Helps and hindrances for adolescents making important real-life decisions

Kathleen M. Galotti*

Department of Psychology, Carleton College, One North College Street, Northfield, MN 55057-4025, USA

Abstract

This article presents data from college students reminiscing about important decisions they have made in the last year. Students who consider more alternatives report more stress and difficulty while they are in the process of making the decision. Students with a connected knowing (CK) epistemological style report themselves to draw on intuition and report more certainty and comfort with the decision; students with a separate knowing (SK) epistemological style report using a more analytic approach to decision-making. Students who report themselves to be good planners are significantly more certain they have made the right decision, more comfortable with the process, more satisfied with the information they have gathered, more likely to consider future consequences of their decision, and more likely to make their decision based on their overall values or principles. These findings are discussed in terms of what educators might do to help adolescents improve decision-making. © 2001 Elsevier Science Inc. All rights reserved.

Keywords: Decision-making; Adolescents

1. Introduction

By definition, adolescence is a transition from childhood to adulthood. One of the expectations put on adolescents is that they make important life decisions (Havighurst, 1972, Marcia, 1966). In many cultures, adolescents are expected to make choices about education, careers, life partners, places of residence, and philosophy/religion/ideology — all of which will frame the adolescent's early adult life.

* Tel.: +1-507-646-4376; fax: +1-507-646-7005.
E-mail address: kgalotti@carleton.edu (K.M. Galotti).

Marcia and colleagues' work has explored in great depth the styles adolescents bring to the task of making these important commitments (Marcia, 1966, 1983; Rowe & Marcia, 1980; Schiedel & Marcia, 1985). Other work has explored adolescents' cognitive understanding of the nature of commitment itself (Galotti & Kozberg, 1987; Galotti, Kozberg, & Appleman, 1990; Perry, 1981). But both of these lines of work have focused on adolescents' thinking hypothetically and theoretically. Little work has focused upon adolescents' thinking about, and reactions to, episodes of real-life decisions of consequence.

This article reports on older adolescents (first-year college students) recalling important real-life decisions. Sixty-five college first-year students during their first 8 weeks of college reminisced about their decision to choose a college. The findings from this study are compared with two other previously published studies: one, involving 322 college-bound high school students who were in the process of choosing a college between April of their junior year of high school and April of their senior year of high school, who were resurveyed in January of their first year of college (Galotti, 1995a, 1995b; Galotti, & Kozberg, 1996; Galotti & Mark, 1994). The second comparison study included 61 college students followed longitudinally for a year as they chose a college major (Galotti, 1999).

Before turning to the data, I present a brief overview of background issues. Three research traditions in psychology are relevant to understanding the way adolescents approach decision-making. These include Marcia's work on adolescent identity formation, which describes the adolescent's agency as a decision-maker, and the study of epistemological development, which involves the adolescent's understanding of the sources of information, knowledge, and the nature of commitment. There is also a work in cognitive psychology on rational decision-making, which bears on the questions in my investigation.

1.1. Identity development and making commitments

The development of identity involves self-definition; coming to terms with oneself, one's personality, and ideology. Moreover, developing an identity means creating a picture of who one will be in the future (Moshman, 1999). Erik Erikson (1968) is the psychologist originally credited with putting identity development at the center of adolescence. He believed that personality formation continued across the life span, and that the adolescent period, in which alternatives were explored, led in the ideal case to a mature adult with a clear sense of both individuality and continuity with both childhood and adulthood (Moshman, 1999).

Marcia (1966) put Erikson's ideas into empirically testable form. A true identity, he believed, could be achieved only after a period of doubt and uncertainty (called a "crisis" period) during which various alternatives are explored and a *commitment* made to ideology and/or career. Marcia uses evidence of crisis and commitment to define four distinct identity statuses: *Identity achieved*, wherein adolescents (typically older) have experienced crisis and made a commitment. A variety of very positive psychological correlates accompany this status, including better ego strength, a stronger capacity for intimacy, and greater self-acceptance (Muuss, 1996). *Identity diffused*, wherein adolescents may or may not have gone through a crisis period, but have not made commitments. *Foreclosed* adolescents, by contrast, have made commitments but without any crisis; a typical foreclosed adolescent "is becoming

what others have prepared or intended him to become as a child" (p. 552). Finally, *moratorium* adolescents are those who are actively experiencing the crisis period — actively struggling to make commitments, but not having yet made them.

Notice that a key to achieving a mature and stable identity requires commitment. This topic of commitments has been explored in older adolescents — primarily college students — by William Perry (1970, 1981) in greater detail. Perry viewed commitment as synonymous with personal affirmation. True commitments were made only after careful consideration of many alternatives, and a recognition that no alternative would be "right" or "wrong," only better or worse. The ability to make true commitments, Perry felt, required a certain level of epistemological development in which both black-and-white dualistic thinking and "anything goes" multiplism are transcended, and the student comes to see that he or she can construct his or her own principles against which to assess different options.

The decisions I have been studying explore how adolescents actually make some of these important decisions. I focus very specifically on one important life commitment, examining the approaches students report themselves to take either during or shortly after the process.

1.2. Epistemological development and planning

A mature understanding of the nature of commitment itself develops during adolescence, especially late adolescence, according to Perry (1970, 1981) and others. Epistemological development in turn is supported by the widespread cognitive changes occurring in adolescence. In Piagetian theory, adolescents are said to transition from concrete operations to formal operations, which in turn allows their thinking to become more abstract. This in turn means that adolescents have an increased ability to consider alternative possibilities, to reason hypothetically and deductively, to organize their thinking systematically, to plan ahead and anticipate possible consequences, and to reflect on their own thinking (Keating, 1990; Moshman, 1999). They also become more able and more likely to recognize the relative, constructivist nature of knowledge (Chandler, Boyes, & Ball, 1990).

These sprouting skills make it possible for adolescents to become more rational decision-makers than they previously were. In turn, adolescents are granted more autonomy in making important decisions — about their education, their residence, their friends, their leisure time, and consumer decisions, to name but a few.

There may well be predictable individual differences in adolescent epistemology that impact on decision-making, and these individual differences may relate in part, to gender as well as personality differences.

Belenky, Clinchy, Goldberger, and Tarule (1986/1997) have asserted that there is a link between different patterns of epistemological development and gender. They identified two distinct types of procedural knowledge, which they named "separate" and "connected" knowing (SK and CK, respectively).

SK involves objective, analytical, and detached evaluation of an argument or piece of work. It often takes on an adversarial tone, involving argument, debate, playing devil's advocate, "shooting holes" in another's espoused position, or critical thinking (Clinchy, 1996). CK, in contrast, involves trying to understand how a position or piece of work that one

may initially find alien might make sense in another frame of reference. Connected knowers place themselves in alliance with another's position, even when it is initially disagreed with, and try to look at things from the other's point of view, in the other's own terms, and try first to understand the other's point of view before evaluating it.

SK and CK have been demonstrated to be orthogonal constructs (Galotti, Clinchy, Ainsworth, Lavin, & Mansfield, 1999). More recent work has demonstrated that students with different ways of knowing differ in predictable ways in their perceptions of their partners and the learning environment when asked to learn a new and complex task (Galotti, Drebus, & Reimer, 1999). CK and SK scores apparently influence students' goals and overarching orientations toward a learning task. I, therefore, included these measures to see whether they would similarly affect students' orientation toward a naturally occurring episode of decision-making.

Another dimension of individual difference may be in adolescents' orientation to the future (Nurmi, 1991; Nurmi, Poole, & Kalakoski, 1994). Klaczynski and Fauth (1996; see also Klaczynski, Gordon, & Fauth, 1997) have demonstrated stable individual differences in assessment of life chances of experiencing both positive (e.g., having happy children, living past the age of 80, winning an award for professional work) and negative events, with some adolescents much more optimistically biased than others. Other work has demonstrated that older adolescents differ reliably in the degree to which they consider future consequences, set goals, allocate resources for those goals, and work to minimize conflicts — in other words, in their planning ability (Simons & Galotti, 1992). Planning also is argued to be the tendency to formulate in advance an organized method of action (Friedman & Scholnick, 1997). Planning skills or tendencies may direct adolescents to organize their search for information, their structuring and integration of the information gathered, and help them better synchronize their decision-making activities with their broader goals.

1.3. Standards for rational decision-making

To assess the effectiveness of adolescents' decision-making, we need some sort of standard. Many psychologists and philosophers equate effectiveness with rationality (Baron, 1994). Rational decision-making has been defined as that which serves a person's ends or goals or principles as much as circumstances allow (von Winterfeldt & Edwards, 1986, p. 2). Some works suggest that individuals with greater cognitive ability often behave more rationally (Stanovich & West, 1997, 1998). Others have different definitions of what makes a decision rational (e.g., Evans & Over, 1996), although this issue goes beyond the scope of this article.

Rational decision-making requires that one gather information about a decision as carefully as possible under the circumstances. Rational decision-making requires in particular that the person look at not only evidence that supports their initial inclinations but also evidence that does not (Baron, 1994). That may or may not honor the conventional advice to "consider all options carefully"; time and other constraints will probably preclude a decision-maker from examining every possible option. Rationality in general requires not that a decision-maker be error-free in outcomes (that would require omniscience and the absence of chance factors),

but instead that the decision-maker have good reasons for making the decision she or he makes at the time that she or he makes it (Moshman, 1999).

1.4. Major features of adolescent decision-making

Although conventional wisdom presents adolescents as much more impulsive in their action and possessing an unrealistic sense of invulnerability to risk (Elkind, 1967), empirical studies of adolescent decision-making do not typically bear out these assertions. Adolescents appear to assess consequences of risky behaviors (e.g., driving after drinking; "skipping" school) in ways very similar to adults (Beyth-Marom, Austin, Fischhoff, Palmgren, & Jacobs-Quadrel, 1993; Quadrel, Fischhoff & Davis, 1993). Other studies have found some small differences between adults and adolescents, primarily that some adolescents (particularly junior high females) are more pessimistic than adults in predicting outcomes, and that adults searched for information in a computer display using more sophisticated strategies (Ganzel, 1999).

Unfortunately, typical adult decision-making performance is hardly a gold standard of rationality. A plethora of studies document adults' misuse of various heuristics and biases and other shortcomings (Arkes, 1991; Tversky & Kahneman, 1974).

The general picture that emerges from cognitive laboratories is that even well-educated adults show biases in the way they gather information (Baron, 1994), underexplore complex issues (Perkins, 1985), and put too much confidence in their own performance (Fischhoff, Slovic, & Lichtenstein, 1977). To the degree that adolescent performance mirrors adult performance on typical decision-making tasks, adolescents fall prey to the same shortcomings as do adults.

Few studies have examined the actual decisions adolescents make. Typically, the studies present adolescent (and adult) participants with hypothetical decisions, and present all the relevant information to be used in making the decision. As I have argued elsewhere (Galotti, 1999), important real-life decisions are often much less well defined. Not all "given" information is supplied. Nor are all of the options neatly laid out before real-life decision-makers. Indeed, one of their tasks may be the very act of figuring out how to structure the decision-constructing a list of alternative options, determining what criteria ought be used to decide among them, weighing these different criteria, and deciding how to integrate all of the information gathered (Slovic, Lichtenstein, & Fischoff, 1988).

1.5. Rationale of present study

In this study, I asked first-term college students to describe the most important decision they had made within a year. Overwhelmingly, the students chose their decision of where to attend college, which conveniently allowed comparison of some of their retrospective accounts with those of high school students who were in the process of making this decision (Galotti, 1995a; Galotti & Kozberg, 1996; Galotti & Mark, 1994). Although there is good reason to believe that students' recall of the content of their decision (e.g., which criteria they used, which options they considered) will be biased by their current view of what they should

have done (Galotti, 1995b), there is little reason to doubt the validity of the various structural aspects of their decision (e.g., how many criteria or options were listed).

I also examined some of the correlates of decision-making in this study. In particular, I looked to see whether students who reported their planning to be more consistent, and whether students with different epistemological stances, made decisions differently. Because planning involves goal setting and prioritizing, I thought that those who planned more consistently might have a better understanding of their own goals, which might in turn focus their search for information and their structuring of the decision. Because decision-making typically involves some degree of uncertainty, students who differ in their epistemological approaches might show stable differences in their decision-making.

2. Method

2.1. Participants

Sixty-five first-year students were surveyed during their first 10-week term of college. There were 29 men and 36 women, all recruited from an introductory psychology course. Although age data were not collected, most first-year students at this college are 18 or 19 years of age. Students received extra credit toward the course in exchange for their participation.

2.2. Materials and procedure

Students received a packet of surveys and a cover letter inviting their participation. The surveys were preassembled into different random orders, and students were instructed to fill out the instruments in order, in one sitting in a quiet place. Students were further instructed to work carefully without dwelling on any question, and not to change answers to a question after they had moved on to answer other questions.

The three surveys used[1] were: a decision survey, which asked students to first think of the most important decision they had made within the last year. Next, students described the resources they consulted to make the decision, the factors or criteria they used to make the decision, the relative importance weights of each criterion (each criterion was rated on a 11-point scale of importance), and the alternatives that they considered. Finally, students filled out 15 seven-point rating scales describing their affective reactions to, and descriptions of the decision-making process adapted from Galotti and Kozberg (1996) and Frisch and Clemen (1994). Sample items include: "How certain are you that you made the right decision?" "How much did you draw on your intuitions, 'gut' reactions, or feelings to make this decision?," and "How much did you make trade-offs among different possibilities in making this decision?" Possible ratings went from 1 (*not at all*) to 7 (*completely*).

---

[1] Copies of all instruments are available from the author.

A second instrument was the Attitudes Toward Thinking and Learning (ATTLS) scale (Galotti, Clinchy, et al., 1999). This consists of 20 items, again with a seven-point response scale, which measures agreement with different epistemological positions of SK (detached, objective, critical) and CK (empathic, contextual). Sample items include: "I like to understand where other people are 'coming from', what experiences have led them to feel the way they do," "I'm more likely to try to understand someone else's opinion than to try to evaluate it," "I like playing devil's advocate — arguing the opposite of what someone is saying," and "In evaluating what someone says, I focus on the quality of their argument, not on the person who's presenting it." Possible ratings went from 1 (*strongly disagree*) to 7 (*strongly agree*).

The third instrument, the "Survey of Common Practices" (Simons & Galotti, 1992) assessed students' attitudes toward planning ahead, allocating resources, and prioritizing. It consisted of 31 items with five-point response scales. Sample items included "I keep a written list of 'things to do'," "I break a goal into parts or subgoals," "I anticipate conflicts ahead of time." Possible ratings went from 1 (*never*) to 5 (*always*).

Students completed these instruments on their own within a 1-week period. Of the 97 students invited to participate, 65 did so for an overall response rate of 67%.

3. Results

3.1. Content and structure of the decision

Although the students were free to list any decision, 57 of them (88%) responded that their most important decision over the past year was the choice of college to attend. Subsequent analyses of the data come from just these participants.

Participants listed an average of 7.64 criteria. The range in this measure was from 3 to 19 (S.D. = 3.37). The number of criteria listed did not differ for men or women. Participants also listed an average of 5.00 alternatives, with a range from 1 to 11 (S.D. = 2.74). Once again, there were no differences as a function of gender in the number of alternatives listed.

These numbers are quite comparable to those reported in previous studies, of high school students in the process of choosing a college (where the mean number of criteria listed was 8.85, and the mean number of alternatives listed was 4.24; Galotti, 1995a), and college students in the process of choosing a major (where the mean number of criteria listed was 6.77, and the mean number of alternatives listed was 3.95; Galotti, 1999). Thus, although these participants were *recalling* a decision rather than describing it on-line, their data are comparable in structure to those data generated by adolescents while in the midst of making similar decisions.

3.2. Descriptive data on predictor variables

Internal reliabilities of the respective instruments were calculated using coefficient alpha. For the planning scale, the internal reliability was .84. For the ATTLS, the internal reliabilities of the SK scale was .81 and for the CK scale it was .80. The mean overall planning score was

100.50 (possible range: 31–155, S.D. = 13.70) and did not differ by gender, comparable to the value reported by Simons and Galotti (1992) of 100.13. The mean overall SK and CK scores were 43.54 and 52.90 (possible range: 20–70 for both scores, S.D. = 9.84 and 7.90, respectively); but these did differ significantly by gender. Replicating the results of Galotti, Clinchy, et al. (1999), women had higher CK scores than men (55.30 vs. 50.08) and lower SK scores than men (41.41 vs. 46.04), although the differences were only marginally significant ($p < .10$) for the first comparison [for the overall interaction, $F(1,48) = 9.80, p < .01$]. Planning scores were not significantly correlated with either CK or SK scores.

3.3. Correlates of decision structure

I next examine whether the descriptive and affective reactions to decision-making were related to either students self-reported planning or their epistemological stances.

Table 1 presents the rating items from the decision survey, and the correlation of each item with the planning score, the CK score, the SK score, as well as the number of factors and alternatives listed.

The two major performance measures, number of criteria and number of alternatives listed, had some positive relationships with descriptions of, and affective reactions to the process. Interestingly, the two measures correlated with different ratings. The number of criteria a student reported considering was only marginally significantly correlated with stressfulness of the decision, and negatively marginally significantly with the independence (from other people) of the process. The number of alternatives considered showed more statistically significant correlations. Specifically, the more alternatives considered, the more pressured the student reported feeling, and the more difficult the student reported with making this decision in particular. Students also reported making more trade-offs with more alternatives.

I have speculated that students who consider more options or criteria see themselves as less decisive, and hence, less effective decision-makers, if they equate "good" with "fast" or "unambiguous" decision-making (Galotti, 1999). One way to make the decision-making process go faster is to incorporate less information: e.g., by using fewer criteria, considering fewer alternatives, or both. Of course, one's stress during the decision-making process may turn out to be either unrelated, or negatively related, to one's eventual satisfaction with the outcome of the decision, an issue for future research.

Table 1 shows few statistically significant correlations between responses to the decision-making survey and SK scores. SK scores correlated significantly only with a self-reported tendency to make trade-offs while making the decision, an analytic strategy.

CK scores showed more statistically significant relationships. Connected knowers (those who use empathy and act as "angel advocates" of new ideas, at least initially), reported more certainty in making the right decision, more comfort with the process, less of a feeling of being rushed or pressured in the process. They also report drawing more on their intuitions to make this decision, although that correlation was only marginally significant.

Planning is a fairly potent correlate of decision-making comfort, certainty, and satisfaction. Sensibly, those students rating themselves as high in planning tendencies are more likely to place emphasis on future consequences when making an important decision. Students with

Table 1
Correlations of ratings with planning score, CK and SK scores, and decision structure measures

Rating scale item	Planning score	CK score	SK score	Number of criteria	Number of alternatives
How certain are you that you made the right decision?	.43***	.36**	.09	−.07	−.10
How comfortable are you with the way you made this decision?	.52***	.30*	.16	−.09	−.22
How rushed or pressured did you feel in making this decision?	−.02	−.31*	.12	.17	.29*
How stressful was it to make this decision?	−.02	.01	.01	.26†	.09
How satisfied do you feel with the amount of information you obtained while making this decision?	.50***	.17	.05	−.02	.01
How independently (e.g., of other people) were you while making this decision?	.08	.16	.10	−.24†	.02
How much did you enjoy making this decision?	.25†	.14	.07	.00	.01
How difficult was this decision, relative to other decisions you have previously made?	.12	.05	−.09	.16	.30*
How much did you use specific criteria to make this decision?	.26†	.19	.02	−.02	.18
How much did you draw on your intuitions, "gut" reactions, and feelings to make this decision?	.23†	.25†	−.04	−.11	−.07
How much emphasis did you place on the future consequences of your decision?	.27*	.16	−.17	.07	.07
How much did you rule out some possibilities because of one or a few criteria?	.08	.00	.00	−.07	.28†
How much did you use previous habits or policies in making this decision?	−.13	.13	−.02	.05	.03
How much did you make trade-offs among different possibilities in making this decision?	.16	.06	.36*	.16	.31*
How much of your decision was guided by your overall values, principles, goals, and/or objectives?	.54***	.11	.02	−.05	−.03

* $p < .05$
** $p < .01$
*** $p < .001$
† $p < .10$

high self-reported planning scores report using their overall values and principles in the process, express more certainty and comfort with the decision-making process, and are more satisfied with the information they have gathered. They are also marginally more likely to report enjoying making the decision, to use specific criteria, and to draw on their intuition and feelings in making the decision.

4. Discussion

Clearly, much more work is needed to discover how well the pattern of results holds for other populations and other decisions. That the results are consistent with two other previous studies is encouraging, though it should be noted that to date, all decisions studied have been educational ones. Thus, final conclusions cannot yet be drawn. However, tentative speculations can be offered and specific issues for future research identified.

What are the hindrances to good adolescent decision-making? A major stumbling block seems to be the problem of cognitive overload. Students appear to naturally avoid becoming swamped with information by restricting the number of alternatives they consider, and the number of criteria they use to assess alternatives. Adults apparently do this too, pruning the number of options they consider at any given point in time to one or a very small number (Beach, 1993; Mitchell & Beach, 1990). But it seems quite plausible that in their rush to screen options and criteria that decision-makers may be impulsively rejecting or even failing to consider viable possibilities. A variety of techniques exist to help people structure information in making a decision (Arkes, 1991); the present work suggests that educators start explicitly teaching adolescents to use decision aids to help them manage information and to avoid premature cessation of thinking. Future work might profitably investigate whether explicit instruction in decision structuring reduces information overload and thereby stress.

Another hindrance might be maladaptive expectations of what constitutes effective decision-making. The absence of good models of careful, prolonged, reflective thought may lead young people especially to place too much value on quick decisions that are never ever revisited. They may avoid the hard work of rational decision-making both because they lack a system to do it, and because they fear that when they stop to reflect that they will mire themselves in endless wavering. In our educational systems, we can combat this by explicitly modeling the long, slow, and often circuitous nature of careful, rational, decision-making. We can offer better support to adolescents in the midst of the stressful uncertainty of the process, providing reassurance that a good decision-making process is not always one that feels comfortable. Researchers might also turn attention to the question of what people take to be models of exemplary decision-making, and how this conception changes with development. Relatedly, investigators might explore individual differences in decision-making style and how this affects standards of decision-making.

What then helps adolescent decision-making? Apparently, having a tendency to plan ahead. The present study suggests that those students who are more likely to set priorities, allocate resources, and who have a future orientation are those most likely to be confident and satisfied with the decision-making process. Another thing educators can do to help novice decision-

makers is to help them clarify their own goals, and use this clarification to derive criteria and weight the criteria appropriately. This has been called self-regulated decision-making by psychologists (Byrnes, 1998). Notice that clarifying goals helps block impulsivity, and provides some framework for assessing different options. More broadly, clarifying goals helps adolescents be true to their own values. Getting adolescents to be more explicit about their goals may also help them rethink the importance they attach to long-term, life-framing goals (e.g., educational or career goals), and the relative importance of those in comparison with shorter-term ones (e.g., social reputation; Carroll, Durkin, Hattie, & Houghton, 1997). We need to understand better the way that adolescents set, revise, and plan for their own goals.

A demonstration borrowed from Covey, Merrill, and Merrill (1994) may be quite useful here. Imagine a large jar, in the midst of which are several containers containing large rocks, gravel, sand, and water, respectively. Several large rocks can fit in the jar. Some spaces will be left among those rocks. Some gravel can be poured into those spaces. Yet more, albeit smaller spaces will be left, and sand that is poured into the jar next can fill them. There will again be small and hard-to-see spaces left that water can fill.

The above scenario is often demonstrated with the actual materials at executive seminars. The demonstrator, after finishing with the water, asks the audience what the point of the demonstration is. The point, according to Covey et al., 1994, is that if you do not put the big rocks in first, none of them will ever fit. Educators may help adolescent decision-making most by using this concrete demonstration as an impetus to help adolescents identify their own "rocks," "gravel," "sand," and "water."

Acknowledgments

References

Arkes, H. R. (1991). Costs and benefits of judgement errors: implications for debiasing. *Psychological Bulletin,* *110*, 486–498.
Baron, J. (1994). *Thinking and deciding* (2nd ed.). Cambridge: Cambridge Univ. Press.
Beach, L. R. (1993). Broadening the definition of decision-making: the role of prechoice screening of options. *Psychological Science, 4*, 215–220.
Belenky, M. F., Clinchy, B. M., Goldberger, N. R., & Tarule, J. M. (1997). *Women's ways of knowing: the development of self, voice, and mind* (2nd ed.). New York: Basic Books (original work published 1986).
Beyth-Marom, R., Austin, L., Fischhoff, B., Palmgren, C., & Jacobs-Quadrel, M. (1993). Perceived consequences of risky behaviors: adults and adolescents. *Developmental Psychology, 29*, 549–563.
Byrnes, J. P. (1998). *The nature and development of decision making*. Mahwah, NJ: Erlbaum.
Carroll, A., Durkin, K., Hattie, J., & Houghton, S. (1997). Goal setting among adolescents: a comparison of delinquent, at-risk, and not-at-risk youth. *Journal of Educational Psychology, 89*, 441–450.

Chandler, M., Boyes, M., & Ball, L. (1990). Relativism and stations of epistemic doubt. *Journal of Experimental Child Psychology, 50*, 370–395.

Clinchy, B. McV. (1996). Connected and separate knowing: toward a marriage of two minds. In: N. R. Goldberger, J. M. Tarule, B. McV. Clinchy, & M. F. Belenky (Eds.), *Knowledge, difference, and power: essays inspired by "Women's ways of knowing"* (pp. 205–247). New York: Basic Books.

Covey, S. R., Merrill, A. R., & Merrill, R. R. (1994). *First things first: to live, to love, to learn, to leave a legacy.* New York: Simon & Schuster.

Elkind, D. (1967). Egocentrism in adolescence. *Child Development, 38*, 1025–1038.

Erikson, E. (1968). *Identity: youth and crisis.* New York: Norton.

Evans, J.St.B.T., & Over, D. E. (1996). *Rationality and reasoning: essays in cognitive psychology.* East Sussex, UK: Psychology Press.

Fischhoff, B., Slovic, P., & Lichtenstein, S. (1977). Knowing with certainty: the appropriateness of extreme confidence. *Journal of Experimental Psychology, Human Perception and Performance, 3*, 552–564.

Friedman, S. L., & Scholnick E. K. (Eds.) (1997). *The developmental psychology of planning: why, how, and when do we plan?* Mahwah, NJ: Erlbaum.

Frisch, D., & Clemen, R. T. (1994). Beyond expected utility theory: rethinking behavioral decision research. *Psychological Bulletin, 116*, 46–54.

Galotti, K. M. (1995a). A longitudinal study of real-life decision making: choosing a college. *Applied Cognitive Psychology, 9*, 459–484.

Galotti, K. M. (1995b). Memories of a "decision-map": recall of a real-life decision. *Applied Cognitive Psychology, 9*, 307–319.

Galotti, K. M. (1999). Making a "major" real life decision: college students choosing an academic major. *Journal of Educational Psychology, 91*, 1–9.

Galotti, K. M., Clinchy, B. McV., Ainsworth, K. H., Lavin, B., & Mansfield, A. F. (1999). A new way of assessing ways of knowing: the Attitudes Toward Thinking and Learning Survey (ATTLS). *Sex Roles, 40*, 745–766.

Galotti, K. M., Drebus, D. W., & Reimer, R. L. (1999). *Ways of knowing as learning styles.* Presentation made at the meeting of the society for research in child development, Albuquerque, New Mexico.

Galotti, K. M., & Kozberg, S. F. (1987). Older adolescents' thinking about academic and interpersonal commitments. *Journal of Youth and Adolescence, 16*, 313–330.

Galotti, K. M., & Kozberg, F. (1996). Adolescents' experience of a life-framing decision. *Journal of Youth and Adolescence, 25*, 3–16.

Galotti, K. M., Kozberg, S. F., & Appleman, D. (1990). Younger and older adolescents' thinking about vocational and interpersonal commitments. *Journal of Experimental Child Psychology, 50*, 324–339.

Galotti, K. M., & Mark, M. C. (1994). How do high school students structure an important life decision? A short-term longitudinal study of the college decision-making process. *Research in Higher Education, 35*, 589–607.

Ganzel, A. K. (1999). Adolescent decision making: the influence of mood, age, and gender on the consideration of information. *Journal of Adolescent Research, 14*, 289–318.

Havighurst, R. J. (1972). *Developmental tasks and education.* New York: McKay.

Keating, D. P. (1990). Structuralism, deconstruction, reconstruction: the limits of reasoning. In: W. F. Overton (Ed.), *Reasoning, necessity, and logic: developmental perspectives* (pp. 299–319). Hillsdale, NJ: Erlbaum.

Klaczynski, P. A., & Fauth, J. M. (1996). Intellectual ability, rationality, and intuitiveness as predictors of warranted and unwarranted optimism for future life events. *Journal of Youth and Adolescence, 25*, 755–773.

Klaczynski, P. A., Gordon, D. H., & Fauth, J. M. (1997). Goal-oriented critical reasoning and individual differences in critical reasoning biases. *Journal of Educational Psychology, 89*, 470–485.

Marcia, J. E. (1966). Development and validation of ego–identity status. *Journal of Personality and Social Psychology, 3*, 215–223.

Marcia, J. E. (1983). Some directions for the investigation of ego development in early adolescence. *Journal of Early Adolescence, 3*, 215–223.

Mitchell, T. R., & Beach, L. R. (1990). "… Do I love thee? Let me count …" Toward an understanding of intuitive and automatic decision-making. *Organizational Behavior and Human Decision Processes, 47*, 1–20.

Moshman, D. (1999). *Adolescent psychological development.* Mahwah, NJ: Erlbaum.

Muuss, R. E. (1996). *Theories of adolescence* (6th ed.). New York: McGraw-Hill.

Nurmi, J. (1991). How do adolescents see their future? A review of the development of future orientation and planning. *Developmental Review, 11,* 1–59.

Nurmi, J., Poole, M. E., & Kalakoski, V. (1994). Age differences in adolescent future-oriented goals, concerns, and related temporal extension in different sociocultural contexts. *Journal of Youth and Adolescence, 23,* 471–487.

Perkins, D. N. (1985). Postprimary education has little impact on informal reasoning. *Journal of Educational Psychology, 77,* 562–571.

Perry, W. G. Jr. (1970). *Forms of intellectual and ethical development in the college years: a scheme.* New York: Holt, Rinehart & Winston.

Perry, W. G. Jr. (1981). Cognitive and ethical growth: the making of meaning. In: A. Chickering (Ed.), *The modern American college* (pp. 76–116). San Francisco, CA: Jossey-Bass.

Quadrel, M. J., Fischhoff, B., & Davis, W. (1993). Adolescent (in)vulnerability. *American Psychologist, 48,* 102–116.

Rowe, I., & Marcia, J. E. (1980). Ego identity status, formal operations, and moral development. *Journal of Youth and Adolescence, 9,* 87–99.

Schiedel, D. G., & Marcia, J. E. (1985). Ego identity, intimacy, sex role orientation, and gender. *Developmental Psychology, 21,* 149–160.

Simons, D. J., & Galotti, K. M. (1992). Everyday planning: an analysis of time management. *Bulletin of the Psychonomic Society, 30,* 61–64.

Slovic, P., Lichtenstein, S., & Fischhoff, B. (1988). Decision making. In: R. C. Atkinson, R. J. Herrnstein, G. Lindzey, & R. D. Luce (Eds.), *Stevens' handbook of experimental psychology: Vol. 2. Learning and cognition* (2nd ed.) (pp. 673–738). New York: Wiley.

Stanovich, K. E., & West, R. F. (1997). Reasoning independently of prior belief and individual differences in actively open-minded thinking. *Journal of Educational Psychology, 89,* 342–357.

Stanovich, K. E., & West, R. F. (1998). Individual differences in rational thought. *Journal of Experimental Psychology, General, 127,* 161–188.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: heuristics and biases. *Science, 185,* 1124–1131.

von Winterfeldt, D., & Edwards, W. (1986). *Decision analysis and behavioral research.* Cambridge: Cambridge Univ. Press.