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# Cultural Bases of Risk Behavior: Danish Adolescents

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ARNETT, JEFFREY, and BALLE-JENSEN, LENE. *Cultural Bases of Risk Behavior: Danish Adolescents*. CHILD DEVELOPMENT, 1993, 64, 1842–1855. Risk behavior was investigated among 1,053 Danish adolescents aged 12–20. Driving a car while intoxicated was rare even among the oldest adolescents, but riding a bicycle while intoxicated was reported by the majority of adolescents aged 14–20. Driving a car at high speeds was widespread among the oldest adolescents (aged 18–20), but still lower than rates reported for same-age American adolescents. Rates of sex without contraception were higher than expected, in spite of early and extensive sex education, while rates of illegal drug use other than marijuana were extremely low. Participation in risk behavior was analyzed in relation to sensation seeking, city size, and various family variables. Results are discussed in the context of the theory of broad and narrow socialization, in which a cultural and multidimensional understanding of socialization is emphasized.

*Cultural bases of risk behavior: Danish adolescents.*—In recent years, numerous studies have been conducted on adolescent risk behavior. In addition to many studies focusing on a particular area of risk behavior, such as automobile driving, sexual behavior, or drug use, studies have been conducted on multiple risk behavior (e.g., Arnett, 1989; Elster, Ketterlinus, & Lamb, 1989; Jessor, 1987; Steinberg, Mounts, Lamborn, & Dornbusch, 1991). These studies have established that various types of risk behavior tend to be correlated, and have investigated the common basis that underlies them. That common basis has been found to include sensation seeking (Arnett, 1989; Jessor, 1987), living in an urban environment (Elster et al., 1989), and a low level of parental rules and monitoring (Steinberg et al., 1991). With rare exceptions (e.g., Feldman, Rosenthal, Mont-Reynaud, Leung, & Lau, 1991), studies in this area have been concerned solely with the characteristics that make some adolescents within the majority culture of the United States more likely to participate in risk behavior than other adoles-

cents in that culture. There have been few cross-cultural studies, and few studies that consider the socialization patterns of a culture as a whole that allow or inhibit adolescent risk behavior.

The theory of broad and narrow socialization (Arnett, 1992a, 1992b) provides a cultural perspective for examining adolescent risk behavior. In this theory, the socialization environment is described as having seven different dimensions: family, peers, school, neighborhood/community, the legal system, the media, and the cultural belief system. As applied to risk behavior, the theory suggests that certain developmental characteristics, mainly sensation seeking and egocentrism, make risk behavior more likely in adolescence than at other ages, and that the extent and form of the expression of these characteristics as risk behavior depend on the restrictiveness of the socialization environment. For a population of adolescents, the combined extent to which the dimensions of socialization restrict or allow the expression of these tendencies as risk behavior

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determines the prevalence of risk behavior. However, it is recognized that individual differences exist among adolescents in the strength of the developmental tendencies—sensation seeking, egocentrism, etc.—that might lead to risk behavior.

Sensation seeking is one of the developmental contributors to risk behavior (Arnett, 1992a), and it is the developmental characteristic of interest in the present study. It can be described as the degree of novelty and intensity of sensation and experience a person prefers (Zuckerman, 1979). For a person high in sensation seeking, an experience involving a high level of novelty and intensity is likely to be pleasurable, while for a person low in sensation seeking a similar experience would be aversive.

Sensation seeking is highest in adolescence (Zuckerman, Eysenck, & Eysenck, 1978), and part of the appeal of risk behavior for adolescents who take part in it is that it has the quality of being high in novelty and intensity. Driving a car at high speeds is attractive by virtue of the intensity of the experience, and there may be an attraction in the novelty of it, compared to ordinary experience (Zuckerman & Neeb, 1980). Sexual activity involves sensations that are intense and, for adolescents, novel as well; risky and unusual sexual experiences are still higher in novelty and intensity (Arnett, 1990a; Zuckerman, Tushup, & Fenner, 1976). Trying illegal drugs results in novel forms of consciousness, so that some adolescents wish to try them “to see what it would be like” (Levine & Kozak, 1979). The alterations in consciousness and psychomotor functioning that accompany alcohol use are also novel for adolescents, and in this sense sensation seeking contributes to alcohol-related risk behavior such as driving a vehicle while intoxicated (Arnett, 1990b). Pervasive forms of adolescent criminality such as minor theft and vandalism possess the experiential quality of intensity, arising from the danger of being apprehended in the act of committing such offenses (Katz, 1982).

Although individual differences in the strength of the sensation seeking tendency are considered to exist inherently (Zuckerman, 1979), these tendencies are not invulnerable to socialization. On the contrary, it is the socialization environment that determines the extent to which individual differences are expressed, for sensation seeking as well as for other characteristics. In cultures characterized by *broad socialization*, indi-

vidualism and independence are promoted, and there is relatively less restrictiveness on the various dimensions of socialization. This allows for a broad range of expression of individual differences on the developmental tendencies (such as sensation seeking) that contribute to risk behavior, and leads to higher rates of risk behavior. Cultures characterized by *narrow socialization*, in contrast, consider obedience and conformity to the standards and expectations of the community to be paramount (enforced through the parents and the school as well as through members of the community), and punish physically and/or socially any deviation from the norm. The result is greater obedience and conformity, a narrower range of expression of individual differences, and low rates of antisocial adolescent risk behavior (although risk-taking tendencies may be directed by such cultures into avenues that serve a culturally approved purpose, such as warfare). Most cultures are not pure forms of one or the other type of socialization, but relatively broad on some dimensions and relatively narrow on others.

The present study took place in Denmark, and is intended to examine the cultural bases of the interaction between socialization and adolescent risk behavior. Denmark consists of two larger islands (Fyn and Sjælland), numerous smaller islands, and a peninsula (Jylland) extending from northern Germany. The population is relatively small (about 5 million) and largely homogeneous. The system of high taxes and extensive social services has resulted in a very large middle class, with only a small percentage of persons at the extreme of wealth and virtually no poverty (Danmarks Statistik, 1991, Table 198).

Denmark, like most cultures of the West, tends toward broad socialization. In general, parents make few rules governing adolescents' behavior; in a study by Kandel and Lesser (1972) comparing Danish and American adolescents, less than half of the Danish adolescents aged 16–18 reported that their parents had even two rules prohibiting or restricting their behavior. The legal age for purchasing alcohol is relatively low, age 18. The level of religiosity is very low, and churches are rarely attended except on holidays and special events (Danmarks Statistik, 1991, Table 107). The media are pervasive in many forms, including television, music, magazines, and newspapers, and generally promote impulse gratification, though not to the same extent as in the United

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States—there are no commercials on the popular television station subsidized by the government, and no billboards.

One exception to this pattern of broad socialization is on the legal dimension, in particular, for automobile driving. The legal age for driving an automobile is 18, which is higher than in the United States and Canada, and even at that age adolescents are unlikely to have regular access to an automobile (the number of cars per capita is less than half the number per capita in the United States; Danmarks Statistik, 1991, Table 486). However, the legal age for driving a moped is lower (age 16) than for automobile driving.

A few other facts are worth mentioning for what they imply about the socialization environment in Denmark. Denmark has one moderately large city (metropolitan Copenhagen, with a population of about 1 million), three mid-size cities (population 100,000–150,000), and many small towns. Over four-fifths of the people live in cities with a population of less than 50,000 (Danmarks Statistik, 1991, Table 41). This means that most children growing up in Denmark live in a town small enough for them to know many of the people living in it and to be familiar with all of its streets and shops. Also, the small overall size of the country means that friends and relatives living in any part of the country can be visited in less than a day's drive or train ride. Since sexual behavior was of interest in this study, it is also important to mention that school-based sex education takes place nationwide, so that by seventh or eighth grade children have been taught not just about the reproductive process but about types of contraception and their use.

A number of hypotheses for the study were suggested by the theory of broad and narrow socialization. The focus in this study was on three of the seven dimensions of socialization: family, neighborhood/community, and the legal system. It was expected that:

1. Sensation seeking would be positively related to adolescents' participation in risk behavior.

2. Parental monitoring and parental strictness would both be negatively related to adolescents' participation in risk behavior.

3. Rates of risk behavior would be positively related to city size, because the level

of monitoring by parents and neighbors and the level of attachment to the community would both be expected to be lower in larger cities than in smaller.

4. Driving an automobile at high speeds or while drunk would be rare because the legal driving age is 18. Even after age 18, rates of these types of driving-related risk behavior were expected to be lower than for American adolescents, because of the likelihood that most 18–20-year-old Danish adolescents would not have regular access to an automobile.

5. Because the legal age for driving a moped is lower (age 16) than the legal age for driving an automobile (age 18), rates of driving a moped at high speeds or while intoxicated would be higher for adolescents aged 16–17 than rates of driving an automobile at high speeds or while intoxicated. For adolescents below age 16, it was expected that driving a bicycle while intoxicated would be more prevalent than driving a moped or an automobile while intoxicated.

6. In the area of sexual behavior, rates of having sex without contraception would be lower than rates reported for American adolescents, because of the knowledge of contraception that all Danish adolescents can be presumed to have as a result of their sex education programs and because of the ease of obtaining contraception in Denmark.

7. Boys would have higher rates of risk behavior than girls, and older adolescents higher rates than younger adolescents, corresponding to differences that have been found in other countries.

A brief note on terminology. This area of research has been referred to by many different terms, including problem behavior (Jessor & Jessor, 1977), reckless behavior (Arnett, 1992a, 1992b), and delinquency (Rutter & Giller, 1984). Here, the term risk behavior is used (Jessor, 1992), to include a wider range of behavior (e.g., cigarette smoking) than has typically been designated as reckless behavior or delinquency.

### Method

*Subjects.*—The subjects were 1,053 Danish adolescents aged 12–20, in nine schools. There were 499 boys and 554 girls, with roughly even numbers of boys and girls at each age (see Table 1). Three schools were sampled in each of three cities, one

large city (Copenhagen), one mid-size (Odense), and one small (Varde), for a total of nine schools. The three cities were selected to represent the three main regions of the country. One of the three schools in each city was for students aged 12–15 (*Folkeskole*), while the other two were for students aged 16–20. Of the two schools in each city for the older children, one was a *Gymnasium*, or college and professional preparatory school, and the other was a *Handelsskole*, or trade and business preparatory school.

*Procedure.*—All students present on the day data collection took place in the various classes of the various schools were invited to participate in the study. The participation rate was 99%. Students were asked to complete the measures described below as well as a questionnaire concerning demographic information. The measures had been translated from English to Danish by the second author (who is a native Danish speaker and is also fluent in English), and piloted in Denmark prior to the study to ensure that the translation was comprehensible to students. The questionnaires took about 45 min to complete.

*Measures.*—Adolescent risk behavior was measured using a 16-item questionnaire developed by the first author and used in previous studies (see Table 1 for the items). On this scale adolescents reported the number of times they had engaged in a variety of risk activities over the past year, including driving-related behavior (bicycle, moped, and automobile), sexual behavior, various kinds of drug use, shoplifting, and vandalism. Responses were structured into ranges originally established on the basis of pilot testing on a suburban (American) high school population: 0, 1–5, 6–10, 11–20, more than 20. However, because of statistical considerations (see Results), responses were dichotomized in all analyses as to whether the subject had or had not participated in that behavior during the past year. Three month test-retest reliabilities have been found to average over .80 for the items on the scale.

Sensation seeking was measured using Form V of the Sensation Seeking Scale (SSS; Zuckerman et al., 1978). The scale has 40 items, with four subscales of 10 items each: Thrill and Adventure Seeking, Disinhibition, Experience Seeking, and Boredom Susceptibility. The format of the scale is forced-choice for each item. The items on the

subscales were established through factor analysis. Internal reliabilities for the total scale have been found to range from .83 to .86. Reliabilities established for the subscales range from .56 to .82. For the present study, only the total scale score was used. In all analyses, items related to the behavior of interest in the analysis were deleted prior to analysis. For example, for the analyses concerning the relation between sensation seeking and alcohol-related behavior, items on the SSS concerning attitudes toward the use of alcohol were deleted.

Relationships to parents were examined using the Family Relationships subscale of the Offer Self-Image Questionnaire (OSIQ; Offer, Ostrov, & Howard, 1982). For each of the 19 items on the subscale, subjects responded on a six-point scale (from 1 = describes me very well to 6 = does not describe me at all). Internal reliability for the subscale has been found to be .83. The validity of the scale has been demonstrated in a wide variety of studies (Offer et al., 1982), on samples including adolescents in a suburban high school, adolescents in a program for “gifted” children, and in-patient psychiatrically disturbed adolescents.

Adolescents’ perceptions of parental strictness and monitoring were evaluated using two 14-item scales. For each scale, seven items concerned the mother and seven concerned the father. The items for the scale on parental strictness each began, “How strict is your mother/father with regard to\_\_\_\_\_” followed by various specific areas, including how well the adolescent does in school, who the adolescent’s friends are, and the adolescent’s participation in drinking, cigarette smoking, marijuana smoking, and sexual activity. Response categories were 1 = very strict, 2 = moderately strict, 3 = somewhat strict, 4 = a little strict, and 5 = not at all strict. The items for the scale on parental monitoring asked about the same topics, preceded by, “How much does your mother/father know about\_\_\_\_\_.” Response categories were 1 = always knows, 2 = usually knows, 3 = sometimes knows, 4 = seldom knows, and 5 = never knows. The scales were based directly on items in the parental authority–directiveness dimension in Baumrind’s (1978, 1979) parental behavior Q-sort. The forms of the scales used in the present study have been developed and used in a previous study as measures of parental strictness and monitoring (Hetherington et al., 1992), and adequate reliability and validity were demonstrated in that study.

TABLE 1  
PREVALENCE OF RISK BEHAVIOR (in Percentages)

TYPE OF BEHAVIOR	AGE							
	12-13		14-15		16-17		18-20	
	Boys (49)	Girls (62)	Boys (114)	Girls (117)	Boys (180)	Girls (210)	Boys (156)	Girls (165)
Riding bicycle while intoxicated .....	18	13	56	52	77	61	76	63
Driving moped while intoxicated .....	6	2	16	8	35	10	25	4
Driving automobile while intoxicated .....	0	0	0	0	7	2	15	8
Driving moped >30 kmh over limit .....	18	2	23	9	37	10	25	4
Driving car >30 kmh over limit .....	0	0	15	7	16	4	60	38
Driving car >130 kmh .....	0	0	0	0	12	5	58	31
Sex without contraception .....	4	2	4	12	25	20	42	34
Sex with contraception .....	2	3	14	15	53	43	65	75
Sex with someone known only casually .....	6	2	11	5	26	23	39	31
Marijuana use .....	12	10	22	13	33	22	32	24
Heavy marijuana use .....	2	2	7	3	13	9	9	5
Cocaine use .....	2	0	0	0	0	1	1	2
Other drug use .....	4	0	1	1	3	1	4	3
Cigarette dependency .....	6	5	18	18	23	18	19	33
Shoplifting .....	14	5	21	16	25	14	17	11
Vandalism .....	18	5	33	12	38	14	34	10

NOTE.—Figures indicate percentage of adolescents who reported participating in each behavior at least once during the past year, except for cigarette dependency and heavy marijuana use. Cigarette dependency was defined as having smoked cigarettes on at least 20 days during the past month. Heavy marijuana use was defined as at least 10 times in the past year.

## Results

*Prevalence rates of risk behavior.*—Table 1 shows the percentage of Danish adolescents who reported participating in various types of risk behavior during the past year. (In this section, age and gender differences are noted only if found to be significant in the logistic regression analyses that follow [see Table 2].) In the area of vehicle-related risk behavior, driving a bicycle while intoxicated was more prevalent than driving either a moped or an automobile while intoxicated, at all ages and for both boys and girls. Among 16–20-year-olds, three-fourths of boys and nearly two-thirds of girls reported riding a bicycle while intoxicated at least once in the past year. In contrast, the percentage of adolescents who had driven a car while intoxicated at least once in the past year was very low (0%–15%), even for adolescents who had reached the legal driving age as well as the legal drinking age (i.e., adolescents aged 18–20). Driving a moped at high speeds (>30 kmh over the speed limit) or while intoxicated was more prevalent among boys than among girls, and was highest among 16–17-year-old boys. Driving a car at high speeds was relatively rare below age 18, but rose substantially among adolescents of legal driving age (18–20-year-olds), especially boys.

In the area of sexual behavior, the prevalence of sex without contraception increased with age, and prevalence rates were similar for boys and girls. Sex *with* contraception does not involve risk to the same extent as the other types of behavior considered in the study, but the prevalence rates are presented here for the purpose of putting sex without contraception in the context of the overall prevalence of sexual activity among Danish adolescents. Sex with contraception was reported to be more prevalent than sex without contraception among all age groups except the youngest. Adolescents who were sexually active tended to report having sex both with and without contraception: 83% of those who had had sex *without* contraception had also had sex *with* contraception. The prevalence rate of sex with someone known only casually also rose with age, and was similar for boys and girls. Adolescents who reported having sex with someone known only casually also tended to report having sex without contraception: 58% of adolescents who had had sex with someone known only casually also reported having had sex without contraception.

Marijuana use was more common among older adolescents (aged 16–20) than among younger (aged 12–15). Among 16–20-year-olds, about one-third of boys and one-fourth of girls reported using marijuana at least once in the past year. The prevalence of cigarette dependency increased beyond age 12–13, reaching a high of 33% among the oldest (18–20-year-old) girls. Use of illegal drugs other than marijuana was almost nonexistent among adolescents of any age or gender.

Shoplifting varied little according to age. Significantly more boys than girls reported shoplifting. Vandalism was also more prevalent among boys than among girls.

*Factors related to risk behavior.*—To examine the factors underlying reckless behavior, hierarchical logistic regression analyses were conducted (Table 2). The variables concerning cocaine use and “other illegal drug use” were not included in these analyses because the prevalence rates for these types of risk behavior were extremely low. For all analyses, only findings of  $p < .01$  or stronger were reported as significant, in view of the large sample size and the number of analyses conducted.

The risk behavior variables were dichotomized according to whether the adolescent had or had not engaged in that behavior during the time specified. This procedure was utilized because logistic regression requires a dichotomous dependent variable, and logistic regression was necessary because the frequencies of many of the risk behavior variables did not approach a normal distribution, as required for ordinary linear regression analyses.

In the first step of the regression analyses, four demographic variables were entered: age (12–13, 14–15, 16–17, and 18–20), gender, city size (small, medium, or large), and family type (intact, divorced, step). For each of these variables, a priori contrasts were set up comparing the various subgroups. For age, the first contrast compared 12–13-year-olds to 14–15-year-olds, the second contrast compared 14–15-year-olds to 16–17-year-olds, and the third contrast compared 16–17-year-olds to 18–20-year-olds. For city size, the first contrast compared adolescents in the small city to adolescents in the mid-size city, and the second contrast compared adolescents in the mid-size city to those in the large city. For family type, the first contrast compared adolescents from in-

TABLE 2

## LOGISTIC REGRESSION ANALYSES WITH VARIABLES PREDICTED TO BE RELATED TO RISK BEHAVIOR

TYPE OF RISK BEHAVIOR	AGE			Gender	CITY SIZE		FAMILY TYPE		Sensation Seeking	Family Relationships	Parental Monitoring	Parental Strictness
	12-13/ 14-15	14-15/ 16-17	16-17/ 18-20		Small/ Med.	Med./ Large	Intact/ Div.	Div./ Step				
Odds Ratio												
Riding bicycle while intoxicated .....	.15***	.51**	.99	.57***	.73	1.21	1.01	.84	1.15***	1.00	1.05***	1.00
Driving moped while intoxicated .....	.29	.44*	1.76*	.20***	1.12	1.15	1.09	.92	1.09***	1.00	1.03*	.99
Driving automobile while intoxicated .....	1.10	.18	.36*	.38**	.73	1.25	.89	1.08	1.07	1.01	1.03	.98
Driving moped >30 kmh over speed limit .....	.57	.56	2.40**	.19***	.85	1.35	.88	1.33	1.07**	1.00	1.01	.99
Driving car >30 kmh over speed limit .....	.56	.56	.10***	.34***	.97	1.12	2.43*	.55	1.05	1.00	1.01	1.00
Driving car >130 kmh .....	.47	1.19	.09***	.33***	1.05	1.28	2.07	.52	1.02	1.00	1.00	.99
Sex without contraception .....	.33	.30***	.46***	.80	.91	.39***	.63	.90	1.08***	1.00	1.00	1.00
Sex with someone known only casually .....	.47	.24***	.62*	.68	.54*	.52**	.56	1.14	1.19***	.99	1.01	.99
Marijuana use .....	.62	.53*	1.02	.56**	.69	.26***	.57	.86	1.18***	.99	1.08***	1.00
Heavy marijuana use .....	.40	.42	1.89	.53	1.46	.13***	.35**	1.79	1.22***	.97	1.03	1.04
Shoplifting .....	.47	.94	1.63	.53**	1.19	.44**	.60	.96	1.08**	.97*	1.02	1.01
Vandalism .....	.45	.83	1.29	.24***	2.02***	.50*	.78	.86	1.11***	.98*	1.01	.99
Cigarette dependency .....	.26*	.86	.72	1.11	.81	.58*	.65	1.05	1.10***	.99	1.04***	1.00

\*  $p < .01$ .\*\*  $p < .001$ .\*\*\*  $p < .0001$ .



tact families to adolescents from divorced/single parent families, and the second contrast compared adolescents from divorced/single parent families to adolescents from stepfamilies.

In the second step of the regression analyses, Sensation Seeking was entered. In the third step, three family variables were entered: Family Relationships, Parental Monitoring, and Parental Strictness. This way, the relation of sensation seeking to risk behavior could be examined after controlling for other variables expected to be related to both sensation seeking and risk behavior (particularly age and gender). Then, the family variables could be examined after controlling for not only the four demographic variables but sensation seeking as well.

The results are shown in Table 2. Age was significantly related to all types of reckless behavior except shoplifting and vandalism, with older adolescents generally more likely to report risk behavior than younger adolescents. The increase in prevalence with age was especially strong for riding a bicycle while intoxicated and for the two variables related to sexual behavior, sex without contraception and sex with someone known only casually. For driving a moped while intoxicated or at high speeds, however, adolescents in the oldest age group (18–20) were *less* likely to report these types of behavior than adolescents in the next youngest group (16–17-year-olds). Gender was significantly related to most types of risk behavior, with boys more likely than girls to report riding a bicycle while intoxicated, driving a moped while intoxicated, driving an automobile while intoxicated, driving a moped faster than 30 kmh over the speed limit, driving an automobile faster than 30 kmh over the speed limit or faster than 130 kmh, marijuana use, shoplifting, and vandalism. City size was related to adolescents' reports of sex without contraception, sex with someone known only casually, marijuana use, heavy marijuana use, shoplifting, vandalism, and cigarette dependency. For most types of risk behavior, adolescents in the larger city were more likely to report the risk behavior than adolescents in the smaller city, with the difference coming most often between the mid-size city and the large city. For vandalism, however, adolescents in the mid-size city were more likely to report this behavior than adolescents in the large city or the small city. Family type was unrelated to reported participation in risk behavior ex-

cept for marijuana use and driving a car over 130 kmh. Adolescents in divorced/single parent families were more likely to report heavy marijuana use and less likely to report driving a car over 130 kmh, compared to adolescents in intact families.

Sensation seeking was significantly related to every type of risk behavior analyzed in the regression analyses except the three variables related to automobile driving. Of the three family variables, Family Relationships as measured with the OSIQ was related to shoplifting and vandalism, with adolescents who reported these types of risk behavior also reporting poorer relationships within their families. Parental Monitoring was related to riding a bicycle while intoxicated, driving a moped while intoxicated, marijuana use, and cigarette dependency. Parental Strictness was unrelated to any of the types of risk behavior considered.

*Family variables in relation to demographic variables.*—It was hypothesized that the significant relation to risk behavior shown in the logistic regression analyses for the demographic variables of age, gender, city size, and family type would be partly mediated through the family variables of Family Relationships, Parental Monitoring, and Parental Strictness. To test this hypothesis, a MANOVA was conducted with these three family variables as the dependent variables and the four demographic variables as the independent variables. In this MANOVA, a priori contrasts were included for age, gender, city size, and family type. The contrasts were in the same form (described above) as were included in the logistic regression analyses.

There were significant main effects in the multivariate tests for all of the demographic variables. For age, in addition to the significant multivariate test,  $F(9, 2373) = 15.14, p < .001$ , all three univariate tests were significant: for Family Relationships,  $F(3, 977) = 11.04, p < .001$ , Parental Monitoring,  $F(3, 977) = 13.62, p < .001$ , and Parental Strictness,  $F(3, 977) = 21.91, p < .001$ . For gender, the multivariate test was significant,  $F(3, 975) = 6.92, p < .001$ , as well as two of the univariate tests, for Family Relationships,  $F(1, 977) = 7.42, p < .01$ , and for Parental Monitoring,  $F(1, 977) = 14.43, p < .001$ . For city size also, the multivariate test was significant,  $F(6, 1950) = 5.46, p < .001$ , as well as the univariate tests for Family Relationships,  $F(2, 977) = 7.96, p < .001$ , and Parental Monitoring,  $F(2, 977) = 14.43,$

TABLE 3  
RELATIONS BETWEEN FAMILY VARIABLES AND DEMOGRAPHIC VARIABLES

FAMILY VARIABLE	AGE				Gender	CITY SIZE			FAMILY TYPE	
	12-13/ 14-15	14-15/ 16-17	16-17/ 18-20	16-17/ 18-20		Small/ Med.	Med./ Large	Intact/ Div.	Div./ Step	
	Family relationships .....	-1.24	-2.31	-2.66*		-2.72*	3.87**	-2.72*	3.98**	-2.11
Parental monitoring .....	-4.02**	-2.04	-.28	3.80**	-.24	-2.84*	1.84	-1.57		
Parental strictness .....	-2.02	-2.87*	-3.98**	1.89	-1.89	-1.97	.40	-1.22		

\*  $p < .01$ .

\*\*  $p < .001$ .

$p < .001$ . For family type, there was a significant main effect on the multivariate test,  $F(6, 1950) = 4.44$ ,  $p < .001$ , and the univariate test for Family Relationships was significant,  $F(2, 977) = 7.97$ ,  $p < .001$ .

The results of the contrasts are shown in Table 3. Family Relationships were found to be poorer for adolescents in the oldest age period (18–20-year-olds) than for younger adolescents, and poorer for boys than for girls. Family Relationships were also found to be better in the mid-size city than in either the small city or the large city, and better in intact families than in divorced families.

Parental Monitoring was reported to be higher for adolescents in the youngest age period (12–13-year-olds) than for older adolescents, and higher for girls than for boys. Monitoring was also higher in the mid-size city than in the large city. Parental Strictness was higher for adolescents aged 14–15 than for adolescents aged 16–17, and higher for adolescents aged 16–17 than for adolescents aged 18–20.

## Discussion

*Sensation seeking.*—Sensation seeking has been proposed as a developmental motivation for engaging in risk behavior (Arnett, 1992a), and sensation seeking was found in this study to be related to most types of risk behavior considered. This is supportive evidence for the idea that adolescents participate in risk behavior in part for the novelty and intensity of the sensations that accompany such behavior. However, it should be noted that certain items of the sensation-seeking measure (e.g., “I like to have new and exciting experiences and sensations even if they are a little frightening, unconventional, or illegal”) may be considered too close to risk behavior to be actually measuring a separate construct. Further explorations of the relation between sensation seeking and risk behavior may wish to include different scales (see Arnett, 1992c, for an alternative measure of sensation seeking) as well as different methods, such as interviews. Also, developmental tendencies in addition to sensation seeking should be explored for their relation to risk behavior in the context of socialization, tendencies such as egocentrism (Arnett, 1990a, 1990b), decision making (Furby & Beyth-Marom, 1992), and aggression.

*Socialization.*—The theory of broad and narrow socialization implies that the expres-

sion of sensation seeking as risk behavior will be influenced by the socialization environment. In this study, the legal system, the community, and the family were the dimensions of socialization considered in relation to risk behavior.

*Legal dimension.*—The socializing influence of the legal dimension was most evident in the area of vehicle-related risk behavior. The prevalence of high-speed automobile driving was extremely low (4%–16%), even at age 16–17, then rose steeply among adolescents for whom driving was legal (18–20-year-olds) to include over half of boys and over one-third of girls. For middle-class American adolescents, in contrast, by age 16–17 the prevalence of high-speed automobile driving already approaches 80% (Arnett, 1992d). Among the Danish adolescents in the present study, high-speed moped driving and driving a moped while intoxicated also rose—although not as steeply and for boys only—after the age at which driving a moped becomes legal in Denmark, age 16. Also worth noting is that at age 16–17—when driving an automobile is not yet legal—the prevalence of driving an automobile while intoxicated was 2%–7%, while the prevalence of riding a bicycle while intoxicated was 61%–77%. Compare this to the 48% prevalence of driving an automobile while intoxicated for a sample of middle-class adolescent boys (aged 17–18) in the United States (Arnett, 1990b).

These findings indicate that many adolescents in Denmark, as in the United States, use vehicles in risky ways by driving them either while intoxicated or at high speeds. However, for Danish adolescents, the vehicle used is more likely to be a bicycle or a moped than an automobile, principally because of narrower socialization on the legal dimension. The consequences of this narrower socialization (and perhaps related policies, such as high taxes on automobile ownership) are profound, literally life and death: the rate of automobile fatalities among adolescents aged 15–19 in 1989 was more than twice as high in the United States as in Denmark (United States National Highway Traffic Safety Administration, 1991, Tables 1–7 and 1–8; Danmarks Statistik, 1991, Tables 40 and 304). For the United States, these findings suggest consideration of policy changes regarding adolescent driving. Alternatives include raising the legal automobile driving age to 17 (as it is in New Jersey) or 18, or instituting a driving curfew from 9 p.m. to 5 a.m. for young drivers (the current law

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in New York), both of which have been demonstrated to reduce the rate of accidents and fatalities among adolescents (Preusser, 1988).

The comparison to the United States is instructive for what it suggests about the difference in the way the two countries balance the costs and benefits of broad and narrow socialization on this issue. Arguably there are certain advantages to allowing adolescents to drive at age 16—it allows for greater convenience and individual autonomy and at least provides the possibility of that choice for adolescents (and their families) who wish to make it. In the United States, these advantages are valued highly enough to provide a political consensus for establishing a legal driving age of 16, in spite of the social costs in terms of greater traffic congestion and pollution and more lives lost as a result of automobile accidents involving 16–17-year-old drivers. In Denmark, the legal driving age of 18 suggests a social and political consensus that the good of the community—in terms of lower levels of traffic congestion and pollution, and protection from the fatalities that would result from 16–17-year-old drivers—supercedes freedom of choice for individuals, at least on this issue. For each country, the laws both reflect and sustain cultural beliefs about the proper balance between individual autonomy and the good of the community.

It should not be concluded, however, that it would be unambiguously good public policy to encourage American youth to ride their bikes everywhere instead of driving cars. The reliance of Danish youth on bicycles for transportation is woven into the fabric of the culture: all over the country there are safe bike paths next to the roads. In the United States, however, bike paths are rare, and a person on a bicycle often has to use the main roads, where there is the risk of being hit by an automobile. If 16- and 17-year-old American adolescents suddenly took up bike riding en masse because the legal age for driving an automobile was raised to 18, there can be little doubt that fewer of them would die in automobile accidents than at present, but there would almost certainly be a rise in bicycle-related fatalities in that age group. Still, overall, fewer of them would die in vehicle-related accidents, almost certainly. And it is equally certain that they would cause fewer deaths to others on bicycles than they do currently in automobiles.

*Community dimension.*—Larger city size was related to several types of risk behavior, including sex without contraception, sex with someone known only casually, marijuana use (including heavy marijuana use), cigarette dependency, and shoplifting. The results indicated that this may be partly because parental monitoring is more problematic in a large urban setting. In such a setting, there may be more places where adolescents can go to be away from the monitoring eyes of parents and other adults whom the adolescent knows, which might provide more opportunities for sexual activity, marijuana use, and high-speed driving. However, city size is only a very rough measure of community differences in socialization. Questions remaining to be explored include: Do adolescents in a smaller community feel a greater sense of attachment and responsibility to their community, making risk behavior less likely?

*Family dimension.*—Parental monitoring was related to riding a bicycle while intoxicated, riding a moped while intoxicated, marijuana use, and cigarette dependency, but parental strictness was not related to any type of risk behavior. This seems to indicate that if parents do not *know* about their adolescents' participation in risk behavior, it does not matter how "strict" they are about it; when adolescents spend a great deal of their time out of their parents' company (Youniss & Smollar, 1985), they can engage in a great deal of risk behavior without their parents ever finding out. To put it another way, narrow socialization on the family dimension may be ineffectual if socialization is relatively broad on the other dimensions. This underscores the importance of considering socialization in its many dimensions, rather than focusing exclusively on the family.

*Media dimension.*—Socialization on the dimension of the media was not measured directly in this study, but the results concerning cigarette smoking are suggestive in this respect. Cigarette dependency increased with age and reached a proportion of one-third among the oldest (18–20-year-old) girls. In the United States, in contrast, only 18% of high school seniors report smoking cigarettes daily (down from 29% in 1976–1977; Wetzels, 1989). This difference may be due to the intensive media campaign over the past two decades in the United States that has stressed the health risks of cigarette smoking—arguably an example of a success-

ful effort at narrow socialization on the media dimension.

*Sexual behavior and contraceptive use.*—One other finding worthy of discussion is in the area of sexual behavior. The prevalence of sex without contraception was surprisingly high among the older adolescents, about 22% for adolescents aged 16–17 and about 38% for those aged 18–20. This was lower than for the rate of sex *with* contraception for the adolescents in this study, but comparable to the rate of sex without contraception reported for American high school students. Arnett (1990a) found that 36% of girls (aged 17–18) in a predominantly white American middle-class high school sample reported having had sex without contraception at least once in the past year, and a similar proportion was reported for American boys in a similar sample (Arnett, 1991).

How is it, then, that the rate of both childbirth and abortion among Danish adolescents (aged 15–19) is less than half the rate among (white) American adolescents (Jones et al., 1986)? Studies of the sexual behavior of adolescents (e.g., Centers for Disease Control, 1992; Jones et al., 1986; Zelnik & Kantner, 1980) typically do not report the *frequency* of sex without contraception, only its *prevalence* (e.g., the percentage of adolescents who did not use contraception at last intercourse). It may be that American adolescents who are sexually active have sex without contraception more frequently than Danish adolescents, leading to higher rates of childbirth and abortion. For Danish adolescents, sex without contraception may be more likely to be the result of an occasional lapse from responsible use of contraceptives rather than a consistent pattern.

In any case, the finding that Danish adolescents have a prevalence rate of sex without contraception similar to American adolescents, in spite of more extensive sex education and a culture more tolerant of sexual activity among adolescents (Jones et al., 1986), was not expected. This finding indicates that, for Danish adolescents as well as their American counterparts, factors other than merely knowledge of or access to contraception are involved in adolescents' failure to use contraception consistently, factors such as egocentrism (Arnett, 1990a) and the unplanned and infrequent nature of the intercourse (Morrison, 1985). Knowledge of contraception is a necessary but evidently not a sufficient condition for consistent con-

traceptive use, and for this reason sex education may have only limited effectiveness in preventing unintended pregnancy among adolescents. (However, improvements in the content, methods, and timing of sex education may be possible that would improve its effectiveness, in Denmark as well as in the United States.) This is further indicated by the finding that 83% of adolescents in the present study who had had sex without contraception had also had sex *with* contraception, which suggests that they know about contraception and how to obtain it, but they do not use it every time they have intercourse. (This figure is almost identical to the 81% reported by Arnett [1990a] for a sample of white middle-class American female adolescents.) The finding that 58% of those who reported sex without contraception also reported sex with someone known only casually suggests that one contributor to contraceptive nonuse may be a lack of anticipation of and preparation for sexual activity, as well as a lack of communication between partners due to unfamiliarity and embarrassment (Kisker, 1985). Interview studies with adolescents in Denmark, the United States, and elsewhere might help clarify the circumstances surrounding contraceptive use and nonuse.

*Conclusion.*—In addition to supporting the hypothesis that sensation seeking is one motivator of several types of risk behavior, the results of this study demonstrate that the degree to which sensation seeking is expressed as risk behavior and the forms that risk behavior takes depend on the various dimensions of the socialization environment. The family dimension of socialization has received much research attention, which is fitting in view of the importance of this dimension. Peers, too, have received considerable attention in research on adolescents. However, more attention is merited for the other dimensions of socialization—the school, the community, the legal system, the media, the cultural belief system—in order to gain a fuller appreciation of the complexity of the socialization process, and how the various dimensions interact with one another and with individual characteristics to influence development.

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