

Entrepreneurship and Risk Taking

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According to the definition of entrepreneurship and everyday observation, entrepreneurs are perceived as more risk prone than other people. However, laboratory studies do not provide conclusive support for this claim. In our study, three groups of students served as subjects. One group of students did not express any intention of starting up their own business in the near future. The second group consisted of students who had participated in a special course designed for future entrepreneurs. The third group consisted of students or alumni who became entrepreneurs before graduating. In accordance with Knight's claim, we found that actual entrepreneurs revealed the highest, and students who did not express an intention of starting their own business the lowest, level of self-confidence of all groups participating in the experiment. On the other hand, in well-defined risky situations we did not confirm a hypothesis that would-be entrepreneurs or actual entrepreneurs were more risk prone than students with no intention of starting a business. Yet, in naturalistic-business risky situations we found more risky choices among entrepreneurs than among non-entrepreneurs.

Conformément à la définition même de l'esprit d'entreprise et à l'observation quotidienne, les entrepreneurs sont perçus comme étant plus enclins que les autres personnes à prendre des risques. Seulement, les recherches expérimentales ne confirment pas de façon définitive cette conception. Notre étude a porté sur trois groupes d'étudiants. L'un des groupes n'avait aucunement l'intention de créer une entreprise dans un avenir prévisible. Le deuxième groupe était composé d'étudiants qui suivaient un cours spécialement destiné aux futurs entrepreneurs. Le troisième groupe rassemblait des étudiants ou d'anciens étudiants qui devinrent entrepreneurs avant d'être diplômés. En accord avec les propositions de Knight, on a constaté que les entrepreneurs étaient ceux qui avaient la plus forte confiance en eux-mêmes et les jeunes qui n'éprouvaient aucune vocation d'entrepreneur la plus faible. D'autre part, face à des situations de risque bien précises, il fut impossible de corroborer l'hypothèse que les aspirants entrepreneurs ou les chefs d'entreprise étaient plus portés sur le risque que les étudiants n'ayant aucunement l'intention de fonder une entreprise. Toutefois, devant des décisions risquées dans des situations concrètes

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industrielles ou commerciales, on a observé plus de choix aventureux chez les entrepreneurs que chez ceux qui ne l'étaient pas.

INTRODUCTION

According to the definition of entrepreneurship and everyday observation, entrepreneurs are perceived as more risk prone than other people. As Wärneryd (1988, p. 407) put it, “. . . there seems to be general agreement that risk bearing is a necessary . . . prerequisite for being called an entrepreneur”. However, laboratory studies do not provide conclusive support for this claim.

Indeed, in a piece of research by Brockhaus (1980), in which the Kogan-Wallach questionnaire was used to measure the propensity of risk taking in three groups—entrepreneurs, freshly hired managers, and managers who just got promoted—no differences were apparent between these groups. The Kogan-Wallach questionnaire is made up of 12 scenarios which portray individuals who face a decision that involves a risky activity. For example, the decision might concern accepting a job offer in a newly established company, the future of which is uncertain. A participant has to choose the level of probability which would justify taking the risky action (in this case accepting the job offer). The actions described in the questionnaire relate to different life domains such as career, health, stock exchange investments, marriage, etc. Neither in this nor in another piece of research by Masters and Meier (1988), in which the Kogan-Wallach questionnaire was used, was it concluded that there are statistically significant differences between company owners and managers in their propensity to take risk. Similarly, when Richard (1989) used Jackson's questionnaire, consisting of 10 true/false statements that concern risk in different areas (social, ethical, financial), he did not find any differences with regard to risk taking in entrepreneurs and non-entrepreneurs. These results are not easy to interpret. It is possible that entrepreneurs are not in fact more likely to take risks than non-entrepreneurs.

On the other hand, in other research where similar measures of risk propensity were used, the difference between entrepreneurs and non-entrepreneurs was found to exist. For example, the research by Begley and Boyd (1987), by Carland, Carland, Carland, and Pearce (1995), and by Stewart, Watson, Carland, and Carland (1999), where the same Jackson's questionnaire was applied, confirmed the hypothesis that entrepreneurs have a more positive attitude toward risk than non-entrepreneurs. Therefore, we can say that results of various studies are not conclusive on the question whether or not entrepreneurs are more risk prone than other people. In the present research we decided to test this question more thoroughly in two studies. In Study 1 we compared risk attitudes among three groups of students: (1) those who did not express any intention of starting up their own

business, (2) those who expressed such an intention, and (3) those who became entrepreneurs, in two laboratory risky tasks. In Study 2 we compared the frequency of risky choices among entrepreneurs and non-entrepreneurs in naturalistic-business risky situations.

STUDY 1: PROPENSITY TO TAKE RISK IN CHANCE-RELATED AND SKILL-RELATED RISKY SITUATIONS

First, we thought that the explanation of entrepreneurs' propensity to take risk may lie in the distinction between two kinds of risky situations, namely, between purely chance-related and skill-related risk. The difference between the two kinds of risk is the extent to which the decision-maker has control over the outcome. For example, in tossing a coin there is no control and the outcome depends on pure luck. On the other hand, the outcome in a competition or quiz depends on both luck and on the skill or knowledge of the decision-maker. As has been shown in many studies (Heath & Tversky, 1991; Camerer & Lovallo, 1999; Vlek & Stallen, 1981; Weinstein, 1984), individuals are much more likely to take risk when the outcome of the action depends on their own skills rather than on chance.

Undoubtedly, the risk associated with running a business venture is related to the skills of the decision-maker. Shapira (1995), who conducted intensive interviews with top managers, stated that the interviewees stressed the difference between risk taking in business and risk associated with chance. The risk a manager or an entrepreneur has to deal with is associated with his control and skills. In our study, we tested a hypothesis that entrepreneurs are actually more risk prone than other people, but only in skill-related risky situations and not in purely chance-related risky situations.

Entrepreneurs' propensity to take risk may also be related to risk perception. While estimating the riskiness of the situation, the decision-maker forms some beliefs about future outcomes. His/her perceived riskiness of the situation is based on his/her experience. One should distinguish between experience in those environments where the decision-maker believes he/she has no control over the outcomes, and those environments where he/she thinks he/she has at least some control over the outcomes. Overestimating the probability of positive outcomes in situations of lack of control over the outcomes demonstrates optimism of a decision-maker. Overestimating the probability of positive outcomes in the situations of having some control over the outcome results from their belief in their abilities and is an indicator of a high level of self-confidence or self-efficacy. Hence, depending upon the decision-maker's perception of the environment as either externally or internally controlled, either optimism-pessimism (belief in luck) or self-confidence matters.

The specific nature of uncertainty that entrepreneurs have to deal with was emphasised by Knight (1921) who presented a manufacturer facing a commercial decision:

The essential and outstanding fact is that the “instance” in question is so entirely unique that there are no others or not sufficient number to make it possible to tabulate enough like it to form a basis for any inference of value about real probability in the case we are interested in. The same obviously applies to most conduct and not to business decisions alone. (Part III, chapter VII, p. 39)

Knight highlights therefore such situations that do not allow the objective probability of success to be accurately calculated. In such situations, only subjective estimates are possible. Undoubtedly, this type of estimation is to a large extent dependent on the individual’s own belief in his/her abilities and self-confidence. Knight was of the opinion that this self-confidence is a trait which clearly differentiates people. One could assume that it distinguishes entrepreneurs from other people.

The assumption of Knight that self-confidence (self-efficacy) is a trait which differentiates people was developed by Albert Bandura (1994). Bandura points out the main sources of self-efficacy. Achieving mastery or proficiency in a given field is considered to be the most effective source of building self-efficacy. Achieving success helps to build a sense of self-efficacy, whereas failure, especially if it happens before the sense of self-efficacy is established, undermines self-efficacy.

In accordance with Knight’s claim, Chen, Greene, and Creek (1998) asked entrepreneurs and managers to rate their confidence in dealing with different types of tasks concerned with running a business. It turned out that for some of these tasks, entrepreneurs had in fact a higher sense of self-efficacy than non-entrepreneurs. This was the case in two out of five areas. One of them was the area of innovativeness—decisions concerning starting a new venture, gaining new markets, gaining new methods of production, etc. The other area in which entrepreneurs showed a higher sense of self-efficacy was in risk taking: taking a calculated risk, making a decision under risk and uncertainty, taking responsibility for ideas and decisions and work in stressful and conflicting circumstances. The results obtained by Chen et al. show that in skill-dependent tasks, entrepreneurs were more likely than students to associate success with their own skill and also they were more likely to rate more highly the chances of undertaking the planned activities (with a high correlation of the two ratings). In our study we test Knight’s hypothesis that what distinguishes entrepreneurs from other people is their higher self-confidence. Naturally, as Knight suggested, a positive relationship between self-confidence and risk taking is expected. Indeed, Krueger and Dickson (1994)

conducted an experiment in which they demonstrated that feedback delivered to the participants influenced their self-efficacy and sense of competence. Therefore, in accordance with Bandura's concept, experiencing success does in fact lead to an increase in self-efficacy. Moreover, they showed that self-efficacy was associated with the propensity to take risk. As expected, individuals with higher self-efficacy were more prone to risk taking, whereas individuals with lower self-efficacy were less prone to risk taking. Furthermore, the research showed that the increase in self-confidence in one field (e.g. a dilemma task) influences the propensity to take risk in this field but not in other fields (e.g. lottery type tasks). This suggests that the effects of an increase in self-confidence are task specific. Finally, Krueger and Dickson conducted a path analysis and showed that self-confidence influenced the perception of chances of success and failure which in turn influenced the propensity to take risk. Creating a sense of self-efficacy increased the perception of a given situation as being an opportunity for success and decreased the perceived risk (perceiving the situation as threatening). Thus, we expect a positive relationship between self-confidence and risk taking in skill-related situations.

Method

Subjects. Three groups of subjects took part in the experiment. One group consisted of students who were participating in a special course designed for future entrepreneurs. They were recruited on the basis of their declared intention to start up their own business in the near future. They came from different types of colleges and universities in Mazovia province. The second group consisted of students of equivalent gender, age, and colleges, who explicitly expressed that they had no intention of starting their own business in the future. The third group consisted of students or alumni who became entrepreneurs before graduating. There were 44 students with the intention of starting up a business (20 women and 24 men), 42 students without such an intention (23 women and 19 men), and 40 student-entrepreneurs (10 women and 30 men). The subjects' age in all three groups was between 20 and 30; the majority of them were below 25 years old.

Materials. To test our hypotheses the following measures were used. Self-efficacy: Three kinds of measure of self-efficacy were used:

- Schwartzer's and Jerusalem's Generalised Self-Efficacy Scale
- the estimated number of errors in a classification task
- the high subjective probability of achieving good results in a classification task.

Schwartzter's and Jerusalem's Generalised Self-Efficacy Scale was originally developed in Germany by Matthias Jerusalem and Ralf Schwartzter in 1981 and its latest revised version contains 10 items. Some of the typical items are: "Thanks to my resourcefulness, I know how to handle unforeseen situations", and "When I am confronted with a problem, I can usually find several solutions". A subject indicates on a 4-point scale how true these statements are in relation to him/herself.

Two other measures were based on a figure classification task. The purpose of using such a task was to create a situation where all the subjects, being unfamiliar with the task, have to base their beliefs on a recent and comparable experience. To achieve this purpose, we had to accept the lack of relationship between task and entrepreneurship. In this task, subjects were presented with one of two figures appearing on the screen (a star or a truck) in one of two colors (blue or red), and with the criterion of classification being "color" or "shape". Their task was to press a LEFT or RIGHT button following the instruction:

- when the criterion was "color", a correct classification required pressing "LEFT" if the figure (either a star or a truck) was red or "RIGHT" if the figure (a star or a truck) was blue;
- when the criterion was "shape", a correct classification required pressing "LEFT" when the figure was a truck (either red or blue) or "RIGHT" when the figure was a star (red or blue).

The combinations of figures and criteria were generated randomly. An error was counted when the subject pressed a wrong button or when s/he did not press the right button within the required time. First, subjects completed three series of classifying figures, each series at a different speed (thus, with a different level of difficulty). Then they predicted/estimated the number of errors they would make in the forthcoming series of 30 classifications with a mixed and unknown level of difficulty. The difference between the actually accomplished and the predicted number of errors in the classification task was accepted as a measure of the subject's self-efficacy in this specific task.

Later during the experiment, subjects were asked to assess the probability of making a given number of errors (up to 4, up to 7, up to 10, up to 15, up to 20 and up to 25) during a series of 30 figure classifications. For this we used Spetzler's probability wheel (where the experimenter could change the proportion of the blue and red regions) and free software downloaded from <http://www.stanford.edu/~savage/software.htm>.

The subject was faced with a choice between two bets:

Bet A: You win 100,000 zlotys (about 25,000€) if you complete a series of 30 figure classifications with a mixed and unknown level of difficulty and make no more than a given number of errors (up to 4, up to 7, etc.).

Bet B: Consider the following probability wheel: half of the wheel is red and half of the wheel is blue. You win 100,000 zlotys (about 25,000€) if a pointer randomly hurled at the wheel lands in the blue region. You win nothing if it lands in the red region.

Then subjects were tested with the wheel of a different proportion of red and blue regions, till eventually the experimenter found a version of Bet B such that the subject was indifferent to Bet A or Bet B. The probability assigned to the event in Bet A—making no more than a given number of errors (separately for each number of errors) is set equal to the probability of winning Bet B.

With such a procedure, we elicited our subjects' subjective probability of making a given numbers of errors. This was accepted as still another measure of the subject's self-efficacy in this specific task.

Optimism was measured with a scale consisting of 20 items. The subjects estimated chances of different events happening to them on the scale from 0 per cent to 100 per cent. Thirteen of the events were negative, e.g. breaking a hand or a leg or being a victim of a car accident and seven of them were positive, e.g. finding 100 zlotys (about 25€) on the street or living up to 90 years of age. The coefficient alpha for the overall optimism scale was 0.73.

Risk propensity in skill-related risky situations: The subjects made a choice in a lottery where payoffs were determined by the subject's level of performance—the number of errors in a series of 30 figure classifications with a mixed and unknown level of difficulty (Table 1). Payoffs were made in lottery tickets of the "Golden Fish" lottery issued by Polish Lotto.

Risk propensity in chance-related risky situations: The subjects were presented with six chance-related risky situations, shown in Table 2, where A is the least risky alternative, and F is the most risky alternative. Their task was to make a choice of one out of six lotteries. Payoffs were determined by the results on a probability wheel, half of which were red and half were blue. Again payoffs were made in the form of lottery tickets of the "Golden Fish" lottery issued by Polish Lotto.

TABLE 1
Payoffs in a Lottery Measuring Risk Propensity in Skill-Related Situations

	<i>Number of errors</i>	<i>Payoff</i>
A	up to 25	1
B	up to 20	3
C	up to 15	6
D	up to 10	9
E	up to 7	12
F	up to 4	15

TABLE 2
Payoffs in a Lottery Measuring Risk Propensity in Chance-Related Situations

	<i>Red region</i>	<i>Blue region</i>
A	5	5
B	4	7
C	3	9
D	2	11
E	1	13
F	0	15

Procedure. The procedure consisted of the following steps.

1. Subjects started by completing three training series of a 20-figure classification task.
2. Then they predicted the number of errors they expected to make in a series of 30 figure classification, providing they tried very hard to get the best result.
3. They made a choice in the skill-related risky situation.
4. They made a choice in the chance-related risky situation.
5. They made choices between bets A and B, until subjective probabilities of making different numbers of errors were elicited.
6. Then subjects completed a series of 30 figure classifications.
7. Finally, subjects completed the Optimism scale and the Generalised Self-Efficacy scale.

Results

Table 3 shows correlations between the measure of optimism and two measures of self-efficacy, i.e. for generalised self-efficacy and the estimated number of errors in a specific task. As can be seen, significant but moderate correlations have been found between optimism and the two measures of self-efficacy. At the same time, a significant but moderate correlation occurred between generalised and specific measures of self-efficacy. As could be expected, subjective probabilities of making no more than the given numbers of errors (up to 4, up to 7, etc.) were correlated with the total estimated number of errors in a specific task.

As can be seen in Table 4, students with the intention of starting up their own business, students without such an intention, and entrepreneurs significantly differed in optimism as well as in all but one measure of self-efficacy. Students without the intention of starting up their own business revealed the least optimism and self-efficacy. Students with the intention of starting a

TABLE 3
Correlations between Optimism and Different Measures of Self-Efficacy

	<i>Optimism</i>	<i>Self-efficacy (GSES)</i>	<i>Estimated number of errors</i>
Self-efficacy (GSES)	.37***		
Estimated number of errors	-.25**	-.14	

Note: ** $p < .005$; *** $p < .001$.

TABLE 4
Differences between Students with the Intention and without the Intention of Starting up their Own Business on Various Measures of Self-Efficacy and Optimism

	<i>Students "without intention"</i>	<i>Students "with intention"</i>	<i>Entrepreneurs</i>	F	p
Optimism	57.4	59.1	63.6	3.89	.05
Self-efficacy GSES	29.64	31.55	33.05	8.08	.001
Up to 4 errors	30.48	45.39	55.03	14.51	.001
Up to 7 errors	49.24	63.16	70.38	11.66	.001
Up to 10 errors	60.36	71.93	77.95	8.84	.001
Up to 15 errors	77.24	84.59	87.28	4.45	.01
Estimated number of errors	9.57	8.61	8.88	.90	n.s.

business revealed medium optimism and self-efficacy. Entrepreneurs revealed the highest optimism and self-efficacy. For optimism, a statistically significant difference concerned entrepreneurs and students without the intention of starting a businesses (Tuckey's test, $p < .05$). For generalised self-efficacy the most significant difference was between entrepreneurs and students without a business intention (Tuckey's test, $p < .001$), and the difference between the two groups of students was close to being significant (Tuckey's test, $p < .061$). For subjective probability of making up to 4, 7, and 10 errors in 30 classifications, the results of students without a business intention were significantly lower than those of the two other groups. But the difference between students with a business intention and entrepreneurs was not statistically significant. The estimated number of errors in the classification task did not differentiate the three groups.

For both risky choices we ascribed numerical values from 1 for the least risky alternative (A) to 6 for the most risky alternative (F). As can be seen in Figure 1, there was no difference between students with a business intention, students without such an intention, and entrepreneurs in their choices in the

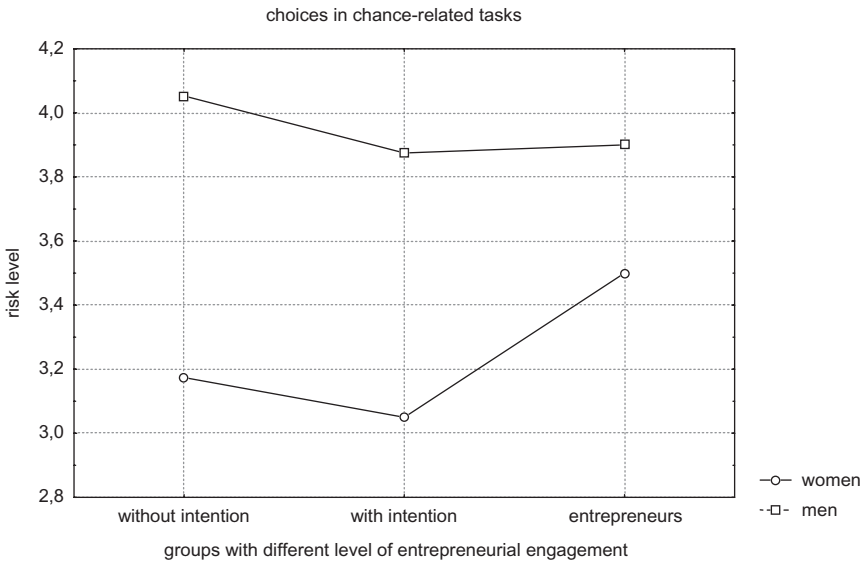


FIGURE 1. Choices in the three groups of students in chance-related tasks.

chance-related risky tasks. On the other hand, there were statistically significant differences between men and women. Men were more risk prone than women ($F(1,120) = 5.72, p < .05$).

As in the previous case, Figure 2 shows that there was no difference between the three groups of subjects in their choices in skill-related risky tasks. However, there were statistically significant differences between men and women. Men were more risk prone than women ($F(1,120) = 8.16, p < .005$). Thus, our hypothesis that entrepreneurs are more risk prone in skill-related risky situations was not supported. As one could expect, a moderate positive correlation was found between choices in chance-related and skill-related risky tasks ($r = .27$).

Finally, we examined the correlations between optimism and various measures of self-confidence and risk taking in both skill-related and chance-related situations. As can be seen in Table 5, significant correlations were found between choices in the skill-related task and all task-specific measures of self-efficacy and generalised self-efficacy. Choices in the chance-related task were not correlated with either self-efficacy or with optimism.

Discussion

Contrary to our assumption, optimism and self-efficacy turned out not to be independent. This may be due to the illusion of control (Langer, 1975) in

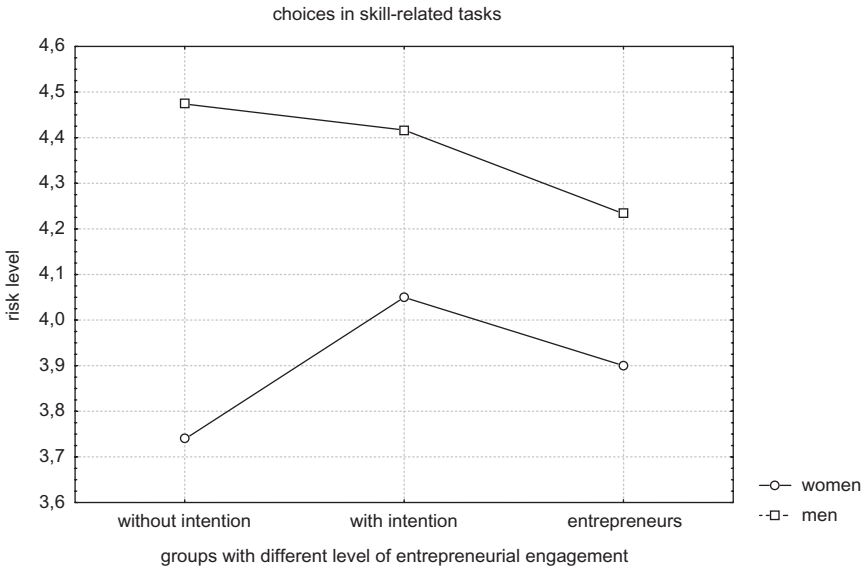


FIGURE 2. Choices in the three groups of students in skill-related tasks.

TABLE 5
Correlations between Choices and Optimism and Various Measures of Self-Efficacy

	<i>Choices in skill-related task</i>	<i>Choices in chance-related task</i>
Optimism	.08	.10
Self-efficacy (GSES)	.18*	.11
Estimated number of errors	-.64***	-.19*
Up to 4 errors	.31***	.07
Up to 7 errors	.37***	.08
Up to 10 errors	.21*	.09
Up to 15 errors	.18*	.01

Note: * $p < .05$; *** $p < .001$.

accordance with which people feel that they have control even in purely random situations. On the other hand, we found significant differences between entrepreneurs and non-entrepreneurs in all but one measure of beliefs. Moreover, entrepreneurs also revealed higher optimism than other people. Thus, in agreement with Knight’s claim, high self-confidence seems, in reality, to be the trait which distinguishes entrepreneurs from other people.

Our hypothesis that entrepreneurs are also more risk prone than other people, at least in skill-related risky situations, was not supported. Choices of entrepreneurs were similar to those of non-entrepreneurs not only in chance-related risky situations but also in skill-related risky situations. Since in both tasks women turned out to be more risk averse than men (Byrnes, Miller, & Schafer, 1999), we assume that the tasks were capable of ascertaining differences in risk propensity. Thus, this lack of differentiation means that we still lack the explanation why some people choose objectively risky entrepreneurial ventures, despite the fact that they do not reveal a higher level of risk propensity in risky laboratory tasks than other people.

STUDY 2: RISK TAKING IN NATURALISTIC-BUSINESS SETTINGS

Standard decision theory requires that before making a choice, the decision-maker should carefully analyse the information about outcomes and probabilities associated with alternative courses of action. In Study 1, we followed this concept of risky decision-making, i.e. we confronted our subjects with lotteries with well-defined outcomes and probabilities. However, in many naturalistic decision situations, people have very little and rather vague information about probabilities and outcomes (see Rottenstreich & Kivetz, 2006; Tyszka & Zaleskiewicz, 2006). In such situations people may base their decisions on rules which do not require judging the likelihood of relevant events. As shown by Tyszka and Zaleskiewicz (2006) and by Huber (1997; see also Huber, Beutter, Montoya, & Huber, 2001), in these situations people do not even ask about probabilities (which may suggest that they find this kind of information irrelevant). What is more, they can even be unaware (or not fully aware) that they are taking any risk. Imagine, for example, a physician prescribing a medicine without full awareness of its side effects.

As noted by Russo and Schoemaker (1990), there are several occupation-specific rules of thumb which people use in solving their decision problems. It is hard to imagine that in the business arena, where a certain level of risk has to be accepted, these rules of thumb would not make taking some risky options advisable. For example, for the question whether or not to take out a loan such a rule may say: "It is always better to take out loan than not to take it out" (as it is better for an entrepreneur to have more money than less). For the question whether or not to sign a contract with a new agency a rule may say: "it is good to try new possibilities, especially if the status quo is not satisfactory", etc. Following such rules, an entrepreneur may get accustomed to undertaking some risky activities even without full awareness of this.

In accordance with this line of thinking, we asked two groups of subjects—employees vs. self-employed—to make choices in some specially constructed

risky business scenarios, in which neither outcomes nor probabilities were described quantitatively. Additionally, at the end of the questionnaire they were presented with the real choice: to accept a smaller but sure payment or to take part in a quiz in economic knowledge, and to receive payment depending on the quality of their answers.

We formulated a hypothesis that in ill-defined, naturalistic-business risky situations, entrepreneurs as compared to employees would more frequently choose risky options.

Method

Subjects. Thirty-nine employees and 41 self-employed inhabitants of a medium-sized town in Mazovia province participated in the study. All of them were men. The subjects' age in both groups was between 26 and 55.

Materials. Seven risky managerial scenarios (from Tyszka & Zaleśkiewicz, 2006) addressed various managerial problems: Taking out a new loan, signing a contract with a new advertising agency, paying a risky advance, selling low-quality fruit, continuing an unsuccessful business, accepting a threat of strike in a workplace, and not admitting to pollution of the environment.

Each scenario contained a description of a dilemma that had to be solved. In each case there were two alternatives to choose between. One of these alternatives was clearly more risky than the other (containing a higher but risky payoff). However, both outcomes and probabilities were described in a vague way. Here is an example of a scenario used in this study (the Velvet scenario).

The Velvet company, a producer of soft drinks, employs a large and renowned advertising agency, Supermedia. So far, the campaigns have been prepared perfectly, but with time they have become rather static and not very aggressive. Now Velvet has received an offer of a new contract with a new advertising agency, Nova, whose proposal seems very attractive and would have a chance to hit the market. The greatest doubts are caused by the fact that the new agency has very little experience and the contract with Velvet would be one of their first contracts. The management of Velvet has to decide whether they should break the existing contract and start working with the new advertising agency. (from Tyszka & Zaleśkiewicz, 2006)

Procedure. Taking advantage of another study examining individual characteristics fostering the decision to start up a business, we included a questionnaire with descriptions of naturalistic decision situations, and a choice between a sure payment vs. taking part in a quiz. The participants were asked whether they would engage in each of seven risky situations.

TABLE 6
 Payments in Zlotys for Different Numbers of Correct
 Answers in the Quiz

<i>Number of correct answers</i>	<i>Payoffs</i>
5	50
4	40
3	30
2	20
1	10
0	0

At the end of the study, the subjects made a choice between a sure payment of 20 zlotys (about 5€) and taking part in a quiz, where they could earn different amounts of money (up to 50 zlotys—about 12€) depending on how many questions (concerning different aspects of the Polish economy) they answered correctly. If a subject decided to take part in the quiz s/he got five questions drawn from a set of 20. They were then presented with a table showing payments corresponding to different numbers of correct answers (see Table 6).

Results

We found that in one of our seven experimental scenarios, a large majority of subjects in both groups chose the risky option. We realised that this was a typical sunk cost type of situation, i.e. when you have spent money on an unsuccessful venture and it cannot be recovered, you still tend to continue spending to make money back. In this type of situation, people predominantly tend to choose risky options. Therefore, we excluded this situation from further analysis. The comparison of choices in the six remaining risky situations showed that the average percentage of risky options in the employees group was 44, and the average percentage of risky options in the self-employed group was 55. The difference in frequency of choosing risky options between the self-employed and the employees was significant ($t(77) = 1.950, p < .055$).

A particularly large difference between the two groups concerned the scenario of accepting the threat of strike in the workplace, where 78 per cent of self-employed and only 56 per cent of employees accepted the risky option ($\chi^2(1) = 4.27, p < .05$).

Finally, the self-employed somewhat more often than the employees tended to choose the quiz rather than accept a smaller but sure payoff. The difference was only marginally significant ($\chi^2(1) = 3.202, p < .08$). In both

groups, the majority of subjects preferred taking part in the quiz to be sure of payment (88% among self-employed and 72% among employees; maybe the stakes were too small).

Discussion

In contrast to our first experiment in which we found no differences in the level of risk acceptance between entrepreneurs and non-entrepreneurs, in naturalistic-business risky situations we did find more risky choices among entrepreneurs than among non-entrepreneurs. This may indicate that with our scenarios we came close to entrepreneurial naturalistic risky decision-making.

GENERAL DISCUSSION

In this study, we tried to distinguish between optimism and self-confidence (or self-efficacy)—the former defined as overestimating the probability of positive outcomes in situations of lack of control over the outcomes, and the latter in situations of having some control over the results. Unfortunately, our measures of optimism and self-efficacy turned out not to be independent, and on the other hand, our generalised and specific measures of self-efficacy turned out either not to be correlated or to be only slightly positively correlated. A positive correlation between our measures of optimism and self-efficacy may derive from people's belief that they have at least some control over the outcomes we used in our questionnaire, even though we tried to select for this research events that are apparently beyond individual control. This may mean that people do not distinguish well between environments where they have and do not have control over the outcomes.

A correlation between generalised and specific measures of self-efficacy that was not very high suggests that these two concepts concern slightly different characteristics of an individual. Perhaps, Schwartz and Jerusalem's Generalised Self-Efficacy Scale measures generalised beliefs, which are relatively weakly related to performance in a given specific task. On the other hand, our specific measures correspond to Bandura's concept of self-efficacy which is defined as one's self-judgments of personal capabilities to initiate and successfully perform specified tasks at designated levels (Bandura, 1994).

Independent of the (internal) relationships between various measures of self-efficacy, it is interesting that we found significant differences between entrepreneurs and non-entrepreneurs in all but one measure of beliefs. It turned out that in situations where results do not depend on the decision-maker, as well as in situations where he/she has control over the outcome, entrepreneurs differ from those who declare no intention of becoming an entrepreneur at any time in their lives. Thus, we confirmed Knight's claim

that entrepreneurs reveal higher self-confidence than other people and that this is the trait which distinguishes entrepreneurs from other people. It is due to this trait that entrepreneurs may dare to undertake courses of action which others consider too uncertain. Yet, Knight drew a sharp distinction between risk and uncertainty. Risk involves recurring events whose relative frequency can be known from past experience, while uncertainty arises from unique events which can only be subjectively estimated. Note that according to Knight, entrepreneurs' uniqueness concerns uncertainty and not risky situations. This allows that entrepreneurs, while being more self-confident than other people in dealing with uncertain unique events, need not be more risk prone than other people, when the measure of risk is based on expected utility theory.

As we stated in the introduction, the results of previous studies have not been conclusive regarding the question whether or not entrepreneurs are more risk prone than other people. After running the present experiments, we have to admit that our results are also not conclusive. In our first experiment we found no differences in the level of risk acceptance between entrepreneurs and non-entrepreneurs, either in chance-related or in skill-related risky tasks.

Thus, in the light of the present as well as previous studies, we tend to conclude that in terms of risk attitudes, entrepreneurs are not that different from other people. There are even hints indicating that in a subjective sense entrepreneurs may take less risk than others. Indeed, since we found a positive relationship between self-confidence and risk taking in skill-related situations, the lack of differentiation in the accepted risk level between entrepreneurs and non-entrepreneurs in these situations may suggest that in subjective terms the former group is less risk prone than the latter. This is in line with the results of Palich and Bagby (1995) who found that entrepreneurs tend to see no risk in their entrepreneurial ventures.

Still, one cannot deny that in their ventures outside laboratories, entrepreneurs undertake risk. How can we explain this discrepancy? We do not think that either inside or outside the laboratory entrepreneurs love risk more than other people. Perhaps, like the majority of humans, entrepreneurs try to avoid risks. Risky ventures which they undertake outside the laboratory are perhaps the result of a specific motivation and/or specific perception of risk involved in these ventures. Motivation for creating one's own new activity can be different—from life necessity to achievement motivation. Indeed, as noted by many authors (see Wärneryd, 1988), because they have no alternative, to reach an acceptable standard of living, members of minority groups often start new businesses. Similarly, in the 1990s we observed an outburst of entrepreneurship in Poland after the system transformation which caused enormous unemployment (Osborn & Słomczynski, 2005). Of course, many other motives, including achievement motivation, independence seeking, etc., can stimulate an individual to create a new business (see Wärneryd, 1988). In fact, Masclet,

Lohéac, Denant-Boémont, and Colombier (2006) showed that there is a correlation between independence seeking and risk proneness.

The problem is that it is extremely difficult to create tasks fitting both motivation and/or skills necessary for running a business inside the laboratory. Even though our laboratory task of classifying trucks and stars revealed a difference in self-confidence between entrepreneurs and non-entrepreneurs, perhaps the skills required for this task were too far from the skills of running a business to motivate entrepreneurs to take the risk in our laboratory. It is a true challenge for further research to create laboratory conditions which activate motivation and the feeling of self-efficacy similar to those present in entrepreneurial ventures.

The discrepancy between laboratory findings and the fact that outside laboratories entrepreneurs undertake risky ventures suggests also that there are still further things to be clarified regarding entrepreneurial risk taking. One of these is that the notion of risk itself in traditional decision theory is defined too narrowly to encompass the risky business environment.

Certainly, the concept of risk in business and the entrepreneurial context cannot be reduced to that accepted in traditional decision theory, i.e. to the variance of the probability distribution over outcomes. Indeed, Shapira (1995), who interviewed top executive managers, found that they were reluctant to see risk as a single quantifiable concept. They also sharply distinguished between risk taking in business and gambling, emphasising that in managerial risk taking, one can use one's skills and exert control. This declaration is in agreement with what was emphasised by Kornai (1971) many years ago, and more recently by Huber and his colleagues (Huber, 1997; Huber et al., 2001). They claim that when the decision-maker faces a risky situation, his/her first intention is not evaluating values and probabilities, but rather searching for actions which can reduce the risk, i.e. searching for control of the situation. However, as we demonstrated in our research, the distinction between chance- and skill-related risks is not enough to capture the essence of entrepreneurial risk taking.

In Study 2 we therefore turned our attention to specific risky tasks which entrepreneurs have to deal with in their environment—such as taking out a loan, signing a contract with a new agency, allowing the possibility of a strike in the workplace, etc. We assumed that instead of analysing variance of the probability distribution over outcomes in these situations (what they should do according to decision theory), entrepreneurs use simple rules of thumb, accepted in their environment. Presumably, in the business arena, these rules have to permit risk taking. Thus, we expected that in such situations entrepreneurs as compared to employees would more frequently choose risky options. This prediction was generally supported.

This result is in line with studies by Rottenstreich and Kivetz (2006) and by Tyszka and Zaleskiewicz (2006) which show that in naturalistic risky

situations people tend to choose the course of action that conforms to certain norms or that has been successful in the past, etc. Since norms and past experience may be different for entrepreneurs and non-entrepreneurs, their choices in naturalistic risky situations may also differ. Our results show that at least in some of these situations entrepreneurs may choose risky options more frequently than non-entrepreneurs.

This turned out to be especially true for certain kinds of business risky situations. In particular, we found divergence for the scenario of accepting the threat of strike in the workplace. This is a type of situation where risky activity can lead not only to financial loss but also to negative reactions from other members of the social environment. Maybe, this is related to Schumpeter's (1934) definition of an entrepreneur, as a "creative destructor", i.e. an individual who disrupts the present equilibrium and initiates a new development. This suggests that the entrepreneur is a person prone to act against certain norms, accepted in his/her society, and in this sense he/she takes a risk. The issue, of course, needs further intensive investigation.

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