What Are Your Risk Attitudes?

by

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Demonstrating that risk attitudes do differ among individuals and that these differences can affect decisions is difficult with a group of individuals who have limited background in economics and statistics. This situation can arise in extension, undergraduate, and beginning graduate education settings. Elicitation of utility functions or their derivatives is not an intuitive process with these audiences. In addition, results of elicitation have been demonstrated to have measurement limitations: they are not stable over time(Whittaker and Winter; Binswager), have interview errors(Fleischer and Robison; Musser and Musser), can vary with functional form assumptions(Buccola and French; Dillon and Scandizzo; Musser, et.al.), can show risk-preferring behavior even with Delphi procedures(Gunjal and Legault), and measurement errors in variables can result in biased regression coefficients (Knowles). With all of these problems, estimation of utility functions is often not considered a useful approach (Young).

Nevertheless, demonstrating that differences in risk preferences affects decisions has an important pedagogical value. Other approaches include estimation of preferences from observed economic behavior (Young; Buccola and Love; Pope and Just; Saha, Shumway, and Talpaz) and using psychological scaling methods (Musser and Musser). Patrick, Musser, and Ortmann use a choice dilemmas scale adapted from the psychological literature to demonstrate differences in preferences of producers. Even though measures from this scale cannot be used in optimization models or behavioral relations derived from these models, they do contribute to the pedagogical purposes discussed above.

This paper presents a teaching unit with choice dilemmas that has been used in the classroom and in extension programs to demonstrate differences in risk preferences and the impact of these preferences on decisions. The unit takes about 40-45 minutes to complete. It also

requires two instructors or at least one instructor and one data analyst. As discussed below, the data analyst summarizes scores from the scale while the instructor discusses the scale; a laptop computer facilitates summarizing the data.. Two versions of the choice dilemmas scale have been developed. One uses Cornbelt farm management situations and was developed in 1991 (Patrick, Musser, and Ortmann). A recently updated version is available from the authors. A second version has horticultural management situations and is used in this teaching unit. The horticultural version was developed for use in a series of 1999 in-service programs on horticultural risk management that were given across the Northeastern U.S. and the Eastern Cornbelt. It was subsequently used in a risk research meeting and at a national extension conference. The horticultural version is included in Appendix A of this paper.

This paper is organized around the set of overhead slides used in the extension workshops. These slides are in Appendix B and are section headings below. Each section provides a commentary about the slide that can be adapted for a presentation. Instructions for the educator are included in parentheses at the appropriate place in the discussion.

Slide One

Agricultural producers have to deal with several sources of risks in managing their business. These sources are production, marketing, financial, legal and environmental, and human resources risk that are all important for producers. Producers have various management responses that can be used to manage these risks. Choosing among these responses is a complex decision. Part of the complexity arises from the fundamental risk-returns trade-off that most of these responses pose. One can usually not reduce risk without simultaneously reducing average profits or returns from the business. Besides recognizing this trade-off, producers, family

members, and those advising them must recognize that individuals differ in their willingness to take risk. A management decision that is risky, but potentially quite profitable, may be desirable for someone who is willing to assume considerable risk but would be rejected by someone who is less willing to assume risk. Many risk responses involve different levels of risk and recognizing that differences do exist among producers in willingness to take risks is important in evaluating these options.

Willingness to assume risk can be summarized into risk attitudes. Risk attitudes are related to a number of management questions. Most producers and their advisers are interested in questions such as "What is your risk attitude?", "How does it compare to other farmers?", and "What effect does it have on your management decisions?". These are complex questions, and we do not know all the answers. We do know that individuals do differ in their risk attitudes. We think that these differences in risk attitudes can lead farmers in similar circumstances to make different decisions. We also think that differences among risk attitudes of various individuals involved in a farming operation, such as spouses, parents, children, and partners, also may be important and also can impact farm decisions.

While we cannot answer all these questions here, we can demonstrate that differences in risk attitudes exist. You will be introduced to a scale with choice dilemmas that we have developed to measure willingness to assume risk across a wide range of typical producer decisions. This scale measures differences in risk attitudes and illustrates the effect of risk preferences on decisions. After you complete the scale, we will discuss it more. (At this point the questionnaire is passed out to participants, and they are asked to complete it. While they are working on it, the instructor walks through the room and monitors progress. As some are near finishing, the score sheet is passed out, and discussion begins on the score sheet).

Slide Two

Now we will review the score sheet and answer any questions. The score for each of the twelve choice dilemmas is based on your response. Responses with probabilities of one out of ten to nine out of ten are assigned scores of one to nine, respectively, for that situation. The response that the risky choice is never taken no matter the probabilities is scored as ten. Then, the scores on the twelve individual choice dilemmas are summed for a total score. Please finish the questionnaire, complete the score sheet, and give the completed score sheet to (Name of the data analyst) as you finish. (The instructor assists with this process. The analyst begins entering the total scores into a spreadsheet on the laptop as the score sheets are given to him/her. After everyone has turned in their score sheets, the analyst continues tabulating the data while the instructor resumes the discussion. Note that the maximum number of participants with this process is limited by the number of score sheets that can be analyzed during the next part of the unit. For larger groups, participants can be asked to complete the instrument and mail it to the instructors for tabulation before the workshop; the authors have used this process for larger groups).

Slides Three and Four

(Start with Slide Three and then use Four to illustrate the points in this paragraph). While the scores are being tabulated, let's discuss the scale. The choice dilemmas scale represents elements of risky decisions in agriculture. All the situations have outcomes that one cannot precisely know at the time of the decision. In addition, the risky choice has the highest desired outcome if it occurs. (Use Slide Four to illustrate the following discussion). Let's use Choice

Dilemma 4 to illustrate this discussion. (Slide 4 is Choice Dilemma 4 on the questionaire). Possible responses include not choosing the risky choice no matter the probabilities of the outcome (picking the sure thing that is less desirable); Lynn buys the new planter. The risky alternative, repairing the planter, can be chosen with different probabilities that the parts will be available. The riskiest choice has the chance of only one in ten that it will be successful. These responses partially depend on magnitudes of gains and losses of the planter not being available when needed, which are not specified. However, the choice also depends on the individual's willingness to assume risk. These risk preferences influence the decision made by an individual. Two individuals may face what appears to be identical situations and make different decisions. Determination of the appropriate decision for individuals requires taking into account their risk preferences. (Go back to Slide Three).

Another point that must be stressed is that one cannot interpret a response to any one choice dilemma individually. Only the responses to all the choices, which in this case are summed, can be interpreted. We will be looking at your summed scores in a minute.

Slide Five

Please note that the choices in the scale are designed to measure overall willingness to assume a wide range of risks that occur in farming. Some choice dilemmas also illustrate the interaction of the different sources of risk.

To illustrate the different sources of risk, let's examine the major source of risk in each of the choice dilemmas. It was stated earlier that the five sources of risk are production, marketing, finance, legal and environmental, and human resources. As you will see, ALL the five sources of risk are represented in the scale. Some can be easily classified as to an individual source, but

others have several sources interacting. (The questions are each classified with participation from the audience. The instructor writes the source for each choice on the overhead transparency as they are identified. Suggested sources of risk for each situation are: (1) Financial, (2) Human Resources, (3) Legal, (4) Production, (5) Financial, (6) Marketing, (7) Production or Financial, (8) Financial, (9) Production, (10) Financial, (11) Production, and (12) Human Resources.)

Slide Six

Now, let's look at the scores. With 12 choice dilemmas, the maximum score is 120 (12 times 10) and the minimum score is 12 (12 times 1). A score of 120 indicates an unwillingness to assume ANY risk, while that of 12 indicates an extreme willingness to assume risk. In practice, these extremes will seldom if ever be encountered. Most people have scores somewhere in between these extremes, which suggests that most people are moderate risk takers. I would expect most of your scores to be in this range.

Slide Seven

A bit of history on this scale and scores that have been found in the past is often helpful in understanding your scores. Psychologists developed the original choice dilemma scale about 1960. The number of choice dilemmas and their structure are the same as this scale. The life situations ranged from chess matches to investment, career, and health decisions (Kogan and Wallach; Wallach and Kogan). In 1991, we developed an agricultural version for use in the Eastern Cornbelt. Both the original psychological and agricultural versions were administered to a group of corn and soybean farmers attending a three-day workshop at Purdue University

(Patrick, Musser, and Ortmann). Subsequently, these two versions were also administered to groups of professional farm managers and agricultural lenders (Patrick and Ullerich).

Mean scores for these groups are included in Table 1. (Tables 1-3 are passed out to the workshop participants at this point). Several aspects of these means are striking. First, the means are almost identical for the original and the agricultural versions for all groups. Thus, the agricultural version was a successful adaptation of the earlier scale. Secondly, essentially no differences exist among the groups. Farmers are a little lower than the other two groups, which indicate a greater willingness to take risk, but these differences are not statistically significant. Although differences might be statistically significant with larger numbers of observations, magnitudes of the differences are small. Even if the differences were significant, farmers are not much more willing to assume risks than other groups. Wallach and Kogan reported means of 76.56 and 76.32 for men and women, respectively, in a general population, which are similar to the means scores in Table 1. We conclude that farmers and agribusiness personnel have no differences in risk preferences from the general population.

Slide Eight

Means for groups taking the horticultural version are presented in Table 2. While these are small groups, the means of all the groups are similar to those for the Cornbelt version in Table 1. The overall mean of 74.9 is quite similar to that for the farmers; means for the groups of risk researchers and risk extension personnel are also similar. Thus, this horticultural version has similar means to those for the other two versions. In addition, both the agricultural extension agents and the risk research and extension specialists have similar means as the groups in Table 1 and the general population.

Slide Nine

Frequency distribution of responses for the Cornbelt and original versions are in Table 3. These distributions show considerable variability in willingness to assume risk in all of the groups. Summaries of the farmer distribution for the agricultural version and of the distribution of the horticultural version for the extension personnel are presented on Slide 9. The distributions are quite similar. Both distributions have at least one score above 100; these individuals are willing to bear hardly any risk. Those with responses in the nineties also are not willing to bear much risk. The majority of the individuals are clustered around the means---60 to 89. However, a number of individuals have scores below 60, and some below 50. These individuals are willing to assume much more risk than those with higher scores. Thus, individuals in these populations have pronounced differences in willingness to assume risk.

Slide Ten

Now we will look at your scores. (The analyst writes the numbers for the distribution of the participating group after the scores are tabulated and gives the slide to the instructor.) As with other groups, individuals in this group have scores with a wide distribution with some individuals unwilling to assume much risk and some individuals willing to assume considerable more risk than others in the group. In addition, the mean of these scores is quite similar to the mean score for other groups. (This discussion can be modified for any differences in the distribution from previous applications.) Think about your own score. Does it put you about where you would expect to be relative to others in this group? If not, you may want to review your answers and your addition. Or, maybe you had not fully considered your willingness to assume risk before today.

Slide Eleven

To conclude, the scale is useful to illustrate risk concepts. Each choice dilemma demonstrates the nature of risky choices and the risk-returns tradeoff. Taken together the choices illustrate the five sources of risk for farmers. Tabulating the scores illustrates that considerable differences in risk preferences exist for this group. Previous applications demonstrated that these differences also exist in willingness to assume risks among Cornbelt farmers, extension educators, and other agricultural business personnel. In addition, the averages and distributions for the various groups are very similar. Such differences in the willingness to assume risk affect farmers' willingness to use various risk management options. As you consider these options for different commodity groups, remember that all farmers will not find these options desirable. In addition, we cannot identify the optimal package of options for any producer independently of risk preferences. Even if all resources are identical, two producers may choose different risk management options because their risk preferences are different.

Conclusions

This paper has illustrated the use of agricultural choice dilemmas to illustrate the nature of risky choices, differences among individual risk preferences, and risk-returns tradeoffs. The illustration was presented in a teaching set of overhead slides. These slides have been used with several different audiences so they can be used in classroom and extension audiences. This teaching unit provides a heuristic approach for illustrating risk concepts to audience with limited background in economic theory and methods. Such a demonstration of risk preferences may motivate further study of risk management responses or standard risk theory. This scale also potentially could be used as a positive measure of risk preferences in empirical analysis of risk

management when theoretical risk preferences are unavailable or seem to unreliable to use in econometric analysis. Patrick, Musser, and Ortmann demonstrate such a use of measures from the scale.

Scores from the three versions that were used in this paper have similar means and frequency distributions. Because these scores are robust, educators are encouraged to adapt the choice dilemmas to agricultural situations in their own geographical or commodity. However, the structure of the questions---two outcomes with ten different levels of probability---and the number of questions should be maintained. Examining both versions of the scale that we have developed would help in adapting the scale to your situation.

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Table 1. Average Scores on Original and Agricultural Choice Dilemmas by Farmers, Professional Farm Managers, and Agricultural Bankers

Group	Choice Dilemma Form	
	Original	Agricultural
Farmers	76.50	79.61
Farm Managers	76.71	79.09
Agricultural Bankers	80.52	79.11

Table 2. Mean Responses to Horticultural Choice Dilemma Scale, Horticultural Risk Management In-Services, June, 1999

Site	Number of Participants	Mean
Batavia, NY	19	72.9
Springfield, MA	7	77.3
Lancaster, PA	29	79.3
Hagerstown, MD	14	75.2
Richmond, VA	21	74.9
Fort Wayne, IN	14	67.3
All Sites	104	74.9

Table 3. Distributions of Total Scores on Original and Agricultural Choice Dilemmas of Farmers, Lenders and Farm Managers.

Range of Scores	Farmers		Lenders		Farm Managers	
	Original n=52	Agricultural n=51	Original n=53	Agricultural n=57	Original n=24	Agricultural n=38
Less than 40	1	-	-	-	-	-
40-44	-	1	-	-	-	-
45-49	-	1	-	-	-	-
50-54	1	1	2	2	-	2
55-59	1	5	2	2	-	-
60-64	4	3	2	2	3	3
65-69	11	9	2	2	3	5
70-74	6	7	9	11	3	3
75-79	9	4	7	7	5	9
80-84	6	11	13	13	3	3
85-89	6	4	7	9	1	3
90-94	4	2	5	5	1	3
95-99	2	2	2	2	1	3
100-104	1	1	1	1	2	2
105 or more	-	-	1	1	2	2
Mean	76.0	74.0	79.2	79.2	79.8	79.5

[a]Possible scores range from 12 (very willing to accept risk) to 120 (unwilling to assume any risk).

Appendix 1. Horticultural Choice Dilemmas Questionnaire

Adapted from N. Kogan and M. A. Wallach, *Risk-Taking, A Study in Cognition and Personality*, New York: Holt, Rinehart, and Winston, 1964 by Wesley Musser and George Patrick.

Instructions. On the following pages, you will find a series of situations that are likely to occur in everyday life. The central person in each situation is faced with a choice between two alternative courses of action, which we might call X and Y. Alternative X is more desirable and attractive than alternative Y, but the probability of attaining or achieving X is less than that of achieving Y.

For each situation on the following pages, you will be asked to indicate the minimum odds of success that you would demand before recommending that the more attractive or desirable alternative, X, be chosen.

Read each situation carefully before giving your judgement. Try to place yourself in the position of the central person in each of the situations. There are twelve situations in all. Please do not omit any of them.

1. Donna B., who is single, has been successfully working as the manager of the sales department of a large nursery since graduating from college five years ago. She is assured of a lifetime job with a modest, though adequate, salary, and liberal pension benefits upon retirement. On the other hand, it is very unlikely that her salary will increase much before she retires. While attending an ornamental horticulture conference, Ms. B. is offered a job with a small, newly founded company producing woody ornamentals which has a highly uncertain future. The new job would pay more to start and would offer the possibility of a share in the ownership if the company survived the competition of larger existing firms.

Imagine you are advising Ms. B. Listed below are several probabilities or odds of the new company's proving financially sound.

Please check the lowest probability that you would consider acceptable for Ms. B to take the new job.

____ The chances are 1 in 10 that the company will prove financially sound.
____ The chances are 3 in 10 that the company will prove financially sound
____ The chances are 5 in 10 that the company will prove financially sound.
____ The chances are 7 in 10 that the company will prove financially sound.
____ The chances are 9 in 10 that the company will prove financially sound.
____ Place a check here if you think that Ms. B. should not take the new job no matter what the probabilities

2. Phil B., a 45-year-old vegetable grower, has recently been informed by his physician that he has developed a severe heart ailment. The disease would be sufficiently serious to force Mr. B to change many of his strongest life habits--giving up his farming activities, drastically changing his diet, reducing favorite leisure time activities. The physician suggests a delicate medical operation could be attempted which, if successful, would completely alleviate the heart condition. But its success could not be assured, and in fact, the operation might prove fatal.

Imagine you are advising Mr. B. Listed below are several probabilities or odds that the operation will prove successful.

Please check the lowest probability that you would consider acceptable for the operation to be performed.

____ Please place a check here if you think Mr. B. should not have the operation no matter what the probabilities.
____ The chances are 9 in 10 the operation will be a success.
____ The chances are 7 in 10 the operation will be a success.
____ The chances are 5 in 10 the operation will be a success.
____ The chances are 3 in 10 the operation will be a success.
____ The chances are 1 in 10 the operation will be a success

3. Peter T. is the owner and operator of a vegetable and fruit operation. The farm is quite prosperous, and Mr. T. has strongly considered the possibilities of business expansion. The choice is between buying additional cropland to plant more vegetables, which would provide a moderate return on the additional $100,000 investment, or planting additional apple trees. Because of Mr. T.'s apple management skills, planting trees offers a much higher potential return on the $100,000 invested. On the other hand, future pesticide use policies are unclear and may be subject to change for fruit. In fact, one proposal would sharply limit fruit production in the area, making the orchard investment worthless.

Imagine you are advising Mr. T. Listed below are several probabilities or odds of continued stability in pesticide use policies.

Please check the lowest probability that you would consider acceptable for Mr. T. to plant additional apple trees.

____ The chances are 1 in 10 that apple production will not be sharply limited.
____ The chances are 3 in 10 that apple production will not be sharply limited.
____ The chances are 5 in 10 that apple production will not be sharply limited.
____ The chances are 7 in 10 that apple production will not be sharply limited.
____ The chances are 9 in 10 that apple production will not be sharply limited.
____ Place a check here if you think that Mr. T. should not invest in additional apple production , no matter what the probabilities.

4. Ms. Lynn P. is in the middle of weekly fresh sweet corn planting when her planter has a major breakdown, and it begins to rain heavily. Ms. P. could purchase a new planter which is currently available from a local dealer and can be delivered in the morning. On the other hand, Ms. P. could arrange for the repairs which would be much less costly than a new planter. The repaired planter would have several years of life remaining after the repairs. However, the local dealer does not know when the needed parts will be obtained and repairs can be completed. If Ms. P. is unable to resume planting after the rain, she will lose a week's worth of production this summer.

Imagine that you are advising Ms. P. Listed below are several probabilities or odds that the repairs will be completed before Ms. P. would be able to resume planting and avoid extra production losses.

Please check the lowest probability that you would consider acceptable for Ms. P. to repair the old planter.

____Place a check here if you think Ms. P. should not consider repair to the old planter no matter what the probabilities.
____ The chances are 9 in 10 that the planter will be repaired before planting can be resumed.
____ The chances are 7 in 10 that the planter will be repaired before planting can be resumed.
____ The chances are 5 in 10 that the planter will be repaired before planting can be resumed.
____ The chances are 3 in 10 that the planter will be repaired before planting can be resumed.
____ The chances are 1 in 10 that the planter will be repaired before planting can be resumed.

5. Mr. C., a married man with two children, has a farm, which provides net income for family living expenditures of $30,000 per year. He can easily afford the necessities of life, but few of the luxuries. Mr. C.'s father, who recently died, carried a $20,000 life insurance policy. Mr. C. would like to use the money as down payment on additional farm land. He is aware of a nearby tract of land, which he could easily incorporate into his existing farming operation. He estimates that his net income, after expenses and making the loan payment, would be $1,200 per year. On the other hand, he has also heard about a tract of land near a local urban area. If the city starts growing again, the land could quickly double in value. In the interim, Mr. C. believes that he can break even farming the land. However, if the city continues its current stagnation, the land could decline in value.

Imagine you are advising Mr. C. Listed below are several probabilities or odds that the land will double in value.

Please check the lowest probability that you would consider acceptable for Mr. C. to invest in the tract of land near the urban area.

____ The chances are 1 in 10 that the land will double in value.
____ The chances are 3 in 10 that the land will double in value.
____ The chances are 5 in 10 that the land will double in value.
____ The chances are 7 in 10 that the land will double in value.
____ The chances are 9 in 10 that the land will double in value.
____ Place a check here if you think that Mr. C. should not invest in the tract of land, no matter what the probabilities.

6. Wes G. is a farmer whose major crop is potatoes. He has storage for half his normal crop and sells the rest at harvest. Currently, he can contract 50% of his normal crop for processing for harvest delivery at $10 per cwt.; this price is less than he receives sometimes, but more than what he often receives at harvest. Alternatively, he can wait to sell his potatoes at the market price when they are delivered. If the market price of potatoes increases, Mr. G. will have a higher income. But there is also some chance the price of potatoes may decrease and Mr. G. would have a lower income. Mr. G. must decide whether it would be best to guarantee himself a price on 50 % of his expected production now, or wait and sell at harvest.

Imagine you are advising Mr. G. Listed below are several probabilities or odds that waiting to sell at harvest will result in higher income.

Please check the lowest probability that you would consider acceptable for Mr. G. to wait to sell at harvest.

____ Please place a check here if you think Mr. G. should not wait to sell, no matter what the probabilities.
____ The chances are 9 in 10 that waiting to sell will be a success.
____ The chances are 7 in 10 that waiting to sell will be a success.
____ The chances are 5 in 10 that waiting to sell will be a success.
____ The chances are 3 in 10 that waiting to sell will be a success.
____ The chances are 1 in 10 that waiting to sell will be a success.

7. Kate S. is a farmer who uses about 10,000 gallons of diesel fuel annually. Currently petroleum prices are quite high compared with historical levels. A local firm offers to sell Ms. S. as much diesel fuel as she would use in the next production season at a price considerably below current levels. At that price, Ms. S. would have significant cost savings. However, Ms. S. must pay for the diesel fuel now, before its delivery next year. Because petroleum prices are quite volatile, prices may drop substantially before the next production season. This would result in a significant loss for Ms. S.

Imagine you are advising Ms. S. Listed below are several probabilities or odds that diesel prices will not drop below current levels.

Please check the lowest probability that you would consider acceptable for Ms. S. to buy the diesel fuel now.

____ The chances are 1 in 10 that diesel fuel prices will not decline.
____ The chances are 3 in 10 that diesel fuel prices will not decline.
____ The chances are 5 in 10 that diesel fuel prices will not decline.
____ The chances are 7 in 10 that diesel fuel prices will not decline.
____ The chances are 9 in 10 that diesel fuel prices will not decline.
____ Please place a check here if you think Ms. S. should not buy the diesel fuel, no matter what the probabilities.

8. George P., a 28-year old married farmer, has been cash renting cropland from several landowners for more than five years. Mrs. W., a widow, is offering George the opportunity to buy her land at a price slightly below the current market value. George can obtain the necessary financing, although the land purchase would involve a large debt and put him in a vulnerable financial situation. Purchase of the land would be a good investment, if no major adversity occurs in agriculture. On the other hand, a significant adversity, such as a severe disease outbreak or a commodity price decline, could force George out of farming.

Imagine you are advising George. Listed below are several probabilities or odds of no significant adversity occurring in agriculture.

Please check the lowest probability that you would consider acceptable for George to purchase Mrs. W.'s land.

____ Please place a check here if you think George should not buy the land, no matter what the probabilities.
____ The chances are 9 in 10 that no significant adversity will occur.
____ The chances are 7 in 10 that no significant adversity will occur.
____ The chances are 5 in 10 that no significant adversity will occur.
____ The chances are 3 in 10 that no significant adversity will occur.
____ The chances are 1 in 10 that no significant adversity will occur.

9. Mr. H. has a farm with sandy loam soils which yield well in years of above average rainfall. Yields tend to be average in normal years and very low if there is a drought. The past couple of years yields have been below average and Mr. H.'s financial position is not strong. Irrigation is possible in the area. A center pivot irrigation system for 80 acres would require an investment of about $50,000. Mr. H. has determined that he would need an increase in his average fresh market green bean yield of about 15 bushels per acre to pay for the additional seed, fertilizer, water applications and recover his investment in the irrigation system over a ten year period. Experimental irrigation plots have obtained yield increases of 25 to 35 bushels per acre. If Mr. H. could obtain this kind of yield increases, the irrigation investment would be very profitable. However, if yield increases of less than 15 bushels per acre were obtained, Mr. H.'s financial position would worsen rapidly.

Imagine you are advising Mr. H. Listed below are several probabilities or odds that Mr. H. will obtain an average green bean yield increase of greater than 15 bushels per acre.

Please check the lowest probability that you would consider acceptable to make the investment in irrigation.

____ The chances are 1 in 10 that the yield increase will exceed 15 bushels per acre.
____ The chances are 3 in 10 that the yield increase will exceed 15 bushels per acre.
____ The chances are 5 in 10 that the yield increase will exceed 15 bushels per acre.
____ The chances are 7 in 10 that the yield increase will exceed 15 bushels per acre.
____ The chances are 9 in 10 that the yield increase will exceed 15 bushels per acre.
____ Please place a check here if you think Mr. H. should not invest in irrigation no matter what the probabilities.

10. David K. is a successful farmer who has participated in a number of civic activities of considerable value to the community. Mr. K. has been approached by the leaders of his political party as a possible congressional candidate in the next election. Mr. K.'s party is a minority party in the district, though the party has won occasional elections in the past. Mr. K. would like to hold political office, but to do so would involve a serious financial sacrifice, since the party has insufficient campaign funds. He would also have to endure the attacks of his political opponents in a hot campaign.

Imagine you are advising Mr. K. Listed below are several probabilities or odds of Mr. K.'s winning the election in his district.

Please check the lowest probability that you would consider acceptable to make it worthwhile for Mr. K. to run for political office.

____ Please place a check here if you think Mr. K. should not run for political office, no matter what the probabilities.
____ The chances are 9 in 10 that Mr. K. would win the election.
____ The chances are 7 in 10 that Mr. K. would win the election.
____ The chances are 5 in 10 that Mr. K. would win the election.
____ The chances are 3 in 10 that Mr. K. would win the election.
____ The chances are 1 in 10 that Mr. K. would win the election.

11. Gerald O., a married 30-year old farmer, has obtained a five- year lease on 320 acres of farmland. Mr. O. currently has sufficient machinery for the land and some operating capital. As he considers a farm plan for the next five years, Mr. O. realizes that he might grow vegetables on part of the land. If he could successfully manage vegetable production and markets continued to exist, he would be very successful financially and would probably be able to purchase the land after the five years. If he were unsuccessful in vegetable production and marketing, Mr. O. would be likely to lose his existing capital and have to quit farming. On the other hand, Mr. O. could, as most local farmers are doing, grow corn and soybeans with which he has had experience, but which would be likely to allow only limited financial progress.

Imagine you are advising Mr. O. Listed below are several probabilities or odds that he will be successful in vegetable production.

Please check the lowest probability that you would consider acceptable for Mr. O. to go into vegetable production .

____ The chances are 1 in 10 vegetable production would be successful.
____ The chances are 3 in 10 vegetable production would be successful.
____ The chances are 5 in 10 vegetable production would be successful.
____ The chances are 7 in 10 vegetable production would be successful.
____ The chances are 9 in 10 vegetable production would be successful.
____ Please place a check here if you think Mr. O. should not attempt vegetable production, no matter what the probabilities.

12. Mr. M., an older farmer, is contemplating forming a partnership with Mr. Z., a man whom he has employed on the farm for more than two years. Recently, however, a number of arguments have occurred between them, suggesting some sharp differences of opinion in the way each views certain matters and how things should be done. Indeed, they decide to seek professional advice from a business counselor as to whether it would be wise for them to form a partnership. On the basis of these meetings with the business counselor, they realize that a well-working partnership, while possible, would not be assured.

Imagine you are advising Mr. M. and Mr. Z. Listed below are several probabilities or odds that their partnership would prove to be a well-working one.

Please check the lowest probability that you would consider acceptable for Mr. M. and Mr. Z. to form a farm partnership.

____ Please place a check here if you think Mr. M. and Mr. Z. should not form a farm partnership, no matter what the probabilities.
____ The chances are 9 in 10 that the partnership will be a success.
____ The chances are 7 in 10 that the partnership will be a success.
____ The chances are 5 in 10 that the partnership will be a success.
____ The chances are 3 in 10 that the partnership will be a success.
____ The chances are 1 in 10 that the partnership will be a success.

Appendix 2. Lecture Slides

WHAT ARE YOUR RISK PREFERENCES?

Complexity of Risky Decisions

- *Risk-Returns Tradeoffs
- *Differences in Willingness to Assume Risk

Importance of Risk Preferences

- *Affect Choices
- *Differences in Recommendations
- *Differences Among Family Members and Business Partners

Purpose of This Unit: *Introduce You to a Scale That Illustrates the Effect of Risk on Decisions and Measures Differences in Risk Preferences*

Choice Dilemma Scale

Slide 1

SCORE SHEET FOR INDIVIDUAL RESPONSES:

Score each situation below based on your response. List the probabilities from one to nine corresponding to your choice for each situation. Score the response that the risky alternative is never chosen no matter the probabilities as ten. Then, sum your scores on the individual situations:

Choice Number	Response Number
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
Sum of Above	

Slide 2

CHARACTERISTICS OF SCALE:

Choice Between Higher and Lower Risk & Returns Responses to Ag Decisions

- ***Choose Low Risk Alternative**
- ***Choose Higher Risk Alternative if Probability of Occurrence is Appropriate**
- ***Probability is Subjective**
- *** *Choice Depend on Risk Preferences***

Sum of Responses Rather Than Responses to Individual Questions

Overall Willingness to Assume Risk in Farming

- ***Five Sources of Risk**
- ***Interactions Among Sources**

Slide 3

4. Ms. Lynn P. is in the middle of weekly fresh sweet corn planting when her planter has a major breakdown, and it begins to rain heavily. Ms. P. could purchase a new planter, which is currently available from a local dealer and can be delivered in the morning. On the other hand, Ms. P. could arrange for the repairs, which would be much less costly than a new planter. The repaired planter would have several years of life remaining after the repairs. However, the local dealer does not know when the needed parts will be obtained and repairs can be completed. If Ms. P. is unable to resume planting after the rain, she will lose a week's worth of production this summer.

Imagine that you are advising Ms. P. Listed below are several probabilities or odds that the repairs will be completed before Ms. P. would be able to resume planting and avoid extra production losses.

Please check the lowest probability that you would consider acceptable for Ms. P. to repair the old planter.

_____ Place a check here if you think Ms. P. should not consider repair to the old planter no matter what the probabilities.
_____ The chances are 9 in 10 that the planter will be repaired before planting can be resumed.
_____ The chances are 7 in 10 that the planter will be repaired before planting can be resumed.
_____ The chances are 5 in 10 that the planter will be repaired before planting can be resumed.
_____ The chances are 3 in 10 that the planter will be repaired before planting can be resumed.
_____ The chances are 1 in 10 that the planter will be repaired before planting can be resumed.

Slide 4

CLASSIFICATION OF SOURCES OF RISK IN THE CHOICES ON THE SCALE

Choice Number	Major Source of Risk
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	

Slide 5

Score Ranges from 12 to 120

*Low Scores High Willingness to Assume Risk

*High Scores Low Willingness to Assume Risk

*Most Individuals Between Extremes

Slide 6

BACKGROUND ON THE SCALE

Developed by Psychologists

- *Probabilistic Choices Between Two Alternatives
- *Everyday Life Situations
- *Mean Score: 76.6 for Men and 76.3 for Women

Situations Changed to Cornbelt Farming Context

- *Original and Farming Versions to Farmers, Farm Managers, and Ag Lenders in Midwest
- *Mean Score 76.0 for Cornbelt Farmers on Original Version and 74.0 on Farm Version
- *No Differences between Versions in Other Groups
- *Scores on Original Same as General Population

Hort Situations for Inservices

Slide7

MEAN RESPONSES AT HORT INSERVICE SITES AND RISK RESEARCH MEETING

Site	Number	Mean
Batavia, NY	19	72.9
Springfield, MA	7	77.3
Lancaster, PA	29	79.3
Hagerstown, MD	14	75.2
Richmond, VA	21	74.9
Fort Wayne, IN	14	67.3
All Inservice Sites	104	74.9
Risk Research Meeting	22	73.5

Slide 8

TABULATION OF RESPONSES:

Range of Scores	Cornbelt Farmers	Hort Inservices
	Number of Responses	
100 or More	1	1
95-99	2	2
90-94	2	0
85-89	4	3
80-84	11	3
75-79	4	6
70-74	7	5
65-69	9	8
60-64	3	3
55-59	5	3
50-54	1	1
Less than 50	2	3
Total Number	51	39
Average	74	73.5

Slide 9

TABULATION OF RESPONSES

Range of Scores	Number of Responses
100 or More	
95-99	
90-94	
85-89	
80-84	
75-79	
70-74	
65-69	
60-64	
55-59	
50-54	
Less than 50	
Total Number	
Average	

Slide 10

CONCLUSIONS

Risk Preferences and Farm Decisions

Five Sources of Risk

Risk-Returns Tradeoff

Risk Preferences Vary among Producers and Other Groups

Recommendations for Producers May Vary Because of Risk Preferences

Scale Used to Illustrate Risk Preferences

Slide 11