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Determinants Of Risk Preference: Implications For Family And Consumer Science Professionals

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Family and consumer science professionals are called upon to counsel clients concerning risky situations and choices on a daily basis. Age, gender, income, marital status, and knowledge have been identified and used as determinants of risk preference by researchers and practitioners. The purpose of this study was to examine whether these characteristics were significant determinants of risk preference. Regression results indicated that only knowledge of risk was a significant determinant. The results indicated that practitioners and policy makers should focus on the dignity and equality of individuals rather than relying on socio-economic characteristics to categorize people.

Key Words: Risk Preference, Socio-Economic Characteristics, Determinants

Family and consumer science professionals, be they family practitioners, educators, or researchers, face many obstacles in their attempts to educate individuals and families regarding social and economic issues. In an attempt to eliminate educational obstacles, many family and consumer science professionals employ the use of socio-economic characteristics to segment their clientele. The use of socio-economic characteristics is particularly prevalent within the context of determining and categorizing a client's risk taking preference.

Okun (1976) concluded that risk preference issues reach into almost every part of economic and social life. He determined that risk taking refers to behavior(s) where there is a desirable goal, but the goal's attainment is uncertain and is accompanied by the chance of possibility of loss. Specifically, risk entails a chance based on probabilities of various outcomes, and a sense of danger based on the severity or consequences of a risk taking behavior. According to Okun, regardless of which risky situation an individual encounters, all risk taking situations necessitate the evaluation of the relative value of a given alternative, and the likelihood of achieving it successfully. Thus, risk preference is defined to mean the amount of risk one is willing to take in a given situation.

Using this concept of risk preference, it becomes apparent that family practitioners, educators, researchers, and policy makers encounter risk taking by their clientele regularly. Even the seemingly simplest purchasing decisions undertaken by family members (e.g., grocery selection) entail a degree of risk, and as such, the risk preference of the family member plays a relevant role in the decision making process. More substantial risks, both monetary and psychological, are faced by family practitioner clients on a continuing basis. For example, the decision to have a child is often considered a desirable goal, but a goal whose attainment is accompanied by uncertainty and

potential financial losses. In order to successfully counsel clients regarding the range of family and consumer science issues undertaken by practitioners it is necessary to know which socio-economic characteristics determine someone's risk preference.

Several socio-economic characteristics are widely used in business, government, and private organizations as determinants of risk preference, however, little empirical evidence exists to support the continued use of these characteristics as predictors of risk preference. The purpose of this study was to examine whether age, gender, income, marital status, and knowledge of risk were significant determinants of risk preference. The results of this study will provide family and consumer science professionals an evaluative criteria relating to the efficacy of predicting their clientele's risk preferences with greater confidence by focusing more intimately on their client's unique attributes.

Background Review

The study of risk has a long history, but it was not until the early 1900s that risk was seen as a behavioral issue that could be linked with socio-economic characteristics (Bernstein, 1996). A thorough review of the literature indicates that more extensive research concerning risk preference determinants is needed, because the research that does exist tends to be quite fragmented and often contradictory (Droms, 1988; Roszkowski et al., 1988).

In 1988 Roszkowski, Snelbecker, and Leimberg identified socio-economic characteristics that are commonly believed to determine an individual's level of risk preference. Several of the characteristics listed in Roszkowski et al.'s study were little more than behavioral based stereotypes with little empirical evidence to support their continued use as determinants of risk

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preference. Due to the lack of empirical evidence concerning the efficacy of many of these characteristics in determining someone's risk preference, Roszkowski and his associates suggested that practitioners instead rely on age, gender, marital status, income, and knowledge of risky situations as determinants of risk preference. The remainder of this section will be devoted to reviewing relevant research findings concerning these five characteristics.

The most widely researched characteristic since 1948 has been age. Several studies since the late-1940s have concluded that age and risk-aversion are positively related, advancing the assumption that older individuals are inherently more risk-averse than younger persons (Hawley & Fujii, 1994; Sung & Hanna, 1996a). However, some recent studies suggest that there is no relationship between age and risk preference (e.g., Cutler, 1995), while additional studies conducted over the past three decades are inconclusive in their findings (Okun, Stock, & Ceurvorst, 1980). In general, the majority of researchers have concluded that a negative relationship exists between age and risk preference.

Gender has also been accepted as contributing to one's risk preference. Various studies conducted since 1966 have concluded that females are more risk-averse compared to males (e.g., Blume, 1978; Higbee & Lafferty, 1972; Slovic, 1966). However, some reviewers have concluded that many of these studies suffered from validity and reliability problems due to sampling and criterion errors (Masters, 1989; Okun et al., 1980). More recently, researchers such as Bajtelsmit and Bernasek (1996), Hawley and Fujii (1994), and Sung and Hanna (1996a) have also concluded that females tend to take less risk than males. Although widely accepted as true, other researchers have concluded that gender and risk preference are not related (Schooley & Worden, 1996), and that any assumed relationships are purely spurious (Grable, 1996; Haliassos & Bertaut, 1995). In summary, consensus concerning the effectiveness of gender as a determinant of risk preference is lacking.

Marital status has also received attention in research studies. There is general consensus among practitioners that that married respondents and single males are more risk-tolerant than single females (Lee & Hanna, 1995; Sung & Hanna, 1996a, 1996b). Research findings concerning marrieds versus non-marrieds have not been as conclusive. Researchers like Roszkowski et al. (1988) determined that singles are more willing to accept risks than comparable married individuals, while Sung and Hanna (1996b) concluded that married couples are more like households headed by single males than like households headed by single females. Others like Hawley and Fujii (1994) concluded that marital status has no relationship with risk preference. Conflicting conclusions make it difficult to hypothesize about the expected relationship between marital status and risk preference.

The use of income by practitioners, researchers, and educators as a determinant of risk preference also has a long history.

Many research projects, primarily those conducted since 1976, have led researchers to conclude that the greater an individual's income, the greater that person's risk preference (e.g., Sung & Hanna, 1996b). The most striking contradictions to these findings was advanced by Cutler (1992) and Schooley and Worden (1996) who found no relationship between income and risk preference.

Recently there has been a renewed focus on the relationship between risk preference and knowledge of risk. According to Roszkowski (1995), individuals who have more knowledge of risk and risky situations tend to have a common psychological profile that allows them to undertake greater risks. Reasons for this include: a) individuals with a high level of knowledge require less information to make decisions, b) they are able to cope with stresses resulting from uncertainties due to familiarity with risky situations, and c) in general, they possess greater confidence in their analytical and decision making skills (MacCrimmon & Wehrung, 1986). There is general consensus among researchers that increased levels of knowledge of risk are associated with increased levels of risk preference (Cutler & Devlin, 1996; Haliassos & Bertaut, 1995; Snelbecker et al., 1990).

A great deal of confusion continues to exist concerning the relationship between risk preference and age, gender, marital status, income, and knowledge of risk. This confusion results from a general lack of consensus of results among researchers, even in cases where similar data and methodologies were used (e.g., Bajtelsmit & Bernasek, 1996; Sung & Hanna, 1996b). Furthermore, many risk preference researchers have begun to dismiss most pre-1976 risk preference studies as being invalid and unreliable, primarily because older studies drew samples from extremes of the population, and relied on one dimensional measures of risk preference (MacCrimmon & Wehrung, 1985; Okun, et al., 1980). For example, one dimensional questions, such as asking a survey respondent a single question concerning how much risk he or she is willing to take in a given situation pose the most serious threat to the validity and reliability of previous findings, because responses to these types of questions tend to lead respondents to overestimate their risk preferences (Botwinick, 1984; Droms, 1988; MacCrimmon & Wehrung; Roszkowski et al., 1988; Snelbecker, Roszkowski, & Cutler, 1995).

Although previous findings should be considered in context of potential validity and reliability problems, there still does seem to be sufficient evidence, both academically and practically, to indicate that individuals with the lower levels of risk preference include older persons, single females, those with low incomes, and those with less knowledge of risk. Again, it should be noted that given the confusion surrounding these relationships, few people are actually in a position to make informed risk preference assessments using these five socio-economic characteristics as either proxies for risk preference or as heuristic tools in the decision making process. The literature clearly suggests that more research is needed.

Methodology

Data

Data were obtained from a 1996 exploratory study of investor risk preferences. The sample consisted of 68 individuals who at one time indicated an interest in receiving financial planning, investment management, or portfolio consulting services. Due to the exploratory nature of the research only subjects indicating interest in financial counseling and planning services after December 1994 were included in the sample. The survey response rate was 90%.

Dependent Variable

The dependent variable was risk preference as determined by each respondent's score on a risk preference measure. Respondents were asked to complete a 21 question self-directed survey. Six of the questions were for demographic characteristics, while 15 questions were used to assess each respondent's risk preference (Appendix). The risk preference questions were included because they met the four criteria as developed by MacCrimmon and Wehrung (1986). Questions covered a variety of risky situations in a multidimensional manner, and each question took a short amount of time to finish. The presence of risk-free alternatives was minimized in order to conform to research findings that suggest validity problems when such answers are present (Kahneman & Tversky, 1979).

Responses to the risk questions were combined into an index of risk preferences. Answers were given a weight according to the riskiness of the response. Higher weightings indicated a riskier choice, while lower weightings indicated a less risky choice. The index was constructed by summing the weights corresponding to each response. Risk preference scores were measured on a continuous interval level for use in regression analysis. This method of measurement also allowed respondents to be categorized into low, moderate, and high risk preferences for descriptive purposes. Twenty-eight percent of scores fell into the low category, while 51% fell into the moderate range, and 21% fell into the high category. These results were consistent with distributions found in the literature (MacCrimmon & Wehrung, 1985).

Validity and reliability Individual risk items were examined to determine how they related to the composite index. This internal validation step was measured by regressing investor risk preference on each of the risk questions. External validation was measured by comparing individual item scores to other item scores and the total index score (Babbie, 1983). This was done to confirm that respondents who scored low, moderate, or high in risk preference on one question generally scored similarly on other questions. General construct validity was confirmed by interviewing respondents at random regarding their obtained score to assess how well the instrument described the individual's actual risk taking behavior. Reliability was calculated and corrected according to the Spearman-Brown formula. The adjusted alpha of .69 was found to demonstrate acceptable levels of consistency for an exploratory study (Pedhazur & Schmelkin, 1991).

Independent Variables

The independent variables in the model acted as determinants (predictors) of the continuous dependent variable. Age, income, and knowledge were coded as continuous variables. The knowledge variable was constructed by combining the responses of two questions on the original survey that dealt with knowledge of investments and risky situations. Due to the relatively high correlation ($r = .532$) between the two questions they were combined into a knowledge index. Since the combined knowledge index score was hierarchically ordered, it was considered continuous. Gender was coded according to the sex reported by each respondent. Marital status was coded as married or other, which included never married/single, widowed, separated, and divorced. Based on known curvilinear effects of age, age-squared was used to test for this possibility. Two interaction variables, based on results and recommendations from previous research (e.g., DeVaney, 1995) were also included. The independent variables are presented in Table 1.

Analysis

Preliminary descriptive analysis was conducted using ANOVA in order to examine the differences in mean risk preference scores of respondents. An Ordinary Least Squares Regression model was used for the primary analyses. Based on results obtained from previous research, as outlined in the review of literature, it was hypothesized that the beta coefficients of risk preference scores regressed on age, gender, income, marital status, and knowledge would be significantly different from each other and not equal to zero. In other words, it was hypothesized that age, gender, income, marital status, and knowledge could be used as determinants of risk preference. It was further hypothesized that higher risk preference scores would be associated with younger aged people, males, higher income earners, married respondents, and those with increased levels of knowledge of risk.

Table 1
Definition of Independent Variables

Variable Definition	
Age	1 = Less Than 39 2 = Between 39 and 61 3 = More Than 61
Income	Household Annual After Tax Income
Knowledge	Experience With Investments Self-Described Knowledge of Risk
Gender	1 = Male 0 = female
Marital status	1 = Married 0 = not married

Findings

Sample Characteristics

The 68 respondents to the risk preference survey were quite diverse. The age of respondents ranged from 20 to 87 years. Fifty-one percent of respondents were 40 years of age or younger, 31% were between 41 and 60 years of age, and 18% were 61 years or older. Females represented 57% of the sample. A majority (62%) of the respondents were married, with the rest being single, never married, divorced, widowed, separated, or another status. Twenty-nine percent indicated annual gross incomes less than \$29,999, while the majority of respondents reported annual incomes between \$30,000 and \$69,999 (51%). Nineteen percent indicated gross incomes above \$70,000 a year.

Preliminary Findings

ANOVA tests indicated no statistically significant differences in risk preference scores based on age, gender, marital status, or income. Although mean scores were not significantly different, the patterns underlying the data were intriguing. It was found that the mean risk preference scores for older individuals were higher than scores for younger respondents, which was opposite of the hypothesized relationship. It was also found that women were more willing than men to take risk, and that higher risk preference scores were associated with singles rather than marrieds. Both findings ran counter to associations suggested in the literature. Middle-income respondents had higher risk preferences than either low or high income respondents.

Regression Results

The results of the regression analysis are presented in Table 2. There was no curvilinear effect in the data by age, nor were there interactions between age and income or age and knowledge. More importantly, age was not found to be a significant predictor of risk preference. Furthermore, neither gender, marital status, nor income were found to be significant in determining a person's risk preference. The only reliable determinant of risk preference to emerge from the regression analysis was knowledge of risk. Based on a previous analysis of the data it was found that knowledge explained almost 15% of the variation in risk preference scores. Overall, the model used in this analysis (Table 2) explained 28% of the variation in risk preference scores.

Table 2
Summary of Regression Analysis for Variables Predicting Risk Preference (N = 68)

Variable	B	SE B	t-Ratio	p
Age	4.075	2.049	1.99	.051
Male	0.794	1.085	0.73	.467
Income	1.713	1.608	1.07	.291
Married	2.199	1.322	1.66	.101
Knowledge	4.568	1.644	2.78	.007*
Age-squared	-0.0171	0.040	-0.43	.668
Age*income	-0.0447	0.067	-0.65	.517
Age*knowledge	-0.3279	0.272	-1.20	.233

R² = .28 *p < .01

Discussion of Results

The results of risk preference regressed on age, gender, marital status, and income contradict the initial hypotheses as developed from the review of literature. However, as indicated in the literature review, the findings of this study are not without precedence. For example, in 1990 the Boettner Center undertook a study which included an analysis of demographic variables in relation to risk taking behaviors. Findings from the Boettner Center study suggest that common stereotypes about "age as an automatic or inevitable cause of changes leading to conservative behavior and attitudes are simply not valid" (Cutler, 1995, p. 37). Other researchers (e.g., Okun, et al., 1980) also concluded that it is unlikely that there are age related declines in risk taking behavior.

Findings relating to gender, income, and marital status are also supported by findings from other recent studies. Masters (1989), McInish (1982), and Haliassos and Bertaut (1995) were among many that found no relationship between gender and risk preference. McInish (1982), Haliassos and Bertaut (1995), and Schooley and Worden (1996) also found no evidence of a relationship between marital status and risk preference, and when researching the effects of income researchers like Schoemaker (1980) and Cutler (1992) also concluded that income is not a determinant of risk preference. The regression results concerning knowledge of risk do support the major research findings of past studies (Cutler & Devlin, 1996; Masters, 1989; Sung & Hanna, 1996). Knowledge of risk results imply that the greater one's knowledge of risk the greater one's risk preference.

Implications and Recommendations

Family and consumer science professionals are on the front lines of educating the world's families about social and economic issues, and as such, these professionals encounter demands and opportunities to counsel their clientele concerning risky situations. Although not always recognized as situations that entail risk, family and consumer science educators, researchers, and policy makers deal with topics that have economic and psychological costs. These topics include counseling individuals, families, and legislators about welfare reform, medicaid/medicare reform, health care, dependent care, child support enforcement, educational reform, and family finance.

A measure of success that family and consumer science professionals often use to gauge their counseling effectiveness involves three stages: a) assessing the individual risk preferences of those individuals and families involved in or affected by risky situations, b) recommending and adopting policy actions based on risk preference assessments, and c) reconciling risk preference assessments with final policy actions. Socio-economic characteristics have been used to determine the risk preferences of those involved in risky situations, leading legislators and policy makers to categorize individuals based on stereotypical characteristics. The results of this study indicate that this type of approach is inadequate and dangerous, because many commonly accepted socio-

economic characteristics may not, in fact, be valid indicators of risk preference.

Educational reform provides a good example of the dangers involved when using socio-economic stereotypes to affect policy. Educational reform has many perceived costs and benefits, however, each cost and benefit can be viewed in terms of risk to those people involved in reform. Risks include lost funding, lost jobs, reduced benefits, and diminished resource availability, while benefits might include higher standards, lower expenses, and greater choice. However, there are no guarantees, which is another way of stating that risk is involved in reform. Using the three stages of counseling effectiveness it becomes apparent that the use of socio-economic characteristics may lead to inappropriate policy recommendations, which may, in turn, lead to a less than optimal reconciliation of individual and family needs in relation to policy actions.

The results of this study indicate a need for policy makers, practitioners, public and private agencies, and other parties involved in the welfare of individuals and families to focus on the dignity and equality of individuals rather than relying on socio-economic characteristics to categorize people. Observing or judging someone's gender, age, marital status, or income to determine their risk preference in a given situation does not afford equality to men, women, and children, and in fact, making stereotypical assessments simply does not work consistently well. On the other hand, since it appears that increasing someone's level of knowledge of risk does lead to higher risk preference, educational efforts should be advanced. These efforts will require clear and explicit explanations, quantification of problems, and workable management solutions, but as the results of this study indicate, these efforts may be the best option available in changing risk preferences.

Finally, since age, gender, marital status, and income were found not to be significant variables in determining risk preference, researchers should begin to explore other characteristics which might measure or predict risk preferences. In addition to knowledge, some researchers have proposed emphasizing factors such as liquidity needs, net worth, stability of employment, occupation, education, life-style, personality, and marital relationships when assessing risk preferences (Cutler, 1995; Hirsch, 1996; Sung & Hanna, 1995; Yoo, 1994). Because of the limitation of the sample and the general exploratory nature of this research, further research to confirm the findings of this study and to identify the determinants of risk preference is needed. Future researchers should include all possible curvilinear relationships and all reasonable interactions among characteristics.

Appendix

Risk Preference Measure Items

- In terms of experience, how comfortable are you investing in stocks or stock funds?
 - Not at all
 - Somewhat
 - A significant amount
- I would prefer the portfolio that gives my \$10,000 investment the potential, over the course of one year, to achieve a:
 - Best case or
 - Worst case
- | | |
|-----------------|---------------|
| a. \$200 gain | \$0 gain/loss |
| b. \$800 gain | \$200 gain |
| c. \$2,600 gain | \$800 loss |
| d. \$4,800 gain | \$2,400 loss |
- Suppose you are offered 2-to-1 odds on the flip of an honest coin. Which bet would you make?
 - Wouldn't make any bet
 - Heads you win \$2, tails you lose \$1
 - Heads you win \$20, tails you lose \$10
 - Heads you win \$100, tails you lose \$50
 - Heads you win \$1,000, tails you lose \$500
- How would you respond to the following statement? "It's hard for me to pass up a bargain."
 - Very true
 - Sometimes true
 - Not at all
- If \$20,000 came to you unexpectedly, you would:
 - Deposit it in your bank account or buy an insured certificate of deposit
 - Invest it in safe high quality bonds or bond mutual funds
 - Invest it in the stock market
- In addition to whatever you own, you have been given \$1,000. You are now asked to choose between:
 - A sure gain of \$500
 - A 50% chance to gain \$1,000 and a 50% chance to gain nothing
- In addition to whatever you own, you have been given \$2,000. You are now asked to choose between:
 - A sure loss of \$500
 - A 50% chance to lose \$1,000 and a 50% chance to lose nothing
- You inherit a mortgage-free house worth \$150,000. The house is in a nice established neighborhood, and you believe that it should appreciate in value faster than inflation. Unfortunately, the house needs repairs. If rented today, the house would bring in \$1,000 monthly, but if updates and repairs were made, the house would rent for \$1,500 per month. However, in order to finance the repairs you would need to take out a mortgage on the property. You would:
 - Sell the house
 - Rent it as is
 - Make the necessary renovations, and then rent it
- Which situation would make you the happiest?
 - You win \$50,000 in a publisher's contest
 - You inherit \$50,000 from a rich relative
 - You earn \$50,000 by risking \$1,000 in the options market
 - Any of the above -- after all, you're happy with the \$50,000
- The apartment building where you live is being converted to condominiums. You can either buy your unit for \$100,000 or the building's owners will pay you \$25,000 to sell them your rights to the apartment. The market value of the condo is \$130,000. You know that it probably will take six to nine months to sell, all the while you will be paying monthly costs of \$1,200. Furthermore, in order to buy the condo you would have to borrow the down payment for a mortgage. You don't want to live in the building -- what do you do?
 - Take the \$25,000
 - Buy the unit and then sell it on the open market
- Your trusted friend and neighbor, an experienced geologist, is assembling a group of investors to fund an exploratory gold/silver mining venture which could pay back 50 to 100 times its investment if successful. If the mine is a bust, the entire investment is worthless. Your friend estimates the chance of success is only 20%. What would you invest?
 - Nothing
 - One month's salary
 - Three month's salary
 - Six month's salary
- You are on a TV game show and can choose one of the following. Which would you take?

- a. \$1,000 in cash b. 50% chance at winning \$5,000
 c. 25% chance at winning \$10,000
 d. 5% chance at winning \$100,000
13. It is 1999, and you believe that inflation is increasing. Hard assets such as precious metals, jewels, collectibles, and real estate are expected to keep pace with inflation. All of your investment assets are now in long-term bonds. What would you do?
 a. Hold the bonds
 b. Sell the bonds, put half the proceeds into money market accounts, and the other half into hard assets
 c. Sell the bonds and put the total proceeds into hard assets
 d. Sell the bonds, put all the money into hard assets, and borrow additional money to buy more.
14. You've lost \$500 playing a slot machine in Las Vegas. How much more are you prepared to wager to win the \$500 back?
 a. Nothing-you quit now b. \$100 c. \$275 d. \$500 or maybe more
15. True or False. The markets are "fixed." Only insiders make money.
 a. True b. False

Scoring

- | | |
|----------------------------|------------------------|
| 1. a=1, b=2, c=3 | 8. a=1, b=2, c=3 |
| 2. a=1, b=2, c=3, d=4 | 9. a=2, b=1, c=3, d=1 |
| 3. a=0, b=1, c=2, d=3, e=4 | 10. a=1, b=3 |
| 4. a=1, b=2, c=3 | 11. a=1, b=2, c=3, d=4 |
| 5. a=1, b=2, c=3 | 12. a=1, b=2, c=3, d=4 |
| 6. a=1, b=3 | 13. a=1, b=2, c=3, d=4 |
| 7. a=1, b=3 | 14. a=0, b=1, c=2, d=3 |
| | 15. a=1, b=2 |

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