful tools that aid information processing. They guide perception, attention, decisions, habits and behaviour. They operate in the moral domain via schemas for moral sensitivity, motivation and action. They operate during moral judgement and when a person takes the DIT.

### **The Schemas of the DIT**

The DIT is designed to capture moral schema changes that are particularly visible throughout adolescence and early adulthood (Rest *et al.*, 1999). Kohlberg contended that a critical social-cognitive advance in adolescence is the “discovery of society”—that is, understanding how people in society are related to each other through institutions, established practices and role-system (“the system”), not merely on a face-to-face basis, where all are kin, friends or well-known acquaintances (Colby *et al.*, 1987). Others have drawn attention to the development of a sociocentric perspective in adolescents (e.g. Adelson, 1971; Youniss & Yates, 1997). Adelson and O’Neil (1966, p. 304) stated:

With advancing age there is an increasing grasp of the nature and needs of the community. As the youngster begins to understand the structure and functioning of the social order as a whole, he begins to understand too the specific social institutions within it and their relations to the whole.... Thus the demands of the social order and its constituent institutions, as well as the needs of the public, become matters to be appraised in formulating political choices.

The adolescent becomes aware that society is organised in terms of a system of rules, roles and institutions, raising simultaneously and necessarily questions of the morality of society and questions of moral authority. How does one organise a network of cooperation on a society-wide basis for mutual benefit? How are power, wealth and opportunity to be distributed? What is the legitimate use of force? These questions are issues of “macro-morality” or society-wide cooperation, rather than issues of “micro-morality”—interactions with known others in everyday life and face-to-face.

Rest *et al.* (1999) proposed that the DIT is particularly good at measuring change in the schemas individuals use to answer the “macro” question—how to get along with people who are not friends, kin or personal acquaintances; how to organise society-wide cooperation. Through various statistical analyses, three factors have been identified in DIT scores. These have been named: Personal Interest Schema, Maintaining Norms Schema, and Postconventional Schema. (These were formerly categorized as Kohlberg Stage 2 and 3, Stage 4 and Stage 5 and 6, respectively.) Because a respondent needs at least a 12-year-old reading level when taking the DIT, respondents will have moved beyond the simpler forms of moral judgement from earlier childhood (e.g. Kohlberg’s Stage 1). As a result, in DIT data the simpler types of moral judgement appear collapsed together (i.e. Stage 2 and 3)



or do not appear at all (i.e. Stage 1) (Rest, 1986). At this point, we would like to interpret the DIT according to schema theory.

The three moral schemas that the DIT measures can be viewed as mental models—an integration of cognitive fields and their memory objects—for reasoning about moral dilemmas. (Of course, there are other moral schemas that a person might use other than the three that the DIT measures, such as specific religious or cultural moral schemas.) We describe the content of each schema according to recent theory (Rest *et al.*, 1999).

The simplest schema measured is called the Personal Interests Schema (PIS). The PIS does not suppose a macro-morality perspective but includes the more Stage-2-like memory objects and cognitive fields such as survival, personal advantage and impulsive cooperation. A fair world is one in which I can get what I want. At this level of thinking, the cogniser begins to consider the needs of others, but only in brief exchanges. The cogniser is able to sacrifice momentarily as long as the result is more advantageous. That is, the cogniser learns to exchange cooperation, however briefly. Because the DIT requires a 12-year-old reading level, it is unable to distinguish carefully between Stage-2-like schemas from the more Stage-3-like schemas. And so both are merged in the PIS. We suppose that Stage-3-like schemas include cognitive fields of caring for others, such as long-term negotiated cooperation and in-group reciprocity. PIS thinking enables the cogniser to apply reciprocity in their mental transformations of relationships with known others. Overall, the PIS answers the question of how to organise cooperation in society as if there were only “micro-moral” relationships to consider. The PIS attends to what each stakeholder in a moral dilemma has to gain or lose personally and in relation to the welfare of significant others. PIS thinking is not concerned with organising cooperation on a society-wide basis, the issues of macro-morality.

At the cusp of adolescent change, sensitivity to the issues of macro-morality begins to flower. The PIS becomes inadequate for addressing issues that have become interesting and important, such as why we have laws or what duties I have towards other members of society. As a result, a more developmentally advanced type of thinking emerges that includes a wider societal perspective, the Maintaining Norms Schema (MNS). Within this schema one considers how people should cooperate generally with those who are not friends, kin or well-known acquaintances. The cogniser is able to coordinate personal/significant other negotiation with reciprocity for the larger society through the interplay of cognitive fields that describe established practices, rules, and codes and their *de facto* authorities. Other cognitive fields connected to this schema include those relevant to issues of fair cooperation such as a uniform application of norms across individuals. Expectations of individuals are only partially reciprocal, however, because role and duty expectations are applied in an egalitarian but not equitable way.

As development progresses, the Postconventional Schema (PCS) begins to make more sense. The individual has experiences, including the persuasive arguments of others, that necessitate thinking about a fair society more broadly—in terms of full reciprocity and equity across all groups within a society. If the individual has enough pluralistic (e.g. multicultural—see Endicott *et al.*, in press)

experiences to effect enough of a cognitive disequilibrium that is not easily denied or minimised, the individual's thinking accommodates to and integrates a broader, postconventional perspective into the mental model of a moral society. The cogniser is able to suggest changes to the *status quo*, to negate extant societal laws and structures, for the sake of morality. He or she can apply moral ideals in a fully reciprocal manner in which each member of society has equivalent status. In particular, postconventional thinking considers macro-level cooperation in terms of advocating sharable ideals that are open to scrutiny and negotiated through the give and take of community life. Whereas Kohlberg focused on a particular postconventional orientation informed by Kant, Rawls and Frankena, the DIT postconventional schema has a broader scope. The PCS can be shaped by various combinations of moral and political philosophy. Individuals with the full use of postconventional tools are able to function at the highest levels of solving moral dilemmas within the community.

The features for each schema are described in Table I (from Rest *et al.*, 1999). We have constructed a diagram (see Fig. 1) of mental representations of the Heinz dilemma based on which moral schema is activated (please note that it is simplistic and partial, particularly in its representation of the complexity of the Postconventional Schema, and meant only as an example). It should be noted that network connections of features can be negative or positive. For example, a person who has reached postconventional reasoning will likely have a schema that contains a negative connection to absolute law, representing a perspective contrary to the MNS perspective. Some features of a problem representation will be activated under each schema, for example we have marked "love" and "personal advantage" although the activation may switch in valence. It should be noted that schemas may be embedded in or overlap with one another. For example, a religious fundamentalist perspective and a conservative political orientation often overlap with the Maintaining Norms Schema (see Narvaez *et al.*, 1999).

Although the three DIT schemas do not cover everything of importance in moral thinking, nor do they constitute a full model of moral-decision making (see Bebeau & Thoma, 1999), they are relevant to many issues of public policy controversy (e.g. abortion, religion in public schools, rights of homosexuals, women's roles, euthanasia, due process rights of the accused, free speech and political demonstrations, etc.—see Narvaez *et al.*, 1999). Moral schemas can illuminate how people formulate opinions about these hotly debated public policy issues, about the "culture wars" (Orthodoxy versus Progressivism—Hunter, 1991), and about the most important clash in ideology since the Cold War (religious fundamentalism versus secular modernism—e.g. Marty & Appleby, 1990). How does the DIT measure moral schemas?

### **How the DIT Works**

The DIT bears similarity to other measures of moral judgement, such as the MJI, in several ways. (1) A dilemma is presented for which a respondent is expected to make an action decision and convey the reasoning behind the decision. (2) When a

TABLE I. Features of DIT moral judgement schemas

Schema	Features
Personal-interest schema	Arbitrary, impulsive co-operation Self-focused Advantage to self is primary Survival orientation Negotiated co-operation Scope includes others who are known In-group reciprocity Responsibility orientation
Maintaining norms schema	Need for norms Society-wide view Uniform categorical application Partial society-wide reciprocity Duty orientation
Post-conventional schema	Appeal to an ideal Shareable ideals Primacy of moral ideal Full reciprocity Rights orientation

person considers a moral dilemma, moral schemas are activated from long-term memory as the data stimulate ideas/knowledge related to the dilemma. A moral judgement measure will not activate irrelevant schemas, for example, about skiing or cooking (although schemas related to the dilemma context will be activated—for example, schemas about marriage and illness when considering “Heinz and the drug”). (3) The moral schemas activated by the stimuli are comprised of verbal and non-verbal tacit knowledge. (4) Like other measures built upon Kohlberg’s theory, the DIT measures how individuals structure their understanding of a dilemma along the lines of justice reasoning. However, the DIT method diverges at this point.

The DIT is distinctive in four ways: in the nature of the post-dilemma stimuli it presents (fragments of reasoning), in what it measures (tacit knowledge), in the tasks assigned to the respondent (select preferred arguments) and in the area of the zone of proximal development it measures (the less-competent end). First, the target stimuli of the DIT are fragments of moral reasoning arguments from different moral schemas. In other words, although items represent different types of moral thinking, they are not complete orations arguing for one course of action or another. As mentioned previously, schemas enable the perceiver to fill in the data that are missing from an input stimulus. If the person has the corresponding schema, he or she is able to infer the missing information. Otherwise, the individual processes the stimulus incompletely or in a distorted fashion. In a sense, the DIT is a “projective test” in that the fragmented nature of the items requires the participant to supply meaning to the items that they are rating. This is similar to a test for the object permanence schema in an infant: when the infant has the object permanence

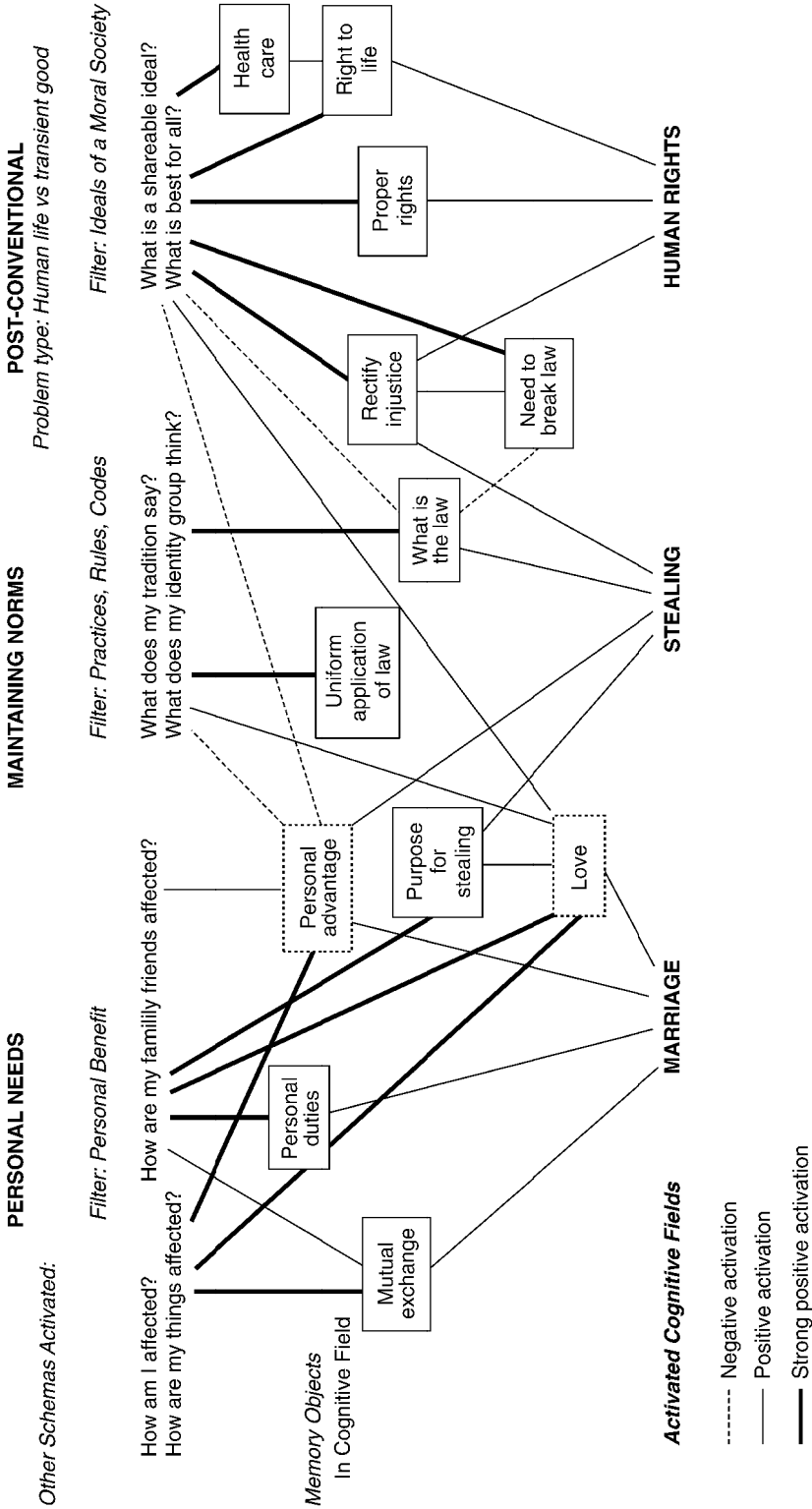


FIG. 1.

schema, only a partial view of an object is necessary for the infant to know that the object is there as a whole. In this way, the DIT balances “bottom-up” processing (providing just enough data to activate a moral judgement schema) with “top-down” processing (providing only a skeletal amount of information so that the participant has to “fill in” what is missing from schemas already in long-term memory).

Secondly, because idea networks or schemas may not be stored verbally, verbal production can grossly underestimate the presence of a particular schema. The foundation of moral schemas lies in implicit or tacit knowledge that has been garnered through social experience. Because the DIT taps into this implicit, foundational understanding, it is able to uncover higher levels of understanding in the lay person than can a moral judgement interview approach. This would be of no surprise to experts in implicit learning because “implicitly acquired knowledge is responsible for performance that goes beyond, as it were, what estimates of conscious knowledge would predict” (Reber, 1993, p. 40). Unlike with other measures of moral judgement, the DIT does not require the participant to explain verbally and argue explicitly for a line of reasoning. The emphasis on tacit understanding follows the work of Gazzaniga *et al.* (1998); Lewicki (1986); Nisbett and Wilson (1977); and Uleman and Bargh (1989) and others who contend that self-reported explanations of one’s own cognitive processes have severe limitations; that people can report on the products of cognition but not as well on the mental operations they used to arrive at the product. We assume therefore that people are clearer in making selections about what they consider to be an important moral issue to them rather than in articulating a moral justification for one course of action or another (the usual data collected in Kohlbergian interviews).

Thirdly, as described earlier, knowledge and explanation do not go hand in hand. Understanding develops prior to explanation, and for some things proper explanations are never learned by non-experts (e.g. why the car starts when one turns the ignition switch) (Keil & Wilson, 1999). The DIT does not require the respondent to produce an explanation. Instead, the respondent selects the explanations that reflect the activated schemas. According to DIT theory, the schema activated as the respondent reads a dilemma subsequently guides the respondent in rating and ranking issue statements for that dilemma. There are two measurable effects. First, when the respondent encounters a statement that both makes sense and also activates a *preferred* schema, that item is given a high rating and ranked of high importance. Alternatively, when the respondent encounters a statement that either doesn’t make sense or seems simplistic and unconvincing (is not activating a preferred schema), the item receives a low rating. Moral comprehension research verifies that individuals prefer reasoning at the upper end of the zone of proximal development—the reasoning that they can hardly explain if at all (Rest, 1973). Thus, individuals select what makes the most sense, the reasoning that explains best the tacit reasoning they hold. They will not select low level reasoning, although it is familiar and understandable (and activated), because it has become inadequate and no longer makes the most sense. Lawrence (1987) found that fundamentalist seminarians had postconventional schema activated but ignored them, preferring

statements that represent the Maintaining Norms schema which more closely matched their religious beliefs.

We believe that the second measurable effect of schema activation is that when a DIT issue statement is encountered, the participant automatically (i.e. rapidly and subconsciously) tries to fit it into the schema that was activated by the dilemma itself. If the schema of the item fits the respondent's schema of the dilemma, the process of rating the item is fast. If the item's schema does not fit, the rating process is slower. As mentioned earlier, schemas affect processing time, speed of information flow and speed of problem-solving which has been demonstrated by numerous studies, including during reading (Gernsbacher, 1996). Speeded recognition or reaction time is a widely used method in cognitive science (e.g. Higgins & Kruglanski, 1996). According to this paradigm, respondents react quickly when probed with an idea that is already activated but more slowly if it is not. That means that the time it takes to rate a DIT item that does not fit the active schema should be longer than for an item that matches the activated moral schema. This has been found in recent work studying this question (Narvaez *et al.*, 2001).

Fourthly, we propose that as a recognition/preference measure the DIT is able to discern mental moral operations at the less-skilled end of the zone of proximal development. This explains the widespread evidence for postconventional thinking that the DIT uncovers. This perspective was foreseen by Jim Rest's dissertation (Rest, 1973). In an effort to provide evidence for the hierarchical nature of moral judgement, Rest created two new measures of moral judgement, comprehension and preference. He presented prototypic reasoning statements for each Kohlbergian stage and asked subjects to recapitulate and evaluate each one (comprehension) and then to rate and rank how convincing it was (preference). These responses were compared with spontaneous production scores obtained from the typical Kohlbergian interview. The findings are striking in how they anticipate a novice-to-expert learning pattern. Respondents reacted to statements in a hierarchical, ordered manner: (1) If they comprehended the statements at one stage, they comprehended all same-stage items and they comprehended all statements from preceding stages. (2) They were increasingly unable to comprehend statements above their predominant stage. (3) Yet they comprehended statements that were above their spontaneous modal stage and were able to produce spontaneously some amount at the comprehended stage. (4) They preferred the highest stage they could comprehend. (5) They preferred the stage statements in hierarchical order, perceiving the higher one as more convincing. Rest concluded that the three tasks, preference, comprehension and spontaneous production, are a type of Piagetian *decalage*, in which one moves from the simpler to the more complex as a stage develops in strength. The first sign of movement towards a new stage is the preference for prototypic statements, followed by comprehension, then spontaneous production, in developmental sequence. Participants found the comprehension task so onerous that Rest dropped it entirely and focused on the preference tasks from which emerged the DIT. More recently, researchers have applied modern statistical techniques in examining the hierarchical nature of moral judgement (Boom & Molenaar, 1989; Boom *et al.*, 2001).

Yet, the big question—the crux of the matter—remains: *what should moral judgement measures be measuring?* If humans operate primarily on the tacit level, making decisions without conscious awareness, should not these processes be those that are studied and measured in the general population, rather than the more conscious processes, including verbal articulation, that come about from extended formal schooling? It depends. If we want to study experts we would examine the latter, mapping out how experts think differently from the lay person (see Narvaez, 2001a) and how they became experts. Asking experts to think aloud as they solve problems, which the MJI does, is a method used frequently by researchers in expertise (e.g. Ericsson & Smith, 1990). If we want to study the middle of the zone of proximal development, middle-level understanding (comprehension), we might use moral text comprehension in which respondents are asked to recall what was presented (e.g. Narvaez, 1998, 2001b). However, if we want to study naturalistic human development, we should study tacit responses, which are less “contaminated” by formal training. We are now aware that tacit knowledge comprises the majority of knowledge employed by humans on a daily basis (Wyer, 1997). Most of the time people act and react without having to explain themselves (Keil & Wilson, 2000). Tacit responses can be studied with cognitive measures such as the DIT or with study-specific measures of intuitive response (e.g. see Haidt, 2001, for a review).

## Conclusion

Ideas from cognitive science are increasingly influential and can provide insight into the nature of moral judgement. The DIT emerged from Rest’s (1973) dissertation, formed from tasks measuring the beginnings of understanding (which is largely non-verbal and intuitive), in contrast to the MJI, which measures the highest level of verbal understanding. The positive attributes of the DIT are more easily seen in a time of increasing respect for implicit knowledge and processing. The DIT offers a means of measuring moral judgement that fits with current views about tacit knowledge and human decision making. Although the MJI and interview techniques generally are worthwhile for measuring production competence, the DIT is better able to measure understanding at the level that drives most decisions for most people.

*Correspondence:* Dr Darcia Narvaez, Associate Professor, Department of Psychology, University of Notre Dame, Notre Dame, IN 46556, USA; e-mail: [dnarvaez@nd.edu](mailto:dnarvaez@nd.edu) and Ms Tonia Bock, Research Assistant, Department of Psychology, University of Notre Dame, Notre Dame, IN 46556, USA; E-mail: [tbock@nd.edu](mailto:tbock@nd.edu)

## NOTE

- [1] The validity of the DIT is discussed in Rest *et al.* (1999) in terms of seven validity criteria: (1) differentiation of various age/education groups; (2) longitudinal gains; (3) correlation with cognitive capacity measures; (4) sensitivity to moral education interventions; (5) correlation with behaviour

and professional decision making; (6) predicting to political choice and attitude; (7) reliability. Consistent and statistically significant trends on all these criteria have been reported in DIT studies for 25 years in over 400 published studies.

## REFERENCES

- ADELSON, J. (1971) The political imagination of the young adolescent, *Daedalus*, 100, pp. 1013–1050.
- ADELSON, J. & O'NEIL, R. (1966) The development of political thought in adolescence: the sense of community, *Journal of Personality and Social Psychology*, 4, pp. 295–306.
- BARGH, J.A. (1989) Conditional automaticity: varieties of automatic influence on social perception and cognition, in: J.S. ULEMAN & J.A. BARGH (Eds) *Unintended Thought*, pp. 3–51 (New York, Guilford Press).
- BARGH, J.A. & CHARTRAND, T.L. (1999) The unbearable automaticity of being, *American Psychologist*, 54, pp. 462–479.
- BEBEAU, M.J. & THOMA, S.J. (1999) “Intermediate concepts” and the connection to moral education, *Educational Psychology Review*, 11, pp. 343–360.
- BOOM, J., BRUGMAN, D. & VAN DER HEIJDEN, P.G.M. (2001) Hierarchical structure of moral stages assessed by a sorting task, *Child Development*, 72, pp. 535–548.
- BOOM, J. & MOLENAAR, P.C.M. (1989) A developmental model of hierarchical stage structure in objective moral judgments, *Developmental Review*, 9, pp. 133–145.
- BOWER, G. & CIRILO, R. (1985) Cognitive psychology and text processing, in: T.A. VAN DIJK (Ed.) *Handbook of Discourse Analysis*, vol. 1, pp. 71–105 (New York, Academic Press).
- CARPENTER, W.B. (1874) *Principles of Mental Physiology* (London, John Churchill).
- COLBY, A., KOHLBERG, L., SPEICHER, B. *et al.* (1987) *The Measurement of Moral Judgment*, vol. 1 and 2 (New York, Cambridge University Press).
- DAMON, W. (1975) Early conceptions of positive justice as related to the development of logical operations, *Child Development*, 46, pp. 301–312.
- DERRY, S.J. (1996) Cognitive schema theory in the constructivist debate, *Educational Psychologist*, 31, pp. 163–174.
- DEVINE, P. (1989) Stereotypes and prejudice: their automatic and controlled components, *Journal of Personality and Social Psychology*, 56, pp. 5–18.
- DISSA, A.A. (1982) Unlearning Aristotelian physics: a study of knowledge-based learning, *Cognitive Science*, 6, pp. 37–75.
- EBBINGHAUS, H. (1885/1964) *Memory*, H.A. RUGER & C.E. BUSSENIUS (Trans.) (New York, Dover).
- ENDICOTT, L., BOCK, T. & NARVAEZ, D. (2002) Multicultural experience, moral judgement and intercultural development, *International Journal of Intercultural Relations*, in press.
- ENRIGHT, R.D., FRANKLINE, C.C. & MANHEIM, L.A. (1981) Children's distributive justice reasoning: a standardized and objective scale, *Developmental Psychology*, 16, pp. 193–202.
- ERICSSON, K.A. & SMITH, J. (1991) *Toward a General Theory of Expertise* (New York, Cambridge University Press).
- FISKE, S.T. (1989) Examining the role of intent, toward understanding its role in stereotyping and prejudice, in: J.S. ULEMAN & J.A. BARGH (Eds) *Unintended Thought*, pp. 253–283 (New York, Guilford Press).
- FISKE, S.T. & TAYLOR, S.E. (1991) *Social Cognition*, 2nd edn (New York, McGraw-Hill).
- GAZZANIGA, M.S., IVRY, R.B. & MANGUN, G.R. (1998) *Cognitive Neuroscience: the biology of the mind* (New York, Norton).
- GERNSBACHER, M.A. (Ed.) (1994) *Handbook of Psycholinguistics* (New York, Academic Press).
- GIBBS, J.C. & WIDAMAN, K.F. (1982) *Social Intelligence: measuring the development of sociomoral reflection* (Englewood Cliffs, NJ, Prentice-Hall).
- GIJSELAERS, W.H. & WOLTJER, G. (1997a) *Expertise in economics: recall and reasoning*, Annual Meeting of the American Educational Research Association, Chicago, IL.
- GIJSELAERS, W.H. & WOLTJER, G. (1997b) *Expert novice differences in the representation of economics problems*, Annual Meeting of the American Educational Research Association, Chicago, IL.



- GIGERENZER, G., TODD, P.M. & ABC RESEARCH GROUP (1999) *Simple Heuristics that Make Us Smart* (New York, Oxford University Press).
- HADIT, J. (2001) The emotional dog and its rational tail: a social intuitionist approach to moral judgement, *Psychological Review*, 108, pp. 814–834.
- HAMMOND, K.R. (2000) *Judgments under Stress* (New York, Oxford University Press).
- HASHER, L. & ZACKS, R.T. (1984) Automatic processing of fundamental information, *American Psychologist*, 39, pp. 1372–1388.
- HELMHOLTZ, H. (1867/1962) *Treatise on Physiological Optics*, vol. 3, J.P.C. SOUTHALL (Trans.) (New York, Dover).
- HIGGINS, E.T. & KING, G. (1981) Accessibility of social constructs: information processing consequences of individual and contextual variability, in: N. CANTOR & J. KIHILSTROM (Eds) *Personality, Cognition, and Social Interaction*, pp. 69–121 (Hillsdale, NJ, Lawrence Erlbaum Associates).
- HIGGINS, E.T. & KRUGLANSKI, A.W. (1996) *Social Psychology: handbook of basic principles* (New York, Guilford Press).
- HOGARTH, R. (2001) *Educating Intuition* (Chicago, IL, Chicago University Press).
- HUNTER, J.D. (1991) *Culture Wars: the struggle to define America* (New York, Basic Books).
- KEIL, F.C. & WILSON, R.A. (1999) *Explanation and Cognition* (Cambridge, MA, MIT Press).
- KEIL, F.C. & WILSON, R.A. (2000) Explaining explanations, in: F.C. KEIL & R.A. WILSON (Eds) *Explanation and Cognition*, pp. 1–18 (Cambridge MA, Bradford MIT Press).
- KESNER, R. (1986) Neurobiological views of memory, in: J. MARTINEZ & R. KESNER (Eds) *Learning and Memory: a biological view*, pp. 399–438 (New York, Academic Press).
- KIHILSTROM, J.F., SHAMES, V.A. & DORFMAN, J. (1996) Intimations of memory and thought, in: L. REDER (Ed.) *Implicit Memory and Metacognition*, pp. 1–23 (Mahwah, NJ, Lawrence Erlbaum Associates).
- KOHLBERG, L. (1976) Moral stages and moralization: the cognitive-developmental approach, in: T. LICKONA (Ed.) *Moral Development and Behaviour*, pp. 31–53 (New York, Holt, Rinehart & Wilson).
- LAWRENCE, J. (1987) Verbal processing of the Defining Issues Test by principled and non-principled moral reasoners, *Journal of Moral Education*, 16, pp. 117–130.
- LEWICKI, P. (1986) *Non-conscious Social Information Processing* (New York, Academic Press).
- LIND, G. (1995) *The meaning and measurement of moral competence revisited*, paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.
- LYONS, N.P. (1982) *Concepts of self and morality and modes of moral choice: identifying justice and care judgements of actual moral dilemmas*, unpublished doctoral dissertation, Harvard University, MA.
- MCCLOSKEY, M. & KOHL, D. (1983) Naive physics: the curvilinear impetus principle and its interactions with moving objects, *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 9, pp. 146–156.
- MCCLELLAND, J.L. (1995) Constructive memory and memory distortions: a parallel-distributed processing approach, in: D.L. SCHACTER (Ed.) *Memory Distortion: how minds, brains, and societies reconstruct the past*, pp. 69–90 (Cambridge, MA, Harvard University Press).
- MANDLER, J.M. (1984) *Stories, Scripts, and Scenes: aspects of schema theory* (Hillsdale, NJ, Lawrence Erlbaum Associates).
- MARCEL, A.J. (1983) Conscious and unconscious perception: an approach to the relations between phenomenal experience and perceptual processes, *Cognitive Psychology*, 15, pp. 238–300.
- MARSHALL, S.P. (1995) *Schemas in Problem Solving* (Cambridge, Cambridge University Press).
- MARTY, M.E. & APPLEBY, R.S. (Eds) (1993) *Fundamentalism and the State* (Chicago, IL, University of Chicago).
- NARVAEZ, D. (1998) The effects of moral schemas on the reconstruction of moral narratives in 8th grade and college students, *Journal of Educational Psychology*, 90, pp. 13–24.
- NARVAEZ, D. (2001a) *Expertise differences in comprehending moral narratives*, manuscript under revision.
- NARVAEZ, D. (2001b) Moral text comprehension: implications for education and research, *Journal of Moral Education*, 30, pp. 43–54.
- NARVAEZ, D., ENDICOTT, L. & THOMA, S. (2001) *Expertise and the speed of moral information processing*, poster presented at the American Psychological Association conference.

- NARVAEZ, D., GETZ, I., THOMA, S.J. & REST, J. (1999) Individual moral judgement and cultural ideology, *Developmental Psychology*, 35, pp. 478–488.
- NEISSER, U. (1976) *Cognitive Psychology* (New York, Appleton-Century-Crofts).
- NELSON, D.R. (1999) *The development of moral judgement, religiousness, and general knowledge: a longitudinal study of Bible college students*, Doctoral dissertation, University of Minnesota, MN, *Dissertation Abstracts International*, 60, p. 650.
- NISBETT, R.E. & WILSON, T.D. (1977) Telling more than we can know: verbal reports on mental processes, *Psychological Review*, 84, pp. 231–259.
- PATEL, V.L. & KAUFMAN, D.R. (1993) *Development of knowledge-based reasoning strategies with medical training*, paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.
- PIAGET, J. (1932/1965) *The Moral Judgement of the Child*, M. GABAIN, (Trans.) (New York, Free Press).
- PIAGET, J. (1970) *Genetic Epistemology*, E. DUCKWORTH (Trans.) (New York, Columbia University Press).
- PASHLER, H.E. (1998) *The Psychology of Attention* (Cambridge, MA, MIT Press).
- POLANYI, M. (1968) Logic and psychology, *American Psychologist*, 23, pp. 27–43.
- REBER, A.S. (1993) *Implicit Learning and Tacit Knowledge* (New York, Oxford University Press).
- REST, J. (1973) The hierarchical nature of stages of moral judgement, *Journal of Personality*, 41, pp. 86–109.
- REST, J. (1979) *Development in Judging Moral Issues* (Minneapolis, MN, University of Minnesota Press).
- REST, J. (1986) *Moral Development: advances in research and theory* (New York, Praeger).
- REST, J., NARVAEZ, D., BEBEAU, M.J. & THOMA, S.J. (1999) *Postconventional Moral Thinking: a neo-Kohlbergian approach* (Mahwah, NJ, Lawrence Erlbaum Associates).
- ROCK, I. (1997) *Indirect Perception* (Cambridge, MA, MIT Press).
- RUMELHART, D.E. (1980) Schemata: the building blocks of cognition, in: R. SPIRO, B. BRUCE & W. BREWER (Eds). *Theoretical Issues in Reading Comprehension*, pp. 33–58 (Hillsdale, NJ, Lawrence Erlbaum Associates).
- RUMELHART, D.E. & NORMAN, D.A. (1988) Representation in memory, in: R.C. ATKINSON & R.J. HERNSTE (Eds) *Handbook of Experimental Psychology*, vol. 2. *Learning & Cognition*, 2nd edn, pp. 571–587 (New York, John Wiley & Sons).
- SCHANK, R.C. & ABELSON, R. (1977) *Scripts, Plans, and Goals* (Hillsdale, NJ, Lawrence Erlbaum Associates).
- SHWEDER, R.A. (1991) *Thinking through Cultures* (Cambridge, MA, Harvard University Press).
- SIMON, H.A. (1979) Rational decision making in business organizations, *American Economic Review*, 69, pp. 493–513.
- STERNBERG, R.J. (1999) Intelligence on developing expertise, *Contemporary Educational Psychology*, 24, 359–375.
- STERNBERG, R.J. & HORVATH, J.A. (Eds) (1999) *Tacit Knowledge in Professional Practice: researcher and practitioner perspectives* (Mahwah, NJ, Lawrence Erlbaum Associates).
- TAYLOR, S.E. & CROCKER, J. (1981) Schematic bases of social information processing, in: E.T. HIGGINS, C.P. HERMAN & M.P. ZANNA (Eds) *Social Cognition: the Ontario symposium*, vol. 1, pp. 89–134 (Hillsdale, NJ, Lawrence Erlbaum Associates).
- TOOBY, J. & COSMIDES, L. (1990) On the universality of human nature and the uniqueness of the individual: the role of genetics and adaptation, *Journal of Personality*, 58, pp. 375–424.
- TURIEL, E. (1983) *The Development of Social Knowledge: morality and convention* (Cambridge, Cambridge University Press).
- ULEMAN, J.S. & BARGH, J.A. (1989) *Unintended Thought* (New York, Guilford Press).
- VON HAYEK, F.A. (1962) Rules, perception, and intelligibility, *Proceedings of the British Academy*, 39, pp. 1372–1388.
- WEGNER, D.M. & WHEATHEY, I. (1999) Apparent mental causation: sources of the experience of will, *American Psychologist*, 54, pp. 480–492.
- WYER, R.S. (1997) *The Automaticity of Everyday Life* (Mahwah, NJ, Lawrence Erlbaum Associates).
- YOUNISS, J. & YATES, M. (1997) *Community Service and Social Responsibility in Youth* (Chicago, IL, University of Chicago Press).