Adolescent (In)vulnerability

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Three groups of subjects were asked to judge the probability that they and several target others (a friend, an acquaintance, a parent, a child) would experience various risks. Subjects were middle-class adults, their teenage children, and high-risk adolescents from treatment homes. All three groups saw themselves as facing somewhat less risk than the target others. However, this perception of relative invulnerability was no more pronounced for adolescents than for adults. Indeed, the parents were viewed as less vulnerable than their teenage children by both the adults and those teens. These results are consistent with others showing small differences in the cognitive decision-making processes of adolescents and adults. Underestimating teens' competence can mean misdiagnosing the sources of their risk behaviors, denying them deserved freedoms, and failing to provide needed assistance.

> The young . . . are full of passion, which excludes fear;
> and of hope, which inspires confidence.
> —Aristotle, *Rhetoric Book II*

It is a commonplace, culturally, that adolescence is a time of risk taking. It is well established, statistically, that adolescents experience the negative consequences of some risk behaviors to a disproportionately high degree (Dryfoos, 1990; Hechinger, 1992). For example, one in seven teenagers in the United States may now have a sexually transmitted disease (Sunenblick, 1988), twice the rate for adults in their 20s (Hein, 1989). In Canada, young people aged 16–21 comprise 21% of all licensed drivers but account for 58% of the traffic accidents (Jonah, 1986; National Center for Health Statistics, 1984).

Although the data are somewhat less firm, some risk behaviors, too, are unusually common at this age. For example, the initiation of smoking, drinking, and illicit drug use all peak among 16- to 18-year-olds (Fishburne, Abelson, & Cisin, 1980; Kandel & Logan, 1984). In other cases, even though comparable data with adults are lacking, adolescents' absolute rates of self-reported risk behaviors seem alarmingly high. For example, in one national survey (National Adolescent Student Health Survey, 1988), 17% of high school students reported having used alcohol or drugs while swimming or boating during the preceding year; 26% of 8th graders and 38% of 10th graders reported having had five or more drinks on at least one occasion during the preceding two weeks; similar numbers reported riding with a driver under the influence of drugs or alcohol. In another national survey (*Monitoring the Future*, 1986), 17% of seniors in high school reported having tried cocaine, and approximately 1 out of every 25 reported smoking marijuana every day. Naturally, some teens engage in more of these risk behaviors than do others, often accumulating an increasing repertoire as they age (Jessor, Donovan, & Costa, 1992).

Policies and Hypotheses

How our society treats its adolescents depends, in part, on how it interprets these behaviors. The easiest explanation, in many ways, is that adolescents get into trouble because they do not understand the risks they are taking. In that case, the response is conceptually straightforward, if technically complex: Provide teens with better information and guidance in how to use it. This strategy is being followed by a bewildering variety of courses, programs, and announcements (see, e.g., Baron & Brown, 1991; U.S. Office of Technology Assessment [OTA], 1991). According to this theory, once adolescents understand the facts of risk, they will voluntarily behave as adults would like. If adolescents continue to take risks, then the message must not have been sent comprehensibly and convincingly enough. Perhaps the communicators have not understood their audience. Perhaps the target adolescents lack the intellectual skills needed to understand the message. Perhaps they lack the social skills for implementing those solutions that they do identify (Botvin, 1991; Tobler, 1986).

Under those circumstances, a case might be made for restricting adolescents' freedom—at least until the message gets through (Gardner, Sherer & Tester, 1989). Such restrictions might include raising the minimum age for driving, involving the courts in reproductive decisions, and prohibiting swimming pools of intermediate depth

(thereby removing the risk of adolescents miscalculating their ability to dive safely). The price paid for such protection includes limiting adolescents' civil rights, denying teens the opportunity for learning by doing, and abandoning the search for more effective approaches to education. It also means blaming adolescents for their predicament and absolving their society, a society that may both encourage them to behave irresponsibly and fail to provide them with constructive outlets.

A more troubling interpretation of risk behaviors is that adolescents actually understand the risks but choose to ignore them. Perhaps they consider the risks to be acceptable, given the attendant benefits. Perhaps they derive benefit from the risk act (e.g., they enjoy the thrill or social status that comes with it). Under those circumstances, several adult responses are possible; each is discomfiting in its own way. One response is to restrict the freedom of those adolescents who reject adults' values. A very different adult response is to accept the possibility that teens know more than their elders about the consequences of taking (or avoiding) some risks (e.g., the full social price of bucking the crowd). A related adult response is to admit that teens sometimes find themselves in impossible circumstances, with little choice but to assume unwelcome risks. Rather than criticizing teens, adults should work to improve teens' lot by increasing their set of opportunities. Finally, it is possible for adults to do nothing, guiltily hoping that teens will come around before anything goes too badly wrong.

These responses represent very different social policies, which could have very different effects on youths' lives. The choice of policy depends partly on political values, such as the importance one places on preserving civil rights or on limiting economic regulations. However, it also depends on one's beliefs regarding adolescents' competence to manage their own affairs. As a result, making assumptions about adolescents' decision-making abilities is part of a high-stakes societal gamble. For the past five years, we have been trying to reduce the uncertainty in these gambles by studying those abilities. This article focuses on one particular ability, judging the probability of adverse outcomes, and one particular failing, the tendency to underestimate one's own risk relative to that faced by others. After reviewing the evidence regarding the existence of this bias, we present an original study, adapting (and demonstrating) the procedures of behavioral decision theory (Fischhoff, Svenson, & Slovic, 1987; Kahneman, Slovic & Tversky, 1982; Yates, 1989). Its results are then compared with those of other studies in our research program, focusing on their joint implications for policies regarding adolescents.

Evidence of Adolescent Invulnerability

A ready explanation for why adolescents take risks is that they ignore, or at least greatly underestimate, the likelihood of bad outcomes. A popular account of such underestimation is that teenagers see themselves as invulnerable to those threats. As a result, they focus just on

the benefits of risk behaviors. Some variant of this "adolescent invulnerability hypothesis" appears in many writings on adolescence (e.g., Blum & Resnick, 1982; Burger & Burns, 1988; Cvetkovich, Grote, Bjorseth, & Sarkissian, 1975; Hein, 1989, Kegeles, Adler & Irwin, 1988; Rotheram-Borus & Koopman, 1990, Sunenblick, 1988; Whitely & Hern, 1991). These discussions offer, however, little documentation of a uniquely adolescent perception of invulnerability or of a link between such perceptions and risk taking.

The most frequently cited theoretical basis for adolescent invulnerability is probably Elkind's (1967) concept of adolescent egocentrism, which postulates two phenomena occurring when adolescents try to conceptualize the thoughts of others: (a) *the imaginary audience,* in which adolescents fail to differentiate others' thoughts from their own (seeing themselves as being as central to others' thinking as they are to their own), and (b) *the personal fable,* in which adolescents overdifferentiate their thoughts and feelings from those of others. Elkind argued that adolescents' personal fable involved a notion of uniqueness so strong that it "becomes a conviction that he will not die, that death will happen to others but not to him" (p. 1031). Elkind noted that his theory was largely speculative, being based entirely on anecdotal evidence from his clinical patients. Although this article has been cited widely,[1] there is relatively little systematic evidence supporting the theory.

In an attempt to test Elkind's (1967) theory, Enright, Lapsley, and Shukla (1979) developed an Adolescent Egocentrism Scale, with a Personal Fable subscale (on which subjects rated the importance of actions such as "communicating my unique feelings and viewpoints to others so they can at least get some idea about what I am like"). However, they found little difference in Personal Fable ratings of subjects in the 6th grade, 8th grade, and college. Lapsley, Milstead, Quintana, Flannery, and Buss (1986) also found no correlation between responses to these scales and either grade level (from 6th to 12th) or performance on verbal and numerical analogy tests, of the sort that might reflect the transition to a formal operations stage (which Elkind held to be essential to the perception of invulnerability). Dolcini et al. (1989) found that adolescents with higher Personal Fable scores actually rated themselves as being somewhat *more* at risk from various activities ($r = .23, p < .001$ for girls; $r = .10, p < .16$ for boys). In a cross-study comparison of archival data regarding the perceived threat of drug and alcohol problems, Millstein (in press) found less evidence of invulnerability among adolescents than among college students or adults. In an unpublished study focused on 30 activities, such as hitchhiking and having sex, Benthin (1988) found that teens rated their own risk as equal to that of an average same-aged person.

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[1] *Social Science Citation Indices* lists 169 citations between 1973 and 1990.

Evidence on Other Decision-Making Skills

Indirect support for the perceived invulnerability hypothesis might be found in studies such as those summarized by Cvetkovich et al. (1975) and Morrison (1985), who concluded that between one third and one half of sexually active adolescents explain not using contraceptives with variants of "I thought I (or my partner) couldn't get pregnant" (p. 553). However, these exaggerated perceptions of invulnerability need not reflect generalized magical thinking (because I am special, I won't get pregnant). Rather, they may be the result of specific misunderstandings about reproductive processes (e.g., it can't happen the first time; if it didn't happen the first time, it won't ever happen; if I have sex infrequently, I can't get pregnant; I can't get pregnant during my period; I can't get pregnant until I've had several periods; Cvetkovich & Grote, 1983; Cvetkovich et al., 1975; Kantner & Zelnick, 1972; Luker, 1975; Oskamp & Mindick, 1983; Quadrel, 1990). Such misperceptions might be just as common with adults (e.g., Shaklee & Fischhoff, 1990), producing similar underestimation of personal risk.

Unfortunately, these studies seldom observe adults and adolescents performing the same tasks. In one of the few studies allowing a direct comparison of decision-making skills, Gardner et al. (1989) reported that 12- to 13-year-olds used less information about options, possible consequences, utilities, and probabilities than did adults. On the other hand, Klayman (1985) and Melton (1981) found that 12-year-olds, older adolescents, and adults used similar problem-solving strategies. After reviewing a number of studies on minors' health care decisions, the OTA (1991) concluded that there were few demonstrated cognitive differences between adolescents (over age 13) and adults.

Nor do adolescents appear to be particularly ignorant of risks. In an absolute sense, investigators have found considerable adolescent awareness of many aspects of some risks, such as those associated with alcohol (Finn & Brown, 1981) and acquired immunodeficiency syndrome (AIDS; DiClemente, Boyer, & Morales, 1988; DiClemente, Zorn, & Temoshok, 1986; Eiser, Eiser, & Lang, 1989; Price, Desmond & Kukulka, 1985). In a relative sense, the prevalence of various misunderstandings about specific human immunodeficiency virus (HIV) transmission processes has been found to vary across ethnic and socioeconomic status (SES) groups (Anderson, 1990; DiClemente et al., 1988) but not across age from 12 years to 18 years (Rotheram-Borus & Koopman, 1990).

In a well-known study using open-ended questions, Lewis (1981) found that 10th graders were more likely than 7th or 8th graders to mention risks (e.g., possible losses) spontaneously when considering decisions, indicating some development in risk awareness. On the other hand, Beyth-Marom, Austin, Fischhoff, Palmgren, and Quadrel (in press) asked 199 middle-class adolescents

(aged 12 to 18) and an equal number of their parents to list consequences that might follow from either accepting or rejecting the opportunity to engage in a risk behavior (e.g., a ride from friends who have been drinking). Overall, these teens and parents listed similar consequences and with similar frequency.

Such agreement about the possibility of adverse outcomes could, of course, conceal differences about their probability. Many studies (e.g., Crosbie & Bitte, 1982; Erickson, Gibbs, & Jensen, 1977; Jonah, 1986; Jonah & Dawson, 1982; Luker, 1975; Namerow, Lawton, & Philliber, 1987; Paternoster, Saltzman, Chiricos, & Waldo, 1982) have elicited quantitative risk estimates. Unfortunately, most have used verbal response scales (e.g., "risky," "very risky"). It has long been known that the same response category can be interpreted differently by different respondents and even by the same respondent in different circumstances (e.g., "very likely to rain" vs. "very likely to kill you"; Beyth-Marom, 1982; Lichtenstein & Newman, 1967; Wallsten & Budescu, 1983). As a result, it is difficult to compare teens' responses either with the responses of adults or with statistical measures of risk. In the few studies eliciting numerical probabilities, teenagers overestimate some risks and underestimate others (Cvetkovich & Grote, 1983; Foreit & Foreit, 1981; Namerow et al., 1987; Quadrel, 1990). Studies with adults have shown similar patterns (e.g., Fischhoff & MacGregor, 1983; Lichtenstein, Slovic, Fischhoff, Layman, & Combs, 1978).

Evidence of Adult Invulnerability

Although evidence of perceived invulnerability among adolescents is sparse, studies with adults have consistently shown invulnerability. For example, most adults (in most countries) judge themselves to be safer and more skillful than the average driver (a claim that could be true for only one half of the population; Svenson, 1981). The tendency to see oneself as less likely than others to experience negative outcomes (and more likely to enjoy positive ones) has been reported with respect to ethical transgressions (Baumhart, 1968), business dealings (Larwood & Whitaker, 1977), disease (Harris & Guten, 1979; Kirscht, Haefner, Kegeles, & Rosenstock, 1966; Kulick & Mahler, 1987; Larwood, 1978; Weinstein, 1983, 1984, 1987), lotteries (Irwin, 1953; Langer & Roth, 1975), social events (Weinstein, 1980, 1983, 1987), natural disasters (Johnson & Tversky, 1983), technologies (Johnson & Tversky, 1983), pregnancy (Burger & Burns, 1988; Whitely & Hern, 1991), crime (Perloff, 1983), and driving (Finn & Bragg, 1986; Matthews & Moran, 1986; Svenson, 1981).

In a typical study, Weinstein (1987) asked subjects between 18 and 65 years of age to evaluate their risk of various negative events (e.g., asthma, drug addiction, homicide), relative to that faced by other men or women their age, on a scale ranging from *much below average* to *much above average*. Subjects typically rated their risk as significantly less than that of others. However, the degree of bias was not related to age. One reliable correlate of

optimism is *social distance:* There is a greater disparity in risk levels when the comparison is with an average peer than with a close friend. The optimism effect is also greater with events judged to be personally *controllable* (Perloff & Fetzer, 1986; Weinstein, 1980, 1983, 1984, 1987; Weinstein & Lachendro, 1982; Zakay, 1983, 1984). Finally, there is some suggestion that people feel less invulnerability when they have *experience* with an event.

These studies have typically elicited judgments of relative, rather than absolute, risk. The logical link to risk behaviors is that people who view themselves as facing relatively little risk will make inferences such as, "Those health warnings are meant for other people" and "I can drive faster than others without taking greater risks."

Study Overview

In summary, there is little empirical support for the claim that perceived invulnerability is particularly large during adolescence. Tests have not supported Elkind's (1967) claim of a personal fable that is endemic to adolescence, nor of adults being less egocentric in this regard. Nor are there convincing data demonstrating that adolescents (aged 13 and older) are markedly less proficient than adults in estimating risk or in other decision-making skills. If there are, in fact, few differences in these cognitive processes, then we do adolescents a disservice both by deprecating their abilities and by failing to address the actual sources of their risk behaviors.

This study provides a direct test of the adolescent invulnerability hypothesis by comparing the degree of optimism in three groups of subjects: low-risk (middle-class) teens, their parents, and high-risk teens (drawn from group homes and juvenile centers). All subjects assessed the probabilities of various bad events occurring to themselves and to several target others. These assessments were made on an explicit quantitative scale, intended to avoid the problems of verbal quantifiers (e.g., *very likely*). The targets were chosen to differ in their social distance from the subject, whereas the events were chosen to differ in their perceived controllability (e.g., auto accidents vs. air pollution).

Previous results led us to expect greater perceived invulnerability with comparisons involving socially distant targets, with events that seem relatively controllable, and with subjects who have had less direct experience with risks. The adolescent invulnerability hypothesis predicts a stronger overall bias with teens than adults. The high-risk–low-risk comparison suggests conflicting hypotheses. On the one hand, if perceived invulnerability is a primary factor in risk taking, teens who take more risks should exhibit more of this bias. On the other hand, at-risk teens may have more experience with risk outcomes and less feeling of control over their environment, factors reducing the bias in previous studies.

By using a quantitative response mode, we can measure perceived invulnerability in three different ways:

1. *Absolute invulnerability.* People see themselves as facing little or no risk. Thus, they would assess their

personal probability as being at or near zero. The demonstration would be more pronounced if they also assigned higher probabilities to other (target) individuals.

2. *Strong relative invulnerability.* People see themselves as facing less risk than other individuals. Thus, they would tend to assign themselves lower risk probabilities.

3. *Weak relative invulnerability.* People see themselves as facing less risk than other individuals—but only in cases in which they see a difference in their respective risk levels. Thus, assigning equal probabilities to themselves and to a target would not violate the hypothesis. However, in cases where the two probabilities differ, their own risk should be lower.

Method

Sample

For the adolescent–adult comparison, we sampled 86 pairs of low-risk teens and parents; for the risk–behavior comparison, we added 95 high-risk teens. Low-risk subjects were recruited from organizations at public high schools (e.g., booster clubs). High-risk teens were recruited from group homes for teens with legal and chemical abuse problems. These groups differ from one another in many ways that might be related to risk judgments (e.g., experience, education, family circumstances). The rationale for such known-group sampling is to see the size of the differences associated with this combination of factors. To some extent, future research might disentangle these factors. To some extent, this tangle reflects the complex of interacting factors that is an inherent part of individuals and groups (Meehl, 1970).

Ages in both adolescent groups ranged from 11 to 18, with a mean of 15 (*SD* = 1.5). The average age for adults was 43. The groups differed on other demographic and behavioral variables as well. Low-risk subjects were primarily girls or women (67% of the low-risk teenagers were girls and 72% of the adults were mothers of those teens); only 23% of the high-risk teens were female adolescents. The low-risk sample was primarily White (96%); only 33% of the high-risk teens were White, with 45% African American and 16% Hispanic, Asian, or other. Only 35% of the high-risk teens lived with both parents, compared with 95% of the low-risk teens. One half of the parents of low-risk teens had graduated from college, whereas only 23% of the high-risk teens' parents had even attended college (of those, 83% had graduated).

High-risk teens reported more of most risk behaviors than did low-risk teens: Sixty-five percent (vs. 38%) reported smoking cigarettes daily; 54% (vs. 9%) reported smoking marijuana at least once in the preceding six months; 52% (vs. 18%) reported having sexual intercourse at least monthly; 22% (vs. 5%) reported having tried cocaine. In contrast, 70% of low-risk teens reported having had a few drinks at least once in the preceding six months (vs. 54% of high-risk teens), with 12% reporting daily use (vs. 11%); 45% of the high-risk teens reported no current

use. (All of the high-risk teens were attending Alcoholics Anonymous as part of their treatment.)

Procedure

These three groups of subjects evaluated each of eight possible adverse events on each of four dimensions for each of three or four target individuals.

Events. The eight events were chosen so that four would be relatively high in perceived controllability (auto accident injury, alcohol dependency, unplanned pregnancy, and mugging) and four would be low (sickness from air pollution, injury in a fire explosion, sickness from pesticides, and sickness from radiation poisoning). All outcomes involving sickness or injury were described as being "severe enough to require seeing a doctor." Probabilities were evaluated for each outcome occurring "sometime in the next five years." Such specific event descriptions were used in light of Quadrel's (1990) finding that adolescents are sensitive to the omission of such detail and may spontaneously supply missing values. As a result, they may be answering different questions than the investigators intended to ask (Fischhoff, 1991; Fischhoff & Furby, 1988).

Dimensions. Each event was evaluated in terms of (a) probability (how likely it is to occur to the target individual), (b) controllability (how much the target can do to prevent it), (c) preventive effort (how much the target does to prevent it), and (d) experience with the event. Probabilities were assessed with a response mode designed to facilitate the expression of very small probabilities. It included a linear probability scale running from 1/100 to 100/100 and, above it, a six-cycle log-linear scale running from 1/100,000,000 to 1/100, along with a final position labeled *zero* and *no chance.* The log-linear portion of the scale was intended to reveal differences that would be lost if respondents had to round probabilities down to zero or up to .01.[2] Subjects recorded their probability assessments by marking a letter (A, B, C, or D) to represent each target individual on the scale.

For perceived *control,* subjects estimated: "How much *can* you do to prevent [X]" on a 5-point scale (anchored at *completely controllable* and *there is nothing one can do to change the likelihood*). For perceived *prevention,* subjects estimated "How much *do* you do to prevent [X]" on a 5-point scale (anchored at *do everything possible to prevent this* and *don't do anything to prevent this*). Where appropriate, *you* was replaced by a target (e.g., a friend, an acquaintance).

Experience was measured as in Weinstein (1987), on a 5-point scale: (1) *don't know anyone this has happened to,* (2) *has happened to acquaintances,* (3) *has happened to close friends or relatives,* (4) *has happened to me once,* (5) *has happened to me more than once.* Subjects evaluated only their own experience (and not that of the targets).

Targets. After evaluating each event on each dimension for themselves, subjects evaluated two or three target individuals. The first target was an acquaintance

("A male [female] acquaintance from your neighborhood who is about the same age as you"); the second was a friend ("a close male [female] friend from your neighborhood who is about the same age as you"). Subjects received questionnaires making these targets same-gendered. The adult–teen pairs also made a third set of judgments: The adults evaluated each event on each dimension for the accompanying teen, and the teens made comparable judgments for the accompanying parent.

Measures on each dimension were collected with separate written questionnaires. Subjects made evaluations for each target on each event before moving on to a new event and for each dimension on all events before moving on to a new questionnaire. For example, high-risk teens assessed the likelihood that an auto accident injury would happen to themselves, to an acquaintance, and to a close friend, in that order, before they assessed the likelihood that the next outcome (getting sick from air pollution) would occur for each target. Then they moved to the next questionnaire and made control judgments in the same order.

Results

Overview

The two versions of the relative invulnerability hypothesis asked whether subjects saw their own risk as higher or lower than that of a target individual. We begin with these hypotheses because they require treating the probability response mode only as an ordinal scale. Subsequent sections consider potential correlates of invulnerability, namely, the control, prevention, and experience judgments. The final results section examines the absolute invulnerability hypothesis, which interprets probability judgments literally. (A more detailed report of this study may be obtained from Baruch Fischhoff.)

Each comparison between the probabilities that subjects assigned to themselves and to the target was scored (0,1) according to whether it supported each version of the relative invulnerability hypothesis. These counts were evaluated with respect to the type of event, the target, and the sample group. Rather than begin with the potentially complex interactions among these evaluations, we start with the main effects, then proceed to consider interactions that might qualify their interpretation.

Main Effects

Overall. The study design has three factors: group (parent, child, and at-risk youth; to compare age and risk-taking factors), target (acquaintance, friend, and parent or child; to examine the social-distance hypothesis), and event (four passive and four active; to assess the impact of perceived control). Table 1 summarizes responses rel-

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[2] For example, an individual may believe that everyone's probability is very small—less than 1%—and still believe that he or she is less at risk.

Table 1
Risk Comparisons: Percentage of Cases

	Judge sees self as		
Variable	Less vulnerable	Equally vulnerable	More vulnerable
Overall			
Across all events and targets	36.8	43.1	20.0
Group			
Adult subjects	34.5	51.2	14.2
Low-risk teen subjects	35.9	40.6	23.5
High-risk teen subjects	41.5	35.3	23.2
Target			
Comparison with acquaintance	39.2	41.1	19.7
Comparison with friend	35.5	45.5	19.0
Comparison with teen (by parent)	31.0	37.6	31.4
Comparison with parent (by teen)	39.4	47.4	13.2
Event			
Across active events	46.1	31.5	22.5
Across passive events	27.6	54.8	17.6

evant to these main effects. The first row shows that respondents assigned the same probability to themselves and the target 43.1% of the time. Where they did make a distinction, respondents were almost twice as likely to assign lower risk probabilities to themselves as to the targets (36.8% vs. 20%)—consistent with weak relative invulnerability. Nonetheless, they viewed themselves as less vulnerable in only about one third of all comparisons, while viewing themselves as more vulnerable one fifth of the time—inconsistent with strong relative invulnerability.

Group. The second variable in Table 1 breaks the results down by group. No group saw itself as less vulnerable in more than approximately 40% of cases. The adults were less likely than either teen group to distinguish their risk level from that of the target. This result is consistent with the claim that adolescents stress their own uniqueness as part of creating their self-identity (Elkind, 1967). However, in cases in which a distinction was made, the adults actually showed more weak relative invulnerability. They were two and a half times more likely to judge themselves to be less vulnerable than more vulnerable (34.9% vs. 14.2%). The corresponding ratios were 1.5 for their adolescent children and 1.8 for the high-risk teens. Thus, at this level of aggregation, adolescents were *less* prone to weak relative invulnerability and equally prone to strong relative invulnerability.

Target. The first two items under Target in Table 1 show little difference in comparisons with a friend and with an acquaintance, contrary to the social-distance hypothesis. Teen subjects assigned the same risk level to the

target friend more often than to the target acquaintance, suggesting that they saw friends as sharing more similar circumstances. However, where they made distinctions, the ratios of cases showing more and less risk were quite similar (39.2% vs. 19.7% for friends; 35.5% vs. 19.0% for acquaintances).

The next two items show substantial differences in the relative risks that low-risk teens and parents assigned to one another. When they made a distinction, the parents saw themselves as facing less risk than their children three times more often than they saw themselves as being more at risk. By contrast, the adolescents were equally likely to see themselves as less invulnerable and as more vulnerable. Thus, there was a much greater trend toward invulnerability in the parents' judgments. As shown below, this difference came from judgments of several active events.

Event. The final two rows of Table 1 show much higher rates of strong relative invulnerability with the active events than with the passive ones (46.1% vs. 27.6%; $p < .001$ for each age group). Most of this difference came from the much greater frequency of assigning the same probability to themselves and to the target with the passive events (54.8% vs. 31.5%). Where subjects did make a distinction, the ratios of less vulnerable to more vulnerable cases were fairly similar for the two classes of events (2.0 and 1.6 for active and passive, respectively).
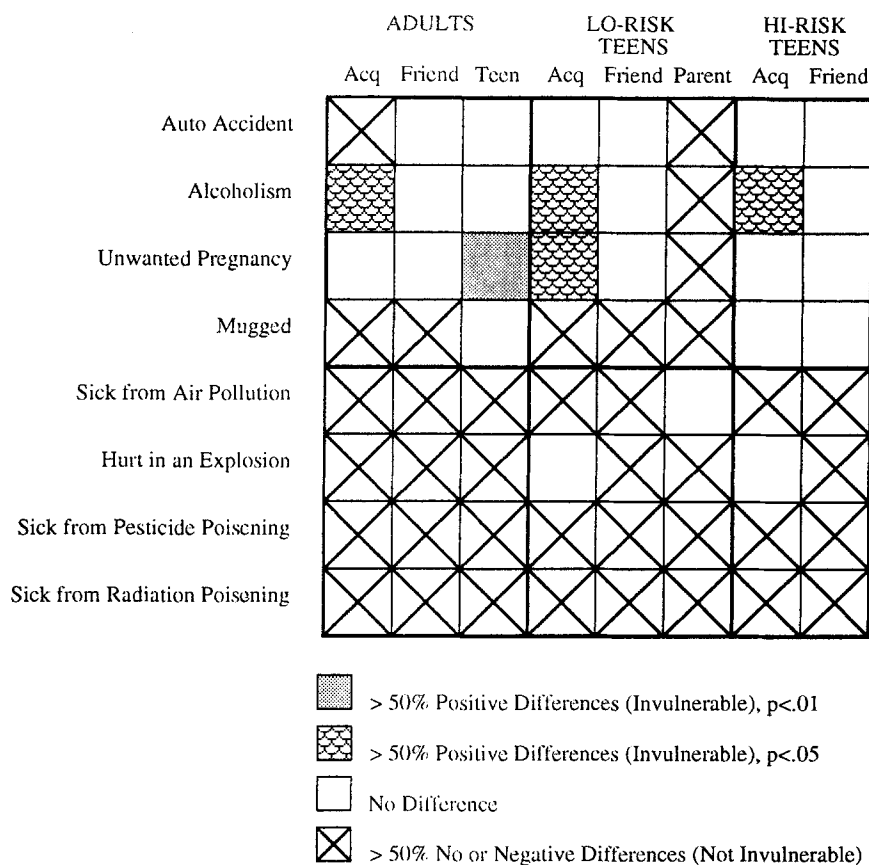
Interactions

Strong relative invulnerability. The adult–teen comparison can be characterized in terms of two interactions: (a) The active–passive difference (in the mean number of comparisons showing invulnerability) was much greater for adults (1.93 vs. 0.82) than for teens (1.62 vs. 1.21). (b) For teens, invulnerability was most common in comparisons with acquaintances (1.67 vs. 1.37 and 1.20, for the friend and parent comparisons); for adults, it was most common in comparisons with their teens (1.56 vs. 1.25 and 1.31, for the acquaintance and friend comparisons).

There was no overall difference between the teen groups, nor any significant interactions involving them. Each group showed more invulnerability with acquaintances than with friends and for active than for passive events.

Weak relative invulnerability. The adult–teen comparison is again characterized by a complex interaction among the test variables. Although both groups showed more invulnerability than vulnerability, teens saw their own risk as greater than that of their parents for active events, whereas the parents showed a particularly large difference in the complementary direction. Thus, as noted before, both groups agreed that the adolescents were relatively more vulnerable to these events.

Again, there was no difference between the high-risk and low-risk teens.

Figure 1
Binomial Tests for Strong Relative Invulnerability

	ADULTS			LO-RISK TEENS			HI-RISK TEENS	
	Acq	Friend	Teen	Acq	Friend	Parent	Acq	Friend
Auto Accident								
Alcoholism								
Unwanted Pregnancy								
Mugged								
Sick from Air Pollution								
Hurt in an Explosion								
Sick from Pesticide Poisoning								
Sick from Radiation Poisoning								

> 50% Positive Differences (Invulnerable), p<.01

> 50% Positive Differences (Invulnerable), p<.05

No Difference

> 50% No or Negative Differences (Not Invulnerable)

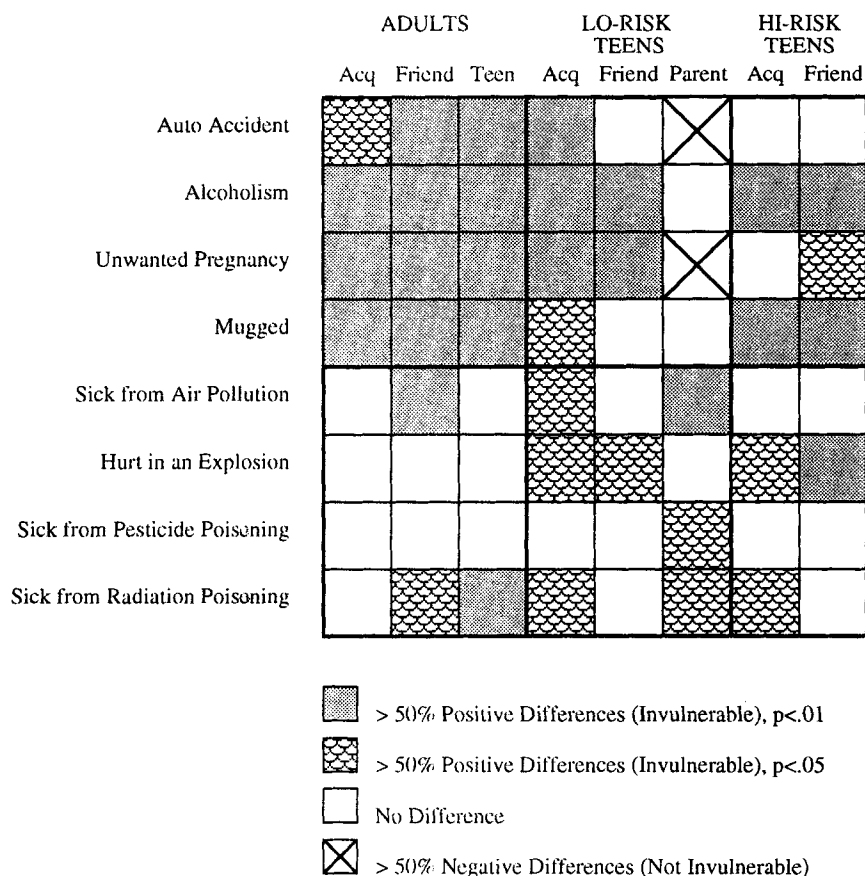Note. Acq = acquaintance.

Individual Events

Obviously, these summaries obscure greater variations at the level of the comparisons with particular targets on particular events. The percentage of adults showing strong relative invulnerability ranged from 11.6% (compared with their teens on pesticide risks) to 75.3% (compared with their teens for unintentional pregnancy). For low-risk teens, the rates ranged from 19.8% (compared with their parents on unintentional pregnancy) to 61.6% (compared with an acquaintance on alcohol dependency). For high-risk teens, the range was from 25.0% (compared with a friend on radiation risks) to 60.9% (compared with an acquaintance on alcohol dependency).

Over the 64 comparisons (across events, groups, and targets), there were only 5 cases in which significantly more than 50% of subjects perceived themselves to be more invulnerable than the target. The comparison with an acquaintance on the risk of alcohol dependency was the only one to pass this test for all three

groups. They are represented by the shaded cells in Figure 1. All are for active events in the top half of the figure. In the 38 cells marked X, significantly fewer than 50% of subjects judged themselves to be less at risk than the target. In the remaining 21 cases, indicated by white cells, the number of subjects expressing strong relative invulnerability was not significantly different from 50%. Thus, from this perspective, too, there is only narrow support for a general tendency toward strong relative invulnerability, and none for it being particularly strong among adolescents.

Figure 2 shows that in 36 cases a significant majority of comparisons showed weak relative invulnerability ($p < .05$), with 24 of these being significant at $p < .01$. In two cases, a majority of subjects showed weak relative vulnerability. Both involved teens comparing themselves with their parents (auto accidents, unwanted pregnancy). Thus, there was a general tendency toward weak relative invulnerability, with localized differences showing greater perceived invulnerability among adults.

Figure 2

Binomial Tests for Weak Relative Invulnerability

	ADULTS			LO-RISK TEENS			HI-RISK TEENS	
	Acq	Friend	Teen	Acq	Friend	Parent	Acq	Friend
Auto Accident								
Alcoholism								
Unwanted Pregnancy								
Mugged								
Sick from Air Pollution								
Hurt in an Explosion								
Sick from Pesticide Poisoning								
Sick from Radiation Poisoning								

▨ > 50% Positive Differences (Invulnerable), p<.01

▩ > 50% Positive Differences (Invulnerable), p<.05

☐ No Difference

☒ > 50% Negative Differences (Not Invulnerable)

Note. Acq = acquaintance.

Control and Prevention Judgments

Mean judgments. Statistical tests showed that respondents judged the active events to be much more controllable than the passive ones for each target individual—as we had intended. Subjects also reported that they and others did more to control the active events. Across all events and subjects, the mean control judgments were 7.71 and 3.00 for the active and passive events, respectively. The corresponding mean prevention judgments were 3.60 and 2.85. Each subject group said that it could do (and was doing) the most about alcohol dependency and unwanted pregnancy, the least about radiation and air pollution.[3] Across all events, subjects in each group saw themselves both as doing more and as being able to do more than the other individuals. The adults saw themselves as having and exercising the most control (3.48 and 3.51, respectively), followed by the low-risk teens (3.34, 3.30) and the high-risk teens (3.25, 2.86).[4]

Correlations. Each comparison between the risks assigned to a subject and to a target was scored as showing vulnerability, no difference, or invulnerability (repre-

sented as −1, 0, and 1). Statistical correlations were then computed with the corresponding differences between control and prevention judgments for the subject and the target to determine whether a relationship existed between judgments of invulnerability and how much the subjects believed they could do, or actually did do (relative to the target) to prevent a risk (Table 2). Where there was a statistical relationship between invulnerability and perceived relative ability to control a risk (indicated by as-

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[3] The one exception was that the high-risk teens reported doing more (of what is possible) about getting mugged than about unwanted pregnancy.

[4] These are unstandardized means, assuming that the groups treated the response scale similarly. Neither we, nor those from whom the scales are taken, have examined the scales' psychometric properties. As a result, these comparisons should be taken with some caution. Although there is no necessary relationship between the control and prevention judgments (the second referring to how much is being done about the possibilities whose extent is described by the first), it may be informative that only the high-risk teens produced much lower ratings for what they were doing than for what they could do.

Table 2

Correlations With Relative Probability for Relative Perceived Control, Relative Perceived Prevention, Experience

	Subjects		
Event/variable	Adults	Low-risk teens	High-risk teens
Active events			
Acquaintance			
Control difference	***	*	*
Prevention difference	***	***	***
Experience			
Friend			
Control difference	***	***	*
Prevention difference	***	***	**
Experience			
Passive events			
Acquaintance			
Control difference	***	*	*
Prevention difference			
Experience			**
Friend			
Control difference	*		*
Prevention difference			
Experience			**

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

terisks in Table 2), subjects who saw themselves as invulnerable also assigned themselves a higher control or prevention score (indicating that they could do more or actually did more to control risks than the target). The greater the number of asterisks, the more pronounced was this effect.

For the active events, the adults showed more invulnerability when they assigned themselves higher scores for control and prevention. However, with the passive events, invulnerability was related only to control and then only for comparisons with acquaintances. For both groups of teens, the correlations had the same signs but were much smaller. Thus, from this perspective, too, the relationship between perceptions of invulnerability and control was stronger for adults than for teens.

Experience

Reported rates. Table 3 shows the reported rates of various experiences with each of the risky events, for the low-risk and high-risk teens (who were the same age and therefore had the same amount of time for things to go wrong). The two right-most columns show that the high-risk teens reported much more personal experience with almost every risky event. These included events (e.g., unwanted pregnancy) other than those for which they were sent to the institutions from which they were recruited. The picture is more complicated for indirect exposures (through the experiences of others). For example, the high-

risk teens reported more friends and family with unwanted pregnancies but fewer involved in auto accidents. These results suggest complex differences both in what happens in each social group and in how those experiences are shared. Although the high-risk teens reported more direct experience, these low-risk teens were not strangers to risk events.

As might be expected, the parents (not shown) reported both more direct and more indirect experience with these events. Fewer than 10% reported not knowing anyone who had experienced an auto accident, alcohol dependency, or unwanted pregnancy. About 30% reported having been injured in auto accidents; 20% of the mothers reported having had unwanted pregnancies (95% knew someone who had).

Correlations. Experience was converted into a 5-point variable: (1) no experience; (2) indirect experience through acquaintances; (3) indirect experience through either a close friend or family member (and, possibly, through an acquaintance, too); (4) personal experience with no additional indirect experience; and (5) both direct and indirect experience. This variable was then correlated with the trichotomized invulnerability score. As shown in Table 2, reported experience was essentially unrelated to invulnerability. Thus, these kinds of experience with risk have not made people feel more vulnerable.

Absolute Invulnerability

The strongest statement of invulnerability is to say that one faces no risk at all. As shown in the 0 probability section of Table 4, subjects made such extreme statements about 10% of the time, over all events. The great majority of these judgments were for active events. As elsewhere, the active–passive distinction was much more pronounced for adults than for teens. Subjects assigned no risk about twice as often to themselves as to acquaintances and friends. The parents saw themselves as facing no risk from the active events more often than did their teens. The teens agreed.

For a subject who interpreted the response scale literally, the end position (zero or no chance) meant less than one in 100 million (the lowest probability listed explicitly). An individual might feel quite invulnerable at a considerably higher level of risk. The $<.0001$ probability section of Table 4 uses one in 10,000 as an alternative threshold for invulnerability. The low-risk teens viewed themselves as invulnerable less often than did the parents and the high-risk teens (24.6% vs. 34.0% and 38.6%). The low-risk teens also assigned so low a probability more often for their target friend (29.1%) or parent (34.4%) than for themselves (24.6%). By contrast, the adults and the high-risk teens more frequently assigned no risk (in this sense) to themselves than they did to the targets.

Looking at absolute invulnerability means interpreting these quantitative judgments literally. In a variety of qualitative checks, we found no differences in how the three groups used the scale. Nonetheless, some caution is still warranted. As might be expected, distributions

Table 3
Reported Experience: High-Risk Teens (HRT) and Low-Risk Teens (LRT)

	Has happened to									
	No one you know		Acquaintances		Friends/family		You once		You more than once	
Event	HRT	LRT	HRT	LRT	HRT	LRT	HRT	LRT	HRT	LRT
Active										
Auto accident	15.2	6.1	25.0	44.9	47.8	70.4	21.7	9.2	10.9	2.0
Alcohol dependent	18.5	22.4	26.1	40.8	44.6	48.0	16.3	1.0	20.7	1.0
Unwanted pregnancy[a]	29.3	25.5	20.7	58.2	46.7	21.4	9.8	0.0	3.3	0.0
Unwanted pregnancy[b]	22.8	33.7	20.7	49.0	34.8	21.4	15.2	0.0	9.8	0.0
Getting mugged	<u>51.1</u>	<u>55.1</u>	<u>18.4</u>	<u>24.5</u>	<u>23.9</u>	<u>21.4</u>	<u>10.9</u>	<u>1.0</u>	<u>1.1</u>	<u>1.0</u>
Mean	27.4	28.6	22.2	43.5	39.6	36.5	14.8	2.2	28.8	0.8
Passive										
Air pollution	88.0	94.9	5.4	2.0	4.3	1.0	3.3	2.0	0.0	0.0
Fire/explosion	46.7	51.0	19.6	26.5	26.1	19.4	7.6	2.0	4.3	1.0
Pesticides	83.7	93.9	3.3	4.1	5.4	2.0	5.4	0.0	2.2	0.0
Radiation	<u>91.3</u>	<u>94.9</u>	<u>3.3</u>	<u>3.1</u>	<u>4.3</u>	<u>2.0</u>	<u>2.2</u>	<u>0.0</u>	<u>1.1</u>	<u>0.0</u>
Mean	77.4	83.7	7.9	8.9	10.0	6.1	4.6	1.0	1.9	0.3

Note. All figures are percentages. [a] Female subjects. [b] Male subjects.

centered around very small probabilities typically had a strong negative skew, making means much higher than medians (because a few relatively large values can substantially increase the mean). By either measure of central tendency, the active events were judged to be somewhat more likely than the passive ones, despite the much greater frequency with which active events were assigned no risk at all (Table 4).[5]

Discussion

Adolescents engage in more risk behaviors than many of their elders would like (e.g., OTA, 1991). Adolescents presumably experience more risk outcomes than they themselves would like. A convenient explanation for these realities is that adolescents systematically underestimate the risks they face from various actions. If it could be demonstrated that adolescents were uniquely afflicted by such an exaggerated sense of personal invulnerability, then a stronger case could be made for restricting their freedom to take risks or for subjecting them to various types of "risk education." We do adolescents a disservice if we overestimate their decision-making competence (hence, deny them needed protections) or if we underestimate it (hence, deny them possible autonomy). Given these stakes, policies should not be based on anecdotal observation and cultural presumptions about adolescents.

We now discuss, in turn, the results of this study, related evidence in the larger project from which it was drawn, and possible implications for policies regarding youths.

Adolescent Invulnerability Revisited

The most common response pattern in our study was to see no difference between one's own risk level and that

faced by the target others. Where subjects distinguished the two risk levels, they were twice as likely to see the target as facing greater risk. Subjects assigned a risk probability of zero (or *no chance*) to themselves about 10% of the time, to others about one half as often. They saw their own risk as less than one in 10,000 about one third of the time; they saw others as having so low a risk less frequently.

The prevalence of these various expressions of invulnerability was very sensitive to the event in question. Specifically, it was much higher with the four active events, especially when subjects assigned themselves higher control and prevention ratings than the target. Invulnerability was not, however, any greater for adolescents than for adults. Teens were more likely to distinguish their risk from that of the target. That might reflect a heightened tendency to overdifferentiate their personal situation, akin to Elkind's (1967) personal fable. However, it might also reflect more intense observation of friends and acquaintances than is possible for adults (whose lives are often more private). In any case, having made these additional distinctions, teens often judged themselves to have the greater risk. Indeed, by most measures, the low-risk teens showed less invulnerability than their parents. Much of that difference came from both groups seeing the teens

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[5] We note in passing that adults assigned themselves a smaller or equal median probability of risk than their teens did for every event except getting mugged. For every active event, the parents assigned their teens a higher probability than the teens assigned to their parents. For passive events, the relationship was reversed. These results, too, are inconsistent with the hypothesis of adolescent invulnerability, mediated by an exaggerated sense of personal control.

Table 4

Expressions of Invulnerability (Percentage of Probability Responses)

Probability	Adults			Low-risk teens			High-risk teens		
	All	Active	Passive	All	Active	Passive	All	Active	Passive
0 (no chance)									
Self	10.2	18.9	1.5	8.3	11.6	4.9	8.3	12.2	4.3
Acquaintance	4.4	8.1	0.1	3.6	5.2	2.0	3.7	4.3	3.0
Friend	4.8	9.0	0.1	2.8	3.8	1.7	4.2	3.8	4.6
Parent/teen	2.8	4.1	1.5	9.7	16.6	2.9	—	—	—
<.0001									
Self	34.0	37.5	30.5	24.6	29.1	20.1	38.6	34.0	43.2
Acquaintance	29.2	26.5	32.0	24.6	21.2	27.9	28.5	17.4	39.7
Friend	30.7	28.8	32.6	29.1	28.5	29.7	28.5	20.9	36.1
Parent/teen	25.9	21.2	30.5	34.4	37.8	31.1	—	—	—

as facing more risk from auto accidents and unwanted pregnancy—arguably, appropriate judgments.

The most straightforward account of these results is that adults and teens rely on similar, moderately biased psychological processes in estimating these risks. Those processes lead them to see themselves as facing less risk than the target others—who, presumably, see themselves as being safer. As suggested by Weinstein (1980) and others, both cognitive and motivational processes could contribute to exaggerating one's own safety. On the cognitive side, for example, the precautions that one takes (or at least plans to take) should be much more visible than those taken by others, especially for active events (where control is more possible). It would take unusual perceptiveness to undo the biases in such readily available evidence (Tversky & Kahneman, 1973). On the motivational side, wishful thinking might deflate perceptions of personal risk, possibly through indirect processes (e.g., which friends and acquaintances one choses for comparisons).

From this perspective, the behavior of these groups would differ only to the extent that their circumstances affected the operation of these common processes. Thus, speculatively, low-risk teens might have a strong need to see their parents as safe, whereas the parents' aura of personal invulnerability may not extend to their children (whom they are, after all, entrusted with protecting). Adults might be more sensitive to the active–passive difference because they have acquired a larger repertoire of control mechanisms (which they imagine using) and individual autonomy that enables them to exercise those options.

By this account, experience was unrelated to perceived invulnerability because it carried no systematic message for subjects who relied on these information-processing strategies. For example, the indirect experience of seeing others suffer a misfortune may point in very different directions. One is to blame the victim in hind-sight, exaggerating how much they could have done to avoid the risk, thereby creating the illusion that one has learned the lesson vicariously (Fischhoff, 1975; Hoch & Loewenstein, 1989). Or, it could lead one to console the victim that "it could have happened to anyone." Or, it could signal an ambient threat in the shared environment, creating concern over when one's own turn will come.

From this theoretical perspective, making different predictions for adolescents and adults means believing that they have different propensities for using these information-processes strategies. As noted in the introduction, there have been relatively few empirical comparisons of these skills. In their stead, the implicit developmental assumption often seems to be that adults have attained a high level of performance, considerably beyond that of adolescents (Shaklee, 1980). Most studies of decision-making skills have looked at adults, typically revealing a complex pattern of strengths and weaknesses (e.g., Fischhoff, 1989; Slovic, Lichtenstein, & Fischhoff, 1988; Yates, 1989, 1992). If adults are imperfect, then it is less surprising that adolescents might perform similarly.

A comprehensive developmental picture would compare adolescents and adults on all of the component skills of decision making. Over the past few years, we have attempted to fill some of these gaps, typically observing small differences, on the order of those in this invulnerability study. Beyth-Marom et al. (in press) asked adolescents and adults to produce possible consequences of taking (or avoiding) risky behaviors. Both groups were sensitive to how the question was posed (i.e., in terms of action or inaction, as a one-time or repeated action). However, they were sensitive in similar ways, producing roughly the same numbers and kinds of consequences. This study treated one aspect of how people judge the probabilities associated with those possibilities, again showing small differences between adults and adolescents.

From a decision-theory perspective, choices should depend not just on one's best guess at the state of the world but also on one's confidence in that guess. As a result, it is critical that people understand the limits to their own knowledge, so that they know when to hedge their bets or to collect more information. Many studies have found that adults are only moderately successful in assessing how much they know, with the most common overall tendency being overconfidence (Lichtenstein, Fischhoff & Phillips, 1982; Yates, 1989). Quadrel (1990) found a similar pattern in responses to a quiz with 100 two-alternative questions about risk behaviors. For each question, respondents chose the most likely alternative answer and then assessed the probability that it was correct. Figure 3 shows responses of subjects drawn from the same populations as in the invulnerability study. The low-risk teens and parents responded similarly. Overall, both groups were moderately overconfident (e.g., they had chosen the correct answer only about 85% of the time when they assigned 1.00 as their probability of being correct). The high-risk youths had fewer correct answers but higher confidence judgments.[6] As a result, they showed much greater overconfidence overall, despite—or perhaps because of—having greater direct experience with these events and participating in substance abuse prevention courses.

In other studies, which have yet to be performed with adults, adolescents have shown surprising sophisti-

cation. For example, surveys attempting to elicit adolescents' (and adults') beliefs about risks often pose quite ambiguous questions.[7] Quadrel (1990) asked low-risk and high-risk adolescents to think aloud as they assessed the probabilities of deliberately ambiguous events, such as "getting into an accident when driving after drinking." All but 5 of 31 subjects spontaneously made assumptions about how much drinking was involved or explicitly asked for information about that detail. Far fewer subjects (3) spontaneously raised the question of how much driving was involved. With varying frequency, subjects wanted to know about a variety of other factors with varying objective relevance (e.g., driving skill, age, social atmosphere and type of alcohol, and physical tolerance). Dose information (e.g., how much drinking) was routinely cited for seven of nine ambiguous events (e.g., the probability of getting cancer from smoking cigarettes, of becoming addicted from drinking alcohol). However, it was not considered for the two events concerning sex (the probabilities of pregnancy and of AIDS virus transmission). Theoretically, these results suggest that adolescents have a more accurate intuitive notion of physiology for the effects of drinking than for the risks of sexuality. Methodologically, they suggest that poorly specified questions can create confusion regarding how much adolescents know and what information they need most critically.

Conclusion

The theoretical and policy implications of these (or any) studies depend on the generality of the phenomena that they document. Ultimately, that is a matter for future research. In the meantime, one might note that most experiments involve pencil-and-paper tasks, are administered in a school-like setting, encourage subjects to perform in ways that will impress the investigators, and direct subjects to consider specific issues (often, these are normatively relevant aspects of decision making that might

Figure 3
Calibration Curves for Adults (Top, White: N = 45), Not-at-Risk Teens (Middle, Dark: N = 43), and At-Risk Teens (Bottom, White: N = 45)
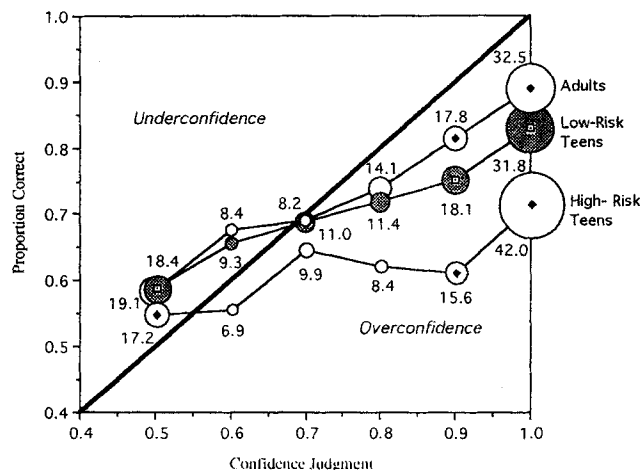
Note. Each point indicates the proportion of correct answers among those in which subjects expressed a particular confidence level. The size of each circle indicates the percentage of answers held with that degree of confidence. From "Elicitation of Adolescent's Risk Perceptions: Qualitative and Quantitative Dimensions" by M. J. Quadrel, 1990, Unpublished doctoral dissertation, Carnegie Mellon University. Reprinted by permission.

[6] Here is an example of an individual item: Only 45% of the at-risk teens knew that having a beer would affect their driving as much as would drinking a shot of vodka. However, the mean probability of having chosen the correct answer, over all subjects, was .84. For this particular question, the adults were just as overconfident and the low-risk teens were better calibrated.

[7] For example, a National Center for Health Statistics survey (Wilson & Thornberry, 1987) asked, "How likely do you think it is that a person will get the AIDS virus from sharing plates, forks, or glasses with someone who had AIDS?" We presented this question to a relatively homogeneous group, psychology students at an Ivy League college. After answering, these subjects were asked what they had understood to be the frequency and intensity of the sharing. There was considerable disagreement about the frequency involved: single occasion (endorsed by 39% of subjects), several occasions (20%), routinely (28%), and uncertain (12%). There was considerable agreement about intensity: sharing utensils during a meal (82%), using the same washed utensils (11%), and uncertain (6%). Even when subjects do agree on the interpretation of a question, readers of the research still must guess at subjects' modal choice. Interestingly, all of our subjects who reported uncertainty about the event definition gave likelihood judgments; none of the subjects who were unable to judge likelihood were uncertain about what event they were assessing (Fischhoff, 1989).

otherwise be ignored). These experimental settings insulate subjects from the social pressure that accompanies actual decision making and isolates them from the attendant social support. The time pressures that they create may be qualitatively different from that of real life.

It is a matter of considerable debate in behavioral decision theory whether these conditions tend to enhance or degrade performance (Arkes & Hammond, 1986, Pt. IX; Kahneman et al., 1982, Pts. VIII and X). One critical developmental question is whether these situational factors affect adults and adolescents differently. If so, then similar performance in experiments might mask larger differences in everyday life. Many speculations are possible (Fischhoff, 1992). They need to be disciplined with fact in the sense of collecting the requisite data.

A second critical developmental question is whether similar performance deficits have similar consequences for adults and adolescents. Generally speaking, judgmental errors can cause more damage when decisions have irreversible consequences, when the stakes are large, when decision makers lack the resources needed to recover from failures, when the domain is unfamiliar (making the uncertainty large), and when decision makers lack structural protections, shielding them from the need (or opportunity) to make decisions that place them at great risk. The same degree of perceived invulnerability could create very different degrees of actual vulnerability. There is no simple summary of adults' and adolescents' relative degrees of such exposure. For example, adults often do much by routine, choosing primarily among modest variations on habitual responses, acquired through trial and error, where they cannot go too far wrong. Yet, they, too, sometimes work without a net, as when they ponder their first equity investment or extramarital liaison or power tool or independent presidential candidate or hazardous waste facility (as a potential neighbor).

Recognizing these possibilities, various experts have advocated protecting adults from the consequences of their fallible judgments (e.g., by banning "unhealthy" products or publications, by excluding laypeople from decisions about complex technologies). These exercises in paternalism, in which parents are treated like children, might provide a useful counterpoint for considering policies toward youths (Fischhoff, 1990).

Unsubstantiated claims about the incompetence of adolescents tilt the balance toward such paternalism. They threaten to disenfranchise and stigmatize adolescents. They encourage denying teens the right to govern their own actions, as well as viewing them as a societal problem rather than a resource. They interfere with the experimentation that is part of the business of adolescence. They make teens rather than society responsible for teens' problems. They place adults in the flattering position of knowing what is right. It might be instructive to study the cognitive and motivational factors that promote this harsh view of adolescents (Baumrind, 1968; Fischhoff, 1992; Fischhoff & Quadrel, 1991; Gardner et al., 1989).

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