

Peer Influence on Risk Taking, Risk Preference, and Risky Decision Making in Adolescence and Adulthood: An Experimental Study

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In this study, 306 individuals in 3 age groups—adolescents (13–16), youths (18–22), and adults (24 and older)—completed 2 questionnaire measures assessing risk preference and risky decision making, and 1 behavioral task measuring risk taking. Participants in each age group were randomly assigned to complete the measures either alone or with 2 same-aged peers. Analyses indicated that (a) risk taking and risky decision making decreased with age; (b) participants took more risks, focused more on the benefits than the costs of risky behavior, and made riskier decisions when in peer groups than alone; and (c) peer effects on risk taking and risky decision making were stronger among adolescents and youths than adults. These findings support the idea that adolescents are more inclined toward risky behavior and risky decision making than are adults and that peer influence plays an important role in explaining risky behavior during adolescence.

Keywords: adolescents, risk taking, peer influence, risk preference, decision making

It is well documented that adolescents are more likely than adults to engage in risky behavior. For example, adolescents are more likely than adults to drive recklessly, to drive while intoxicated, to use varied illicit substances, to have unprotected sex, and to engage in both minor and more serious antisocial behavior (Arnett, 1992). However, despite clinical and anecdotal evidence of heightened real-world risk taking during adolescence, laboratory studies of age differences in risk preference, risk perception, and risky decision making have not yielded consistent evidence that adolescents are actually less risk averse than are their elders. In fact, it is often asserted that, by midadolescence, teens' capacities for understanding and reasoning in risky decision-making situations roughly approximate those of adults (Fischhoff, 1992; Furby & Beyth-Marom, 1992). This assertion has been used to argue both for protecting adolescents' rights to make autonomous decisions about their reproductive health and for holding adolescents to adult standards of criminal blameworthiness (see Steinberg & Scott, 2003, for a discussion).

However, as several writers have recently argued, extant studies suggesting equivalent orientations toward risk among adolescents and adults are only modestly useful in understanding how adolescents compare with adults in real-world decision making. These

authors suggest that typical laboratory studies of risky decision making fail to consider the emotional and social contexts in which risk taking actually occurs (Cauffman & Steinberg, 2000; Scott, Reppucci, & Woolard, 1995; Steinberg, 2004; Steinberg & Cauffman, 1996). In such studies, individual adolescents are presented with hypothetical dilemmas under conditions of low emotional arousal and are then asked to make and explain their decisions. In the real world, however, adolescents' decisions are not hypothetical, they are generally made under conditions of emotional arousal (whether negative or positive), and they are usually made in peer groups. Whether the risky decision making of adolescents is truly comparable to that of adults under real-world conditions remains an open and unstudied question.

A number of explanations have been advanced to account for differences between adolescents and adults in real-world, as opposed to laboratory-based, risk taking. Some have argued that age differences in psychosocial capacities such as impulse control or sensation seeking play an important role (see Steinberg & Cauffman, 1996). Consistent with this, Cauffman and Steinberg (2000) reported that once differences in psychosocial maturity between adolescents and adults are accounted for, age differences in risky decision making disappear. An alternative and entirely compatible account of age differences in risky behavior emphasizes the role of peers and, more specifically, peer influence. That is, adolescents may engage in more risky behavior than do adults because they are more susceptible to the influence of their similarly risk-prone peers. Support for this latter explanation comes, in part, from the criminology literature. There is a small but compelling body of evidence to suggest that when adolescents commit crimes—acts that are inherently risky—they generally do so with their peers (Erickson & Jensen, 1977; Zimring, 1998). For example, adolescents are usually accompanied by one or more persons when committing crimes that range in seriousness from vandalism and drug use (Erickson & Jensen, 1977) to rape and homicide (Zim-

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ring, 1998). This is not, however, true of adults; when adults commit crimes, they typically do so alone (Zimring, 1998).

Although adolescent risk taking often occurs in groups, it is not known whether the greater prevalence of group risk taking observed among adolescents stems from the fact that adolescents spend more time in peer groups than adults do (Brown, 2004) or from the heightened levels of susceptibility to peer influence that have been shown to characterize adolescence (Steinberg & Silverberg, 1986). In other words, it is not clear whether adolescents simply have more opportunities to engage in group risk taking than do adults or whether, when faced with behavioral decisions in a peer group context, adolescents are more easily swayed toward risky choices.

To our knowledge, only one study has attempted to determine whether there are developmental differences in the effects of actual peer presence on orientation toward risk. In a comparison of adolescents and college students, Hensley (1977) sought to determine whether the tendency for individuals to take more risks in groups than when alone—a phenomenon known as the *risky shift* (Vinokur, 1971)—might differ across age groups. Hensley (1977) used a hypothetical decision-making questionnaire to measure risk acceptance and found that the magnitude of the risky shift was greater among adolescents than it was among college students. However, the study sample was very small (22 college students and 18 adolescents), and these results have not, to our knowledge, been replicated with performance (as opposed to hypothetical) measures of risk taking.

There are other findings that indirectly support the notion that adolescents may be more easily swayed toward risky behavior than adults. Compared with adults, adolescents have limited abilities in areas of psychosocial functioning, such as self-reliance, which likely interfere with the ability to act independently of the influence of others (Cauffman, 1996; Cauffman & Steinberg, 2000; Steinberg & Cauffman, 1996). Not surprisingly, several studies have found a curvilinear relation between age and peer conformity on responses to hypothetical dilemmas about antisocial decision making, with conformity increasing throughout childhood and into midadolescence and decreasing thereafter (Berndt, 1979; Brown, Clasen, & Eicher, 1986; Steinberg & Silverberg, 1986). Although researchers have not examined the developmental pattern of resistance to peer influence beyond late adolescence, there is some evidence that peer influence remains an important predictor of participation in risky behavior even during young adulthood (Andrews, Tildesley, Hopps, & Li, 2002; Horvath & Zuckerman, 1993). Thus, when confronted with risky decisions in the context of a peer group, adolescents, and perhaps even young adults, may be less able than older adults to resist the influence of their risk-prone age mates.

Further support for the idea of heightened peer effects on risky behavior during adolescence comes from additional findings on the risky-shift. Although a number of researchers have found that risk-taking tendencies are greater when individuals are in groups than when alone (e.g., Blascovich & Ginsburg, 1974; Blascovich, Ginsburg, & Howe, 1975; Blascovich, Veach, & Ginsburg, 1973; Kogan & Wallach, 1967; Lamm, 1967; Lamm, Trommsdorff, & Rost-Schaude, 1972; Pruitt & Teger, 1969; Vidmar, 1970; Wallach & Kogan, 1965; Yinon, Jaffe, & Feshbach, 1975), several investigations have found the reverse to be true. Indeed, in some cases, individuals demonstrate a conservative shift and are actually more

risk averse when in groups than when alone (e.g., Cohen & Ruis, 1974; Pilkonis & Zanna, 1973; Zaleska, 1974). Accordingly, social psychologists have advanced an alternative theoretical framework for understanding group risk taking. Whereas proponents of the risky shift theory assert that the presence of others should always lead to increased risk taking, advocates for the more recent group polarization theory suggest that the direction of group effects on risk taking depends on the risk-taking tendencies of the group members (Hogg, Turner, & Davidson, 1990). According to this theory, relatively conservative individuals should become even more conservative when grouped together, whereas individuals who are inclined to take risks should make even more risky choices (Hogg et al., 1990). Given this theoretical framework, adolescents' generally greater inclination toward risky behavior as individuals, in combination with their greater susceptibility to peer influence should, in theory, result in a larger effect of peer presence on risky behavior among adolescents than among adults.¹ The goal of the present study is therefore to examine whether adolescents, relative to adults, are more likely to take risks when their peers are present.

The Present Study

In the present study, we examined the differential effects of the presence of peers on risk taking, risk preference, and risky decision making among adolescents (M age = 14), youths (M age = 19), and adults (M age = 37). Our three primary hypotheses were as follows:

Hypothesis 1. Risk taking, risk preference, and risky decision making will decrease with age.

Hypothesis 2. On average, individuals will demonstrate more risk taking, greater risk preference, and more risky decision making when in the company of their peers than when alone.

Hypothesis 3. The difference between levels of risk taking, risk preference, and risky decision making with and without the presence of peers will decrease with age. That is, group effects on risk orientation will be greater among adolescents than among youths, and greater among youths than among adults.

Method

Sample

Our sample included 106 adolescents (54 girls and 52 boys), ages 13 to 16 (M age = 14.01, SD = 1.02), 105 youths (53 women and 52 men), ages 18 to 22 (M age = 18.78, SD = 1.07), and 95 adults (48 women and 47 men), ages 24 and older (M age = 37.24, SD = 12.37). All participants

¹ In keeping with group polarization theory, we are not suggesting that all adolescents should demonstrate shifts toward increased risk taking when in the presence of peers. It is conceivable that some adolescents, when placed in a group with risk-averse peers, might shift toward decreased risk taking. However, we expect that, given generally greater propensities for risk taking among adolescents, adolescents should, on average, be more likely than adults to demonstrate group-induced shifts toward greater risk taking.

were recruited from areas in and around a major urban center. The adolescents were recruited from middle schools, day camps, and community centers; the youths were recruited from undergraduate introductory psychology courses at a large urban university; and the adults were recruited through fliers posted on urban university and community college campuses, advertisements distributed to community organizations, and word of mouth.

The adolescent sample was composed of 50.9% girls and 49.1% boys; the youth sample was composed of 50.5% women and 49.5% men; and the adult sample was composed of 50.5% women and 49.5% men. These three groups did not differ significantly with respect to gender composition, $\chi^2(2) = .005, p = .997$. The three age groups were also very similar in terms of their ethnic composition. The majority of the participants were either White (48.7%) or African American (38.2%). Given the very small percentage of participants from other ethnic groups (the sample included only 1% Native Americans, 7.2% Asian Americans, 3.9% Latinos, and 0.7% others), the three age groups were compared only with respect to the percentages of White versus non-White participants. The adolescent sample included 44.8% White participants and 55.2% non-White participants; the youth sample included 53.3% White participants and 46.7% non-White participants; and the adult sample included 48.4% White participants and 51.6% non-White participants. These three groups did not differ significantly with respect to ethnic composition, $\chi^2(2) = 1.554, p = .460$. Finally, on a participant-report parent education rating scale (a proxy for socioeconomic status) where 1 = *less than high school diploma*, 2 = *high school diploma/GED*, 3 = *some college/vocational school*, 4 = *college graduate*, and 5 = *graduate or professional school*, all three age groups reported a mean level of parent education within the range of some college or vocational training. Thus, the three age groups did not differ substantially with respect to gender, ethnicity, or socioeconomic status (as indexed by parent education).

Recruitment and Procedure

Slightly different recruitment procedures were used for the adolescents versus the college students and adults. Each college undergraduate and adult participant was asked to invite to the session 2 people of his or her gender that he or she knew. These groups of 3 were then randomly assigned to a group condition (in which all 3 participants completed the battery of measures at the same time, in the same room, and communicated with each other while completing the tasks and measures) or to a sole participant condition (in which each of the 3 participants completed the battery of measures alone while the other 2 participants waited outside the room where the session took place).

Requirements concerning the need for parental consent among the adolescent participants necessitated a slight modification in this procedure. We found it difficult to get predetermined groups of 3 adolescents to appear for scheduled appointments together and to arrive with all 3 signed parent consent forms in hand. Thus, after first obtaining parental consent from large numbers of adolescents at different recruitment sites, we randomly assigned half of these adolescents within each recruitment site to the group condition (in which they completed the measures with two other teenagers of the same gender from their recruitment site) and half to the sole participant condition (in which they completed the measures alone). Thus, while the adolescent triads in the group condition were always composed of individuals who knew and were familiar with each other (i.e., individuals within each triad were from the same camp, classroom, or community-center summer or afterschool program), they were not necessarily composed of individuals who had selected one another as partners for the experiment. Although the adolescent and two older groups differed in this respect, in the real world, adolescents often find themselves in groups with other teenagers whom they know but have not necessarily selected as companions (i.e., in classrooms, on sports teams, in extracurricular activities, etc.). Moreover, to the extent that friends have been

shown to exert more pressure on each other than acquaintances (e.g., McPhee, 1996), the way in which adolescents were recruited resulted in a more conservative test of the hypothesis that, relative to adults, risk orientation among adolescents is more influenced by peer pressure.

Among the adults, 54 participants (27 men and 27 women) were assigned to the group condition, and 41 participants (20 men and 21 women) were assigned to the sole participant condition.² Among the youths, 54 participants (27 men and 27 women) were assigned to the group condition, and 51 (25 men and 26 women)³ were assigned to the sole participant condition. Among the adolescents, 54 participants (27 boys and 27 girls) were assigned to the group condition, and 52 (25 boys and 27 girls) were assigned to the sole participant condition.

All participant triads were composed of individuals of the same gender. However, the ethnic composition of the triads was not constricted in this manner. Among the adults, 37.5% of the triads consisted of all White participants, 43.8% consisted of all non-White participants, and 18.8% of the triads consisted of White and non-White individuals. Among the youths, 45.9% of the triads consisted of all White participants, 37.8% consisted of all non-White participants, and 16.2% consisted of White and non-White participants. Among the adolescents, 19.4% of the triads consisted of all White participants, 25% consisted of all non-White participants, and 55.6% consisted of White and non-White participants.

All participants completed three measures of risk orientation that were part of a battery of measures administered for a larger study of psychosocial development. The entire battery of measures took approximately 1 hr to complete. Each adolescent and adult participant was compensated \$20, and each undergraduate participant was given the choice between either a \$20 payment or research credit in an introductory psychology course.

Measures

Risk taking. Risk taking was assessed with a video game called "Chicken" (Sheldrick, 2004). Chicken is played on a laptop computer and requires participants to make decisions about whether to stop a car that is moving across the screen once a traffic light turns from green to yellow. The appearance of the yellow light signals the impending appearance of a red traffic light, as well as a potential crash if the car is still moving when the red light appears. Chicken was selected because it measures risk taking in the moment rather than the more deliberative form of risk taking assessed in many studies, in which participants have unlimited time to consider and evaluate all potential decisions and outcomes. Additionally, Chicken requires participants to make actual decisions in a risky situation, rather than simply requiring participants to report what they would do in a hypothetical risky situation.

The game is played from a third-person, side-view perspective (see Figure 1) and consists of 15 trials. In each trial, participants watched an animated car move across the screen for a predetermined amount of time until a yellow traffic light appeared. Before the first trial, players were informed that at some unknown point after the yellow light appeared, the traffic light would turn red and a wall would pop up in front of the car. Players were told that the object of the game was to allow the car to move as far as possible without crashing into the wall. Players controlled whether the car was moving or stopped but not the speed of the car. Participants accumulated more points the further the car moved without crashing but

² One person was dropped from one of the adult sole participant triads. At the age of 79, we believed this individual to be developmentally dissimilar from the rest of the adult sample.

³ One person was missing from three of the young adult triads assigned to the sole participant condition. In the first two cases, the 3rd member of the group left before it was his or her turn to complete the session. In the third case, data for the 3rd member of the peer group were excluded because it was later determined that the participant had already completed the study several months prior.

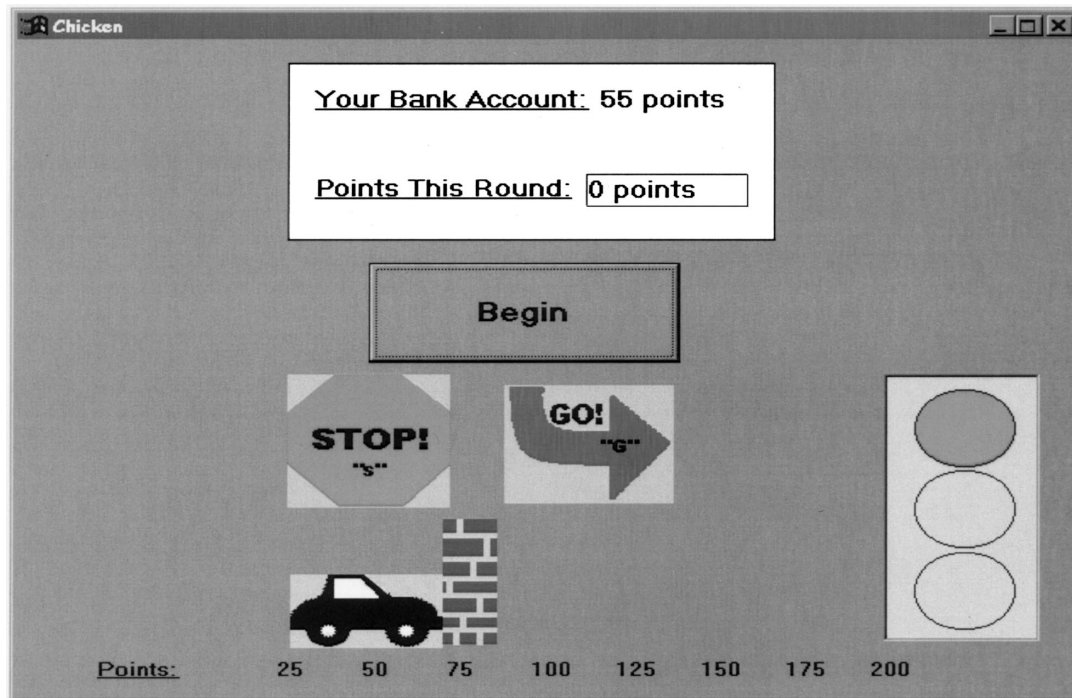


Figure 1. An image from the Chicken video game. In this frame, the traffic light has just turned red. The car was still moving when the light turned red; consequently, a brick wall appeared in front of the car, resulting in a crash.

lost any points that had been accumulated on that trial if the car crashed. If a player stopped the car before it crashed, the player had the option of restarting the car and allowing it to move further, or leaving the car where it was and accepting the amount of points accumulated. Thus, when the yellow light appeared, players had to decide how much further to allow the car to move, balancing their desire to accumulate points against the possibility of crashing the car into the wall. The latency between the beginning of the trial and the appearance of the yellow light, and between the appearance of the yellow light and the appearance of the wall varied across trials, such that the participants did not know whether the wall would appear suddenly or after some delay. The objectives of the game and the potential positive and negative outcomes (earning points vs. crashing and failing to accumulate points, respectively) were explained to participants during a demonstration. In order to ensure that all participants were equally familiar with the potential consequences of driving through a yellow traffic light, the demonstration round included a depiction of the animated car both driving safely through the yellow light without crashing, as well as driving through the yellow traffic light and crashing into the pop up wall.

The computer recorded the amount of time that the car was in motion between the onset of the yellow light and the car's final stop, as well as the number of car restarts per round. Mean scores for the number of car restarts per round, and the percentage of time the car was in motion were calculated for each participant. Longer moving times and more restarts indicated greater risk taking. Scores on these two indices of risk taking were highly correlated ($r = .61, p < .01$) and were therefore standardized and averaged in order to compute a composite indicator of risk taking on the Chicken game.

Participants in the sole participant condition completed the task as described. Participants in the group condition took turns playing the game, but all of them completed 15 trials in a row, as did participants in the sole participant condition. In the group condition, while one participant was

playing the game, the other two were told that they could call out advice about whether to allow the car to keep moving or to stop it. The player was instructed that he or she could choose whether to follow the advice of his or her peers.

Risk preference. A shortened, modified version of the Benthin Risk Perception Measure (BRPM; Benthin, Slovic, & Severson, 1993) was used to assess risk preference. This measure assesses both risk perception (the extent to which one perceives a given activity as carrying the potential for adverse consequences) and risk preference (whether one believes the benefits inherent in an activity outweigh the costs, or vice versa). Only data from the scale reflecting cost–benefit consideration are used in the present analyses. We chose not to include data from the risk perception scale because prior studies have failed to find age differences in performance on this scale (Steinberg, 2004). Similarly, evidence from the research of Beyth-Marom and colleagues (Beyth-Marom, Austin, Fischhoff, Palmgren, & Jacobs-Quadrel, 1993) suggests that adolescents and adults are relatively equal in terms of their awareness of the potential for adverse consequences in risky situations. However, as argued by Furby and Beyth-Marom (1992), adolescents and adults may differ in terms of the relative weights or values that they attach to the potential costs and benefits of risky activities. Studies of the relation between risk taking and cost versus benefit consideration suggest that those who give lesser consideration to costs and greater consideration to benefits are more likely to engage in risky behavior (e.g., Fromme, Stroot, & Kaplan, 1993; Goldberg & Fischhoff, 2000; Horvath & Zuckerman, 1993; Lavery, Siegel, Cousins, & Rubovits, 1993; McBride, Weatherby, Inciardi, & Gillespie, 1999; Singer, Dai, Weeks, & Malave, 1998; Thornton, Gibbons, & Gerrard, 2002). Thus, differential consideration or weighting of potential costs versus benefits among adolescents and adults may partially account for observed age differences in risky behavior.

In completing the Risk Preference Scale, participants were presented with five hypothetical scenarios involving risky behavior. These scenarios included having sex without a condom, riding in a car driven by someone

who has been drinking, trying a new drug that one does not know anything about, breaking into a store at night and stealing something that one really wants, and driving over 90 mph on the highway at night. They were then asked to rate on a 4-point scale ranging from 1 (*risks are much greater than benefits*) to 4 (*benefits are much greater than risks*) how the risks compared with the benefits of the activity. A mean risk–benefit consideration score was then calculated for each participant by averaging responses across the five scenarios ($\alpha = .68$).

Individuals in the sole participant condition read the scenarios from index cards and indicated their choices on a response card displaying the 4-point scale. Group condition participants followed the same procedure but were told that they could discuss each question. However, they were instructed that they need not reach a consensus and that each could make a final decision at any time. Each participant had his or her own set of response cards and had an unobstructed view of the others' response cards. The administrator recorded individuals' responses.

Risky decision making. Risky decision making was assessed via the Youth Decision-Making Questionnaire (YDMQ; Ford, Wentzel, Wood, Stevens, & Siesfeld, 1990). Participants were presented with five hypothetical dilemmas, each involving a risky decision. The dilemmas included decisions about allowing friends to bring drugs into one's home, stealing a car, cheating on an exam, shoplifting, and skipping work without an excuse, all of which adolescents, college undergraduates, and adults potentially could have done. Decisions about each dilemma were made within the context of three different scenarios. In the first scenario, participants were informed that no matter what their decision, no negative consequences would result. The second scenario—introduced by Cauffman and Steinberg (2000)—stated that negative consequences might result if the risky course of action were taken. The final scenario stated that negative consequences would definitely occur if the risky course of action were taken.

Only responses from the second decision-making scenario (i.e., negative consequences might result) were included in the analyses for the present study, as this was the only scenario that involved some degree of uncertainty or risk. For each dilemma, participants were asked to decide what they would do "if they were really in that situation" on a 4-point scale that ranged from 1 (*definitely making the risky decision*) to 4 (*definitely not making the risky decision*). Scores were reverse coded, such that higher scores indicated higher risk-taking tendencies. A mean risky decision-making score was calculated for each participant by averaging the scores across the five dilemmas ($\alpha = .65$).

The YDMQ was presented on a laptop computer. Individuals in the sole participant condition were asked to indicate their desired choices on cards displaying the 4-point response scale. Participants in the group condition followed the same procedure but were told that they could discuss each situation. They were also informed that they did not need to reach a consensus and that they could make a final decision at any time. Each group condition participant had his or her own set of response cards, and each had an unobstructed view of the others' cards. The administrator recorded participants' responses. Means, standard deviations, and intercorrelations among the study variables are presented in Table 1.

Results

Data Analyses

Because participants were recruited in groups of 3, scores for participants within each triad could not be treated as independent.⁴ In order to accommodate the nested structure of the data, all analyses were performed with the linear mixed model (LMM) procedure in the Statistical Package for Social Sciences 11.5 (SPSS; SPSS, Inc., 2005). Unlike the general linear model (GLM) procedure, which assumes that all observations are independent of one another, the LMM procedure allows for correlated variability

Table 1
Intercorrelations, Means, and Standard Deviations of Study Variables

Variable	1	2	3	4	<i>M</i>	<i>SD</i>
1. Chronological age	—	-.243**	-.279**	-.091	22.77	11.98
2. Risk taking (Chicken)		—	.147*	.127*	0.00	0.90
3. Risky decision making (YDMQ)			—	.331**	2.01	0.56
4. Risk preference (BRPM)				—	1.50	0.50

Note. YDMQ = Youth Decision-Making Questionnaire; BRPM = Benthin Risk Perception Measure.

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

among observations. Because the LMM procedure does not permit the simultaneous analysis of multiple dependent variables, separate LMM analyses were performed for each of the three dependent variables (Chicken, BRPM, YDMQ). Prior to entering the independent and dependent variables for each analysis, the structure of the data—individuals nested within triads—was specified. Then, for each analysis, chronological age was entered as a continuous independent variable, and condition (group vs. sole participant) was entered as a fixed factor. Additionally, gender and ethnicity (White vs. non-White) were entered as fixed variables in order to determine whether these variables moderated age, condition, or Age \times Condition effects.

Age differences in risk taking, risk preference, and risky decision making. The effect of chronological age on risk taking and risky decision making was significant, $F(1, 284) = 18.79$, $p < .0001$, $r_{\text{effect size}} = .249$, and, $F(1, 288) = 24.599$, $p < .0001$, $r_{\text{effect size}} = .281$, respectively. During the risk-taking game, younger individuals allowed the car to move forward for longer periods of time after the appearance of the yellow light and were more likely to restart the car after stopping it. Similarly, younger individuals were more likely than older participants to select the risky course of action on the risky decision-making questionnaire. The effect of chronological age on risk preference was not significant, however, $F(1, 288) = .563$, $p = .465$.

Effect of peer presence on risk taking, risk preference, and risky decision making. We found significant effects of peer presence on all three measures of risk orientation. Specifically, compared with those who completed the measures by themselves, participants who completed the same measures with peers present took more risks during the risk-taking game, $F(1, 284) = 15.05$, $p <$

⁴ The adolescent sole participants were not recruited in groups of 3. However, in order to structure the data from the three age groups as similarly as possible, triads of adolescent sole participants were created for purposes of data analyses. The adolescent sole participant sample was subdivided by data collection site and then further subdivided by gender, such that a female from a particular community center could only be grouped with another female from that same community center, or a male from a particular middle school could only be grouped with another male from that same middle school. This was done under the assumption that adolescents of the same gender from the same site would most likely know one another, thus making the triads of adolescent sole participants as similar to those of undergraduate and adult sole participant triads as possible.

.0001, $r_{\text{effect size}} = .224$; gave greater weight to the benefits rather than the costs of risky activities, $F(1, 288) = 3.662$, $p = .057$, $r_{\text{effect size}} = .112$; and were more likely to select risky courses of action in the risky decision-making situations, $F(1, 288) = 6.308$, $p < .05$, $r_{\text{effect size}} = .146$.

Differential effects of peer presence on risk taking, risk preference, and risky decision making as a function of age. The effects of peer presence varied as a function of age on the risk-taking measure, $F(1, 284) = 4.801$, $p < .05$, $r_{\text{effect size}} = .129$, and the risky decision-making measure, $F(1, 288) = 4.943$, $p < .05$, $r_{\text{effect size}} = .130$, but not on the Risk Preference Scale, $F(1, 293) = .284$, $p = .594$. As Figure 2 indicates, for example, the magnitude of the group effect on risk taking was greater among younger rather than older participants (see Table 2 for means and standard deviations). The pattern of results was similar with respect to risky decision making.

The Effects of Gender and Ethnicity

The effects of gender and ethnicity on risk orientation were not focal issues in the present study. Thus, no hypotheses on the effects of these variables were generated. Nonetheless, gender and ethnicity were included in the model in order to determine whether the age, condition, or Age \times Condition interaction effects differed across males and females, or between White and non-White individuals.

We found few significant gender effects. There were no differences between males and females on risk taking or risky decision making, nor were there any significant two-way interaction effects

involving gender on measures of these constructs. Additionally, we failed to find significant Age \times Condition \times Gender interactions on any measure of risk orientation. Nevertheless, we did find main effects of gender and gender differences in age and condition effects on the measure of risk preference. First, males gave significantly greater weight to the benefits of risky decisions than did females, $F(1, 288) = 19.961$, $p < .0001$, $r_{\text{effect size}} = .255$. Second, we found that males weighted the benefits of risky activities more heavily when in a group than when alone, but that cost-benefit consideration did not differ substantially between the group and sole participant conditions among females, $F(1, 288) = 6.058$, $p < .05$, $r_{\text{effect size}} = .144$. Finally, we found that among younger individuals, males weighted the benefits of risky decisions more heavily than did females but that among older individuals males and females gave comparable weights to the benefits of risky decisions, $F(1, 288) = 11.089$, $p < .01$, $r_{\text{effect size}} = .193$.

In contrast to these limited gender differences, a number of significant ethnicity effects were identified. First, we found significant differences between White and non-White participants on the measures of risk taking, $F(1, 284) = 11.67$, $p < .01$, $r_{\text{effect size}} = .199$, and risky decision making, $F(1, 288) = 6.645$, $p < .01$, $r_{\text{effect size}} = .150$. However, the direction of these effects differed. Although non-White participants engaged in greater risk taking than did White participants, White participants made more risky decisions than did non-White participants.

Second, the effects of age on risk taking, risky decision making, and risk preference differed across White and non-White individ-

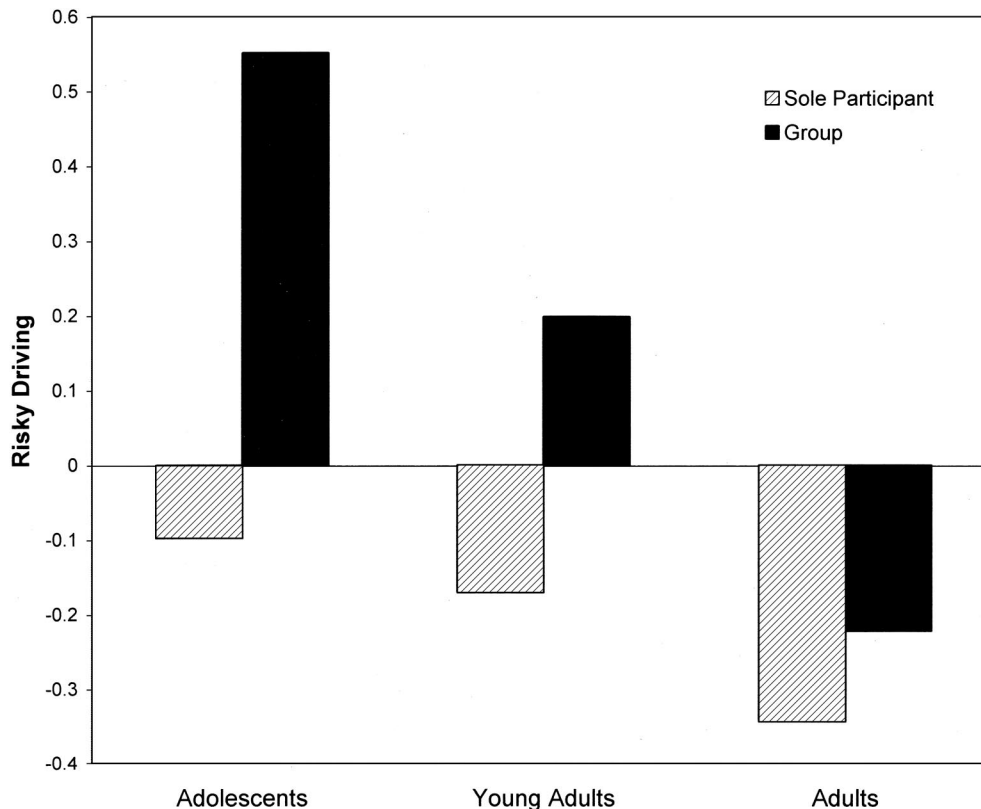


Figure 2. Age \times Condition interaction on Chicken game, where higher scores indicate more risk taking.

Table 2
Descriptive Statistics for Group and Sole Participant Conditions by Age Group

Age	Condition	White			Non-White			Total		
		<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>
Risk taking (Chicken)										
Adolescent	Sole	-.164	.612	22	-.035	.722	29	-.097	.669	52
	Group	.140	.886	25	.907	1.300	29	.552	1.182	54
Youth	Sole	-.258	.729	24	-.091	.666	27	-.170	.694	51
	Group	.139	.848	30	.289	.893	20	.199	.860	50
Adult	Sole	-.367	.387	22	-.316	.620	19	-.343	.502	41
	Group	-.080	.566	24	-.335	1.167	30	-.221	.949	54
Risky decision making (YDMQ)										
Adolescent	Sole	2.127	.511	22	1.862	.571	29	1.977	.551	52
	Group	2.072	.519	25	2.021	.522	29	2.044	.516	54
Youth	Sole	2.142	.564	24	2.074	.448	27	2.106	.502	51
	Group	2.506	.477	32	2.282	.358	22	2.428	.455	50
Adult	Sole	1.655	.339	22	1.962	.758	19	1.781	.581	41
	Group	1.625	.397	24	1.720	.497	30	1.678	.453	54
Risk preference (BRPM)										
Adolescent	Sole	1.391	.335	22	1.372	.286	29	1.385	.304	52
	Group	2.072	.519	25	2.021	.522	29	1.593	.764	54
Youth	Sole	2.142	.564	24	2.074	.448	27	1.451	.447	51
	Group	1.819	.600	32	1.555	.365	22	1.724	.536	50
Adult	Sole	1.427	.317	22	1.368	.354	19	1.400	.332	41
	Group	1.425	.355	24	1.393	.358	30	1.407	.354	54

Note. Chicken means are based on standardized scores. YDMQ = Youth Decision-Making Questionnaire; BRPM = Benthin Risk Perception Measure.

uals, $F(1, 284) = 9.03, p < .01, r_{\text{effect size}} = .176$; $F(1, 288) = 4.289, p < .05, r_{\text{effect size}} = .121$; and, $F(1, 288) = 3.922, p < .05, r_{\text{effect size}} = .116$, respectively (see Table 2). Overall, as noted earlier, adolescents and youths were more oriented toward risk than were adults (although the age effect on risk preference measure did not reach significance). However, within the age groups, risk taking, risk preference, and risky decision making varied somewhat as a function of ethnicity. For instance, although there were negligible differences between White and non-White adults in risk taking and risk preference, among adolescents non-White individuals took more risks and demonstrated a greater preference for risk than did White individuals. Conversely, whereas non-White adults were slightly more likely to make risky decisions than were White adults, White adolescents were slightly more likely to make risky decisions than were non-White adolescents.

Third, White and non-White participants differed in their response to peer presence on the measures of risk taking, $F(1, 284) = 4.383, p < .05, r_{\text{effect size}} = .123$, and risk preference, $F(1, 288) = 6.517, p < .05, r_{\text{effect size}} = .149$ (see Table 2). Peer presence was associated with greater risk taking and risk preference among both White and non-White participants. However, condition (group vs. sole participant) differences in mean risk-taking scores were greater among non-White than were those among White participants. On the risk-preference measure, effect sizes for condition differences mirrored this pattern ($r_{\text{effect sizes}} = .203$ and $.108$ for non-White and White participants, respectively).

However, effect size estimates indicated the opposite pattern for risk taking ($r_{\text{effect sizes}} = .196$ and $.233$ for non-White and White participants, respectively). Effect size estimates are reduced by variability, and although condition differences in mean risk taking were greater among non-White than White participants, scores among non-White participants were more variable (see Table 2 for standard deviations).

Finally, we found significant Age \times Condition \times Ethnicity interaction effects on risk taking, $F(1, 284) = 4.011, p < .05, r_{\text{effect size}} = .118$, and risk preference, $F(1, 288) = 5.961, p < .05, r_{\text{effect size}} = .142$; see Table 2). As noted earlier, peer presence had a greater impact on risk orientation among adolescents and youths than among adults (although the two-way Age \times Condition interaction for risk preference did not reach significance). However, the effects of peer presence on the risk-taking and risk-preference tendencies of individuals within some, but not all, of the age groups varied as a function of ethnicity. For instance, among adults, there were no differences between White and non-White participants in the effects of peer presence on risk preference. However, among adolescents, peer effects on risk preference were greater for non-White than for White participants. A similar pattern emerged on the risk-taking measure. That is, peer effects on risk taking were greater among non-White than among White adolescents. However, on this measure, peer effects on adult risk-taking tendencies were greater for White than for non-White participants (see Figure 3).

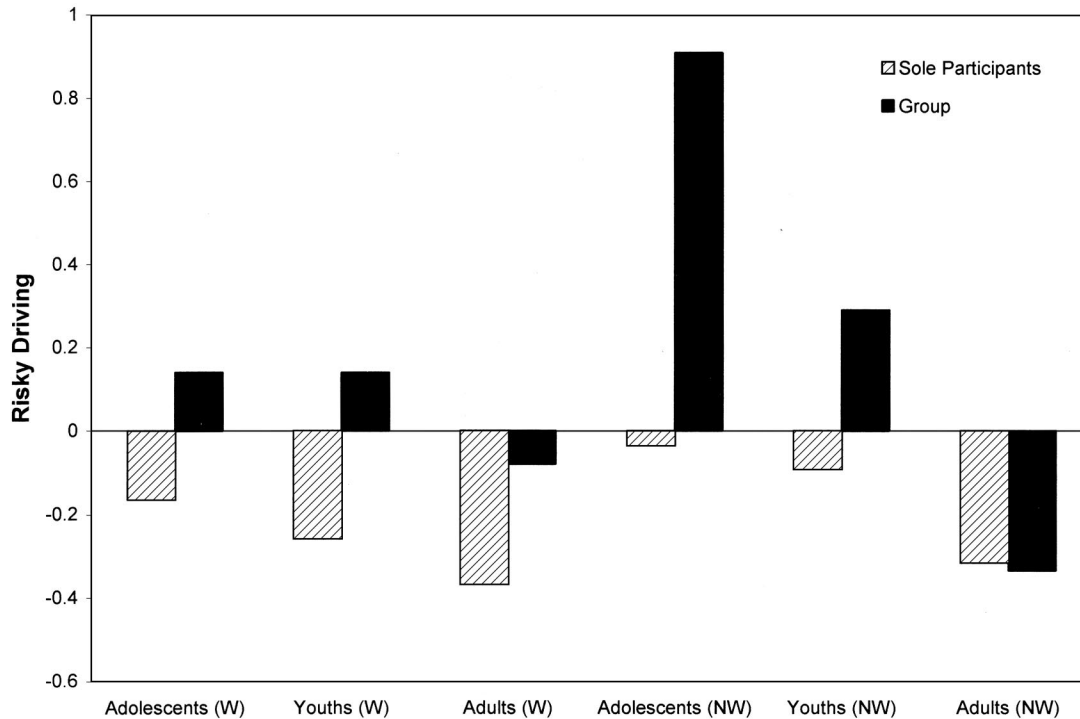


Figure 3. Age \times Condition \times Ethnicity Interaction on Chicken game, where higher scores indicate more risk taking. W = White participants; NW = non-White participants.

Discussion

Between adolescence and adulthood there is a significant decline in both risk taking and risky decision making. In addition, our findings suggest that, in some situations, individuals may take more risks, evaluate risky behavior more positively, and make more risky decisions when they are with their peers than when they are by themselves. Most importantly, the effects of peer presence on both risk taking and risky decision making vary as a function of age. That is, although the sample as a whole took more risks and made more risky decisions in groups than when alone, this effect was more pronounced during middle and late adolescence than during adulthood. Thus, relative to adults, adolescents are more susceptible to the influence of their peers in risky situations.

The methodological strengths of this study provide good reason to feel confident about the internal validity of the findings. First, as an experiment that uses random assignment, we were able to control individuals' exposure to peers. Second, whereas the only previous developmental comparison of peer effects on risk taking (Hensley, 1977) relied on a hypothetical decision-making questionnaire and used risk acceptance as a proxy for risk taking, the battery of measures in the present study included not only hypothetical decision-making questionnaires but also a behavioral measure of risk taking that required participants to make actual decisions about how much risk to take in a situation that closely mirrors one faced in everyday life—whether to “run” a yellow light and continue through an intersection. Third, the use of friends, or at least familiar individuals (in the case of the adolescents), helped to create a more ecologically valid social context

than those of many studies of group behavior (e.g., Vidmar, 1970; Wallach & Kogan, 1965; Yinon et al., 1975). Everyday group decision-making situations generally involve friends or acquaintances, and laboratory studies that do not use such groups may not capture the dynamics of real-life group decision making.

It is also necessary to recognize several of the study's limitations. First, although the driving game Chicken is a closer approximation to real-life risk-taking situations than are the typical decision-making questionnaires used in most research of this sort, no laboratory task can adequately simulate real life. No matter how realistic the task, it is difficult to determine whether participants' performance in the laboratory is an accurate representation of their real-world behavior.

Second, different recruitment procedures were used for the adolescents versus the youths and adults. The youths and adults came to the sessions in groups of 3 friends, but the adolescents were assigned to groups of 3 (although all groups of 3 were made up of individuals who were from the same classroom, camp, or community-center program, and who were familiar with one another). Thus, it is conceivable that the older individuals knew one another better than did the adolescents. However, we believe that differences in familiarity among the age groups were minimal and that any effects of peer familiarity of behavior resulted in a more conservative test of our central hypothesis (i.e., that, relative to adults, adolescents should be more easily swayed toward risky behavior by their friends). Although some contradictory findings do exist (e.g., Leary et al., 1994), there is evidence to suggest that the effects of peer familiarity on behavior may either be negligible,

or may be stronger when in the company of friends versus acquaintances or strangers. For example, in a study of impression management among young adults, Bohra and Pandey (1984) found very few differences in the attempts of participants to manage the impressions of friends versus strangers. Moreover, in the few cases in which differences were found (e.g., use of other enhancement strategies), interactions with friends were generally more likely to elicit the use of impression management strategies than were interactions with strangers. Similarly, Gardner and Martinko (1988) found that participants in a study of school principals were more likely to use impression management strategies (e.g., other enhancement, apologies) when interacting with more familiar, as opposed to less familiar, individuals. Finally, in a study that examined the relation between familiarity and willingness to exert peer pressure (both antisocial and prosocial) among adolescents, McPhee (1996) found that participants were more likely to exert pressure on friends than on acquaintances. Thus, if differences among the age groups in triad familiarity affected our results in any measurable way, we believe that the adolescent participants, who completed the battery of measures with acquaintances (as opposed to self-selected friends), should have demonstrated group induced shifts toward risk taking that were no greater than those observed among the adults. But, overall, this was not the case.

Finally, it is conceivable that members of the three age groups differed in their prior experience with the subject matter of the risk-orientation measures. Thus, age differences in performance on the risky decision-making and risk-taking measures might be construed as an artifact of differences between the age groups in prior experience. However, any differences in experience with the content of the risky decision-making questionnaire were likely limited to the individual dilemmas. Thus, although a given dilemma might have been relatively more familiar to a particular age group, overall, the items were balanced in such a way that no one age group should have been more familiar with all five dilemmas than any other age group. With respect to the risk-taking measure, *Chicken*, it is likely that the youths and adults had more first hand experience with driving than the adolescents. However, *Chicken* is a video game played from a third-person perspective not a driving simulation experienced from a first-person perspective. Although adolescents may have limited experience with driving, they have ample experience with video and computer games. Additionally, by adolescence, individuals have spent a great deal of time riding in cars and are surely familiar with the potential consequences of failing to follow traffic signals. Nonetheless, in order to ensure equal familiarity with the potential consequences of running a yellow light, all participants observed a demonstration round prior to playing the game in which they watched the animated car crash after running a yellow light. Thus, we believe that differences in first-hand driving experience had minimal impact on performance.

It is also important to note the few instances in which our hypotheses were not supported. Specifically, we failed to find significant age main effects or two-way Age \times Condition interaction effects on the risk preference measure. In conceptualizing the study, we assumed that those who gave greater weight to the benefits versus the costs of risky decisions should be more likely to take risks. As noted earlier, there are a number of studies that have found strong correlations between cost-benefit consideration and risk taking (e.g., Goldberg & Fischhoff, 2000; Horvath & Zuckerman, 1993; Thornton, Gibbons, & Gerrard, 2002). However,

the samples in these studies were composed primarily of adults, and there is some evidence to suggest that measures of risk preference may not predict risk taking in the same way among adolescents as among adults. Indeed, despite findings that adolescents are more likely than are adults to engage in risky behavior, several studies suggest that adolescents are relatively similar to adults in their ability to recognize the risks and benefits of their actions. For example, Beyth-Marom et al. (1993) found few differences between adolescents and adults in the spontaneous mention of the costs and benefits associated with several risky actions. This has prompted some to argue that age differences in risky behavior may be better accounted for by differences in psychosocial functioning than by differences in more cognitive aspects of risk orientation, such as risk preference (Cauffman, 1996; Cauffman & Steinberg, 2000; Steinberg & Cauffman, 1996). In this respect, our failure to find age-related differences in individuals' cost-benefit appraisals is not entirely surprising.

We did find some interesting gender differences in risk preference, however. Specifically, males, particularly at younger ages, were more likely than were females to weigh the benefits of risky activities over the costs. Additionally, peer effects on benefit versus cost consideration were greater among males than among females. Although we did not explicitly predict these gender differences, our findings are consistent with several previous studies. For instance, Parsons, Halkitis, Bimbi, and Borkowski (2000) found that, among young adults, males reported more benefits and fewer risks when asked about the consequences of risky behaviors. Additionally, Brown et al. (1986) found that, at least among adolescents, males are more susceptible to peer influence than are females in antisocial or risky situations. Nonetheless, it is interesting that these gender-related differences in risk-benefit consideration did not translate into gender differences on the more direct measures of risk taking or risky decision making.

We also found differences in risk orientation as a function of ethnicity. First, we found differences between White and non-White participants in risk taking, risk preference, and risky decision making—particularly among adolescents (ethnic differences in risk orientation among adults were small to negligible). However, the direction of these ethnic group differences varied across measures. Whereas non-White adolescents demonstrated greater risk taking and risk preference than did White adolescents, White adolescents demonstrated greater risky decision making than did non-White adolescents. This is not entirely surprising given that prior studies have identified differences in the direction of ethnicity effects for different risk behaviors. For example, there is evidence to suggest that minority adolescents (particularly African Americans) are more likely than are White adolescents to engage in risky sexual behavior (e.g., Koniak-Griffin & Brecht, 1995; Neumark-Sztainer et al., 1996; Santelli, Lowry, Brener, & Robin, 2000) and to participate in delinquent activities (e.g., Blum et al., 2000; Hawkins, Laub, & Lauritsen, 1998; Piquero & Buka, 2002). However, there is also evidence to suggest that White adolescents may take more risks than may non-White adolescents when substance use is the behavior of interest. Specifically, a number of studies have found that White adolescents engage in more alcohol and tobacco use than adolescents from many non-White ethnic groups (Best et al., 2001; Blum et al., 2000; Brannock, Schandler, & Oncley, 1990; Douglas & Collins, 1997). Accordingly, researchers studying adolescent risk taking must exercise caution in

asserting that ethnic group differences on particular risk measures reflect more general patterns of ethnic group differences in risk taking overall.

Second, we found that peer effects on risk orientation varied across ethnic groups. Specifically, we found that the effects of peer presence on risk preference were greater among non-White than among White participants. Though effect size estimates were not entirely consistent, inspection of mean scores suggests that the same pattern of ethnic group differences may also exist for risk taking. However, if it is, in fact, the case that non-White, relative to White, individuals are more susceptible to peer influence in risky situations, this ethnic group difference appears to be largely limited to adolescence. Although peer effects on risk taking and risk preference were greater among non-White than among White adolescents, non-White adults demonstrated levels of resistance to peer influence that were equal to or greater than those demonstrated by White adults. Though few studies have examined ethnic group differences in the development of resistance to peer influence, there is tentative evidence to support the finding that, relative to White adolescents, non-White adolescents may be more susceptible to the influence of others when in risky situations. For instance, Zimmerman, Sprecher, Langer, & Holloway (1995) found that African American and Hispanic adolescent females were slightly less confident in their ability to refuse unwanted sex than White adolescent females. However, to our knowledge, no prior research has directly examined the possibility that ethnic group differences in susceptibility to peer influence in risky situations may diminish as individuals move into adulthood. Thus, further research is necessary in order to both replicate and explain this finding.

In conclusion, it appears that differences in rates of group risk taking among adolescents versus adults are not simply the product of differences in the amount of time teenagers and adults spend with peers but are instead the result of age differences in individuals' orientation toward risky behavior when in the presence of friends. Moreover, our results suggest that the psychosocial capacities that undergird the ability to resist peer pressure may continue to develop throughout late adolescence and into early adulthood. Thus, interventions aimed at reducing risky behavior among adolescents and young adults—particularly those from ethnic minority groups—ought to focus some attention on increasing individuals' resistance to peer influence. For reasons not yet understood, the presence of peers makes adolescents and youth, but not adults, more likely to take risks and more likely to make risky decisions.

References

- Andrews, J. A., Tildesley, E., Hops, H., & Li, F. (2002). The influence of peers on young adult substance use. *Health Psychology, 21*, 349–357.
- Arnett, J. (1992). Reckless behavior in adolescence: A developmental perspective. *Developmental Review, 12*, 339–373.
- Benthin, A., Slovic, P., & Severson, H. (1993). A psychometric study of adolescent risk perception. *Journal of Adolescence, 16*, 153–168.
- Berndt, T. J. (1979). Developmental changes in conformity to peers and parents. *Developmental Psychology, 15*, 608–616.
- Best, D., Rawaf, S., Rowley, J., Floyd, K., Manning, V., & Strang, J. (2001). Ethnic and gender differences in drinking and smoking among London adolescents. *Ethnicity & Health, 6*, 51–57.
- 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.
- Blascovich, J., & Ginsburg, G. P. (1974). Risky shifts and gambling: What's at stake? *Personality and Social Psychology Bulletin, 1*, 246–248.
- Blascovich, J., Ginsburg, G. P., & Howe, R. C. (1975). Blackjack and the risky shift, II: Monetary stakes. *Journal of Experimental Social Psychology, 11*, 224–232.
- Blascovich, J., Veach, T. L., & Ginsburg, G. P. (1973). Blackjack and the risky shift. *Sociometry, 36*, 42–55.
- Blum, R. W., Beuhring, T., Shew, M. L., Bearinger, L. H., Sieving, R. E., & Resnick, M. D. (2000). The effects of race/ethnicity, income, and family structure on adolescent risk behaviors. *American Journal of Public Health, 90*, 1879–1884.
- Bohra, K. A., & Pandey, J. (1984). Ingratiation toward strangers, friends, and bosses. *The Journal of Social Psychology, 122*, 217–222.
- Brannock, J. C., Schandler, S. L., & Oncley, P. R. (1990). Cross-cultural and cognitive factors examined in groups of adolescent drinkers. *Journal of Drug Issues, 20*, 427–442.
- Brown, B. (2004). Adolescents' relationships with peers. In R. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (2nd ed., pp. 363–394). New York: Wiley.
- Brown, B. B., Clasen, D. R., & Eicher, S. A. (1986). Perceptions of peer pressure, peer conformity dispositions, and self-reported behavior among adolescents. *Developmental Psychology, 22*, 521–530.
- Cauffman, E. (1996). Maturity of judgment: Psychosocial factors in adolescent decision making (Doctoral dissertation, Temple University, 1986). *Dissertation Abstracts International, 57*(9-B), 5943.
- Cauffman, E., & Steinberg, L. (2000). Researching adolescents' judgment and culpability. In T. Grisso & R. G. Schwartz (Eds.), *Youth on trial: A developmental perspective on juvenile justice* (pp. 325–343). Chicago: The University of Chicago.
- Cohen, S. L., & Ruis, C. B. (1974). Wary shift or risky shift? *Bulletin of the Psychonomic Society, 3*, 214–216.
- Douglas, K. A., & Collins, J. L. (1997). Results from the 1995 National College Risk Behavior Survey. *Journal of American College Health, 46*, 55–66.
- Erickson, M., & Jensen, G. F. (1977). Delinquency is still a group behavior! Toward revitalizing the group premise of the sociology of deviance. *Journal of Criminal Law and Criminology, 68*, 262–273.
- Fischhoff, B. (1992). Risk taking: A developmental perspective. In J. F. Yates (Ed.), *Risk Taking Behavior* (pp. 133–162). Oxford, England: Wiley.
- Ford, M., Wentzel, K., Wood, D., Stevens, E., & Siesfeld, G. A. (1990). Processes associated with integrative social competence: Emotional and contextual influences on adolescent social responsibility. *Journal of Adolescent Research, 4*, 405–425.
- Fromme, K., Stroot, E., & Kaplan, D. (1993). The Comprehensive Effects of Alcohol questionnaire: Development and psychometric evaluation of a new expectancy questionnaire. *Psychological Assessment, 5*, 19–26.
- Furby, L., & Beyth-Marom, R. (1992). Risk taking in adolescence: A decision-making perspective. *Developmental Review, 12*, 1–44.
- Gardner, W. L., & Martinko, M. J. (1988). Impression management: An observational study linking audience characteristics with verbal self-presentations. *Academy of Management Journal, 31*, 42–65.
- Goldberg, J., & Fischhoff, B. (2000). The long-term risks in the short-term benefits: Perceptions of potentially addictive activities. *Health Psychology, 19*, 299–303.
- Hawkins, D. F., Laub, J. H., & Lauritsen, J. L. (1998). Race, ethnicity, and serious juvenile offending. In R. Loeber & D. P. Farrington (Eds.), *Serious and violent juvenile offenders: Risk factors and successful interventions* (pg. 30–46). Thousand Oaks, CA: Sage
- Hensley, W. E. (1977). Probability, personality, age, and risk taking. *The Journal of Psychology, 95*, 139–145.
- Hogg, M. A., Turner, J. C., & Davidson, B. (1990). Polarized norms and

- social frames of reference: A test of the self-categorization theory of group polarization. *Basic & Applied Social Psychology*, *11*, 77–100.
- Horvath, P., & Zuckerman, M. (1993). Sensation seeking, risk appraisal, and risky behavior. *Personality and Individual Differences*, *14*, 41–52.
- Kogan, N., & Wallach, M. A. (1967). Group risk taking as a function of members' anxiety and defensiveness levels. *Journal of Personality*, *35*, 50–63.
- Koniak-Griffin, D., & Brecht, M. (1995). Linkages between sexual risk taking, substance use, and AIDS knowledge among pregnant adolescents and young mothers. *Nursing Research*, *44*, 340–346.
- Lamm, H. (1967). Will an observer advise higher risk taking after hearing a discussion of the decision problem? *Journal of Personality and Social Psychology*, *6*, 467–471.
- Lamm, H., Trommsdorff, G., & Rost-Schaude, E. (1972). Self-image, perception of peers' risk acceptance and risky shift. *European Journal of Social Psychology*, *2*, 255–272.
- Lavery, B., Siegel, A. W., Cousins, J. H., & Rubovitz, D. S. (1993). Adolescent risk taking: An analysis of problem behavior in problem children. *Journal of Experimental Child Psychology*, *55*, 277–294.
- Leary, M. R., Nezlek, J. B., Downs, D., Radford-Davenport, J., Martin, J., & McMullen, A. (1994). Self-presentation in everyday interactions: Effects of target familiarity and gender composition. *Journal of Personality and Social Psychology*, *67*, 664–673.
- McBride, D. C., Weatherby, N. L., Inciardi, J. A., & Gillespie, S. A. (1999). AIDS susceptibility in a migrant population: Perception and behavior. *Substance Use and Misuse*, *34*, 633–652.
- McPhee, J. H. (1996). Influence strategies in young adolescent dyads. *Dissertation Abstracts International*, *57*(02), 1468B.
- Neumark-Sztainer, D., Story, M., French, S., Cassuto, N., Jacobs, D. R., & Resnick, M. D. (1996). Patterns of health-compromising behaviors among Minnesota adolescents: Sociodemographic variations. *American Journal of Public Health*, *86*, 1599–1606.
- Parsons, J. T., Halkitis, P. N., Bimbi, D., & Borkowski, T. (2000). Perceptions of the benefits and costs associated with condom use and unprotected sex among late adolescent college students. *Journal of Adolescence*, *23*, 377–391.
- Pilkonis, P. A., & Zanna, M. P. (1973). The choice-shift phenomenon in groups: Replication and extension. *Representative Research in Social Psychology*, *4*, 36–47.
- Piquero, A. R., & Buka, S. L. (2002). Linking juvenile and adult patterns of criminal activity in the Providence cohort of the National Collaborative Perinatal Project. *Journal of Criminal Justice*, *30*, 259–272.
- Pruitt, D. G., & Teger, A. I. (1969). The risky shift in group betting. *Journal of Experimental Social Psychology*, *5*, 115–126.
- Santelli, J. S., Lowry, R., Brener, N. D., & Robin, L. (2000). The association of sexual behaviors with socioeconomic status, family structure, and race/ethnicity among US adolescents. *American Journal of Public Health*, *90*, 1582–1588.
- Scott, E., Reppucci, N. D., & Woolard, J. (1995). Evaluating adolescent decisionmaking in legal contexts. *Law and Human Behavior*, *19*, 221–244.
- Sheldrick, R. C. (2004). Social networks and degree of psychopathy among adolescent offenders (Doctoral dissertation, Temple University, 1990). *Dissertation Abstracts International*, *65*(3-B), 1564.
- Singer, M., Dai, H., Weeks, M. R., & Malave, D. (1998). AIDS risk perception among women drug users in Hartford, CT. *Women, Drug Use, and HIV Infection*, *27*, 67–85.
- SPSS, Incorporated. (2005). Linear mixed-effects modeling in SPSS: An introduction to the MIXED procedure (LMEMWP-0305). Chicago, IL: Author.
- Steinberg, L. (2004). Risk taking in adolescence: What changes, and why? *Annals of the New York Academy of Sciences*, *1021*, 51–58.
- Steinberg, L., & Cauffman, E. (1996). Maturity of judgment in adolescence: Psychosocial factors in adolescent decision making. *Law and Human Behavior*, *20*, 249–272.
- Steinberg, L., & Scott, E. (2003). Less guilty by reason of adolescence: Developmental immaturity, diminished responsibility, and the juvenile death penalty. *American Psychologist*, *58*, 1009–1018.
- Steinberg, L., & Silverberg, S. B. (1986). The vicissitudes of autonomy in early adolescence. *Child Development*, *57*, 841–851.
- Thorton, B., Gibbons, F. X., & Gerrard, M. (2002). Risk perception and prototype perception: Independent processes predicting risk behavior. *Personality and Social Psychology Bulletin*, *28*, 986–999.
- Vidmar, N. (1970). Group composition. *Journal of Experimental Social Psychology*, *6*, 153–166.
- Vinokur, A. (1971). Review and theoretical analysis of the effects of group processes upon individual and group decisions involving risk. *Psychological Bulletin*, *76*, 231–250.
- Wallach, M. A., & Kogan, N. (1965). The roles of information, discussion, and consensus in group risk taking. *Journal of Experimental Social Psychology*, *1*, 1–19.
- Yinon, Y., Jaffe, Y., & Feshbach, S. (1975). Risky aggression in individuals and groups. *Journal of Personality and Social Psychology*, *31*, 808–815.
- Zaleska, M. (1974). The effects of discussion on group and individual choices among bets. *European Journal of Social Psychology*, *4*, 229–250.
- Zimmerman, R. S., Sprecher, S., Langer, L. S., & Holloway, C. D. (1995). Adolescents' perceived ability to say "no" to unwanted sex. *Journal of Adolescent Research*, *10*, 383–399.
- Zimring, F. E. (1998). *American youth violence*. Oxford, England: Oxford University Press.

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