COMPARING RISK DEFINITIONS GIVEN BY HUNGARIAN AND

BELGIAN BACHELOR STUDENTS

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Abstract: Students can detect the changes of newdays and easily adapt to new challenges. The aim of this paper is to observe and test the Domain-Specific Risk Taking Scale on Hungarian and Belgian Bachelor Students. This survey contains different risk attitudes depending on making decision involving Ethical, Financial, Health or Safety, Recreational, and Social risks. According to the DOSPERT Scale we are trying to find differences between 'Risk-Taking', 'Risk-Perceptions', and 'Expected Benefits'. At the same time, we are trying to measure how university students define risk. Therefore, three definitions were explored with content analysis technique, which helped to highlight and organise the most important attitudes. Furthermore, our results indicate how we can use this validated psychometric scale for our population in the future.

Keywords: Risk, DOSPERT Scale, Survey

Introduction

Reviewing the literature for collecting different approaches on risk, Vasvári (2015) is found to be one of the authors who summarized the different meanings of risk in the most satisfying way from our point of view, i.e. using psychological, economic, sociological and technical approaches. In the field of economics, risk management focuses on risks (not surprisingly) where probabilities play special roles. The terms risk and uncertainty are usually used as synonyms in everyday life. For those who do not deal with decision theory this is understandable. It is not only scientific research where the meanings must be clearly differentiated but also among students in the field of management or business. The complete decision theory system first consisted of three kinds of decisions regarding knowledge outcomes (Luce and Raiffa, 1957):

♦ decision under certainty;
♦ decision under risk;
♦ decision under uncertainty.

We talk about certainty when we are fully informed, have accurate data and knowledge of the outcome for each option. For each alternative to be chosen there is only one possible outcome and there is a sure cause-and-effect relationship. In that case there definitely is an optimal decision but it is supposed that we are able to compute with perfect accuracy in a fully rational way. Here methods of operational research such as linear programming and dynamic programming are to be applied.

We talk about uncertainty when several outcomes for each option can be identified but there is no knowledge at all of the probability to be assigned to each. In that case some criteria are available to help to choose an alternative.

We talk about risk when several possible outcomes of each option can be identified and a kind of probability of occurrence can be assigned to each. Probabilities can be expressed in many ways: as a percentage, a fraction, or a decimal number.
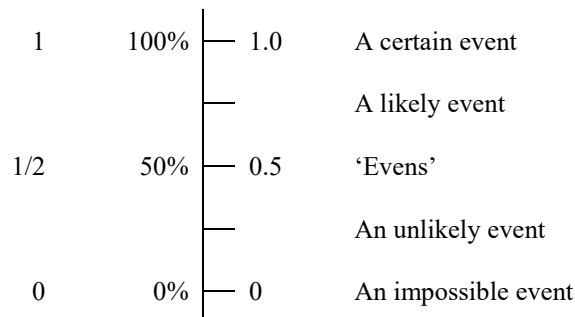
1	100% ── 1.0	A certain event
	──	A likely event
1/2	50% ── 0.5	'Evens'
	──	An unlikely event
0	0% ── 0	An impossible event

Figure 1 Probability scale

Source: Oakshott 2014

Probabilities can be obtained from three different ways depending on the event we are dealing with:

♦ objective probabilities: before the event happens, the exact probability can be calculated often based on mathematical rules. E.g. if you cast a dice what the probability is that a five will appear on the top of it;
♦ empirical approaches: probabilities are based on observations in the past. E.g. probability of having liver disease if someone drinks heavily;
♦ subjective probabilities: if there is a new or unknown event, probabilities are often based on experts' opinions.

The reliability of probabilities is not always 100%, it decreases from top to bottom; that is why we have to point out some criticism of Luce's and Raiffa's classification. Just because the probabilities are mentioned above in the latter two groups, the classification cannot serve as a complete event system. Empirical probabilities (and the subjective ones even more) cannot be interpreted in exact probabilities, so we should talk about a range of values instead that best describe the situation. Many decisions are situated between risk and uncertainty using the terms as mentioned above. Before we watch a football match between Celtic and Hearts do we dare to place a bet on Hearts? This is a yes/no question. Since we do not know the exact probability of victory it cannot be a decision made under risk. But we cannot say that we do not have any information about the chances. That is why it cannot be a decision made under uncertainty. So instead of using the previous approach we prefer the following classification (Hansson 2005):

♦ certainty: deterministic knowledge,
♦ risk: complete probabilistic knowledge,
♦ uncertainty: partial probabilistic knowledge,
♦ ignorance: no probabilistic knowledge.

Kahneman and Tversky (1979) figured out how risk gives weight to our decisions. They handled risk as a variable whose meaning is obvious. The real problem is how the subjects - who make decisions in the everyday life involving risk - define risk, can be interesting, as well. Recognizing this need, the concept of decision theory began to grow as most researchers built risk-taking into their models. However, Weber and her colleagues (Weber, et al., 2002) suggested a validated (i.e. scientifically approved) scale for measurement of risk. In their framework, people's preference for risky options is assumed to reflect a trade-off between an option's expected benefit, usually equated to

expected value, and its riskiness. Firstly, they suggested 40 items in three various points of view. In 2006 a new (shorter) version was developed which contains only 30 items i.e. risk interpretations or statements on risk classified into 5 domains. All items have to be evaluated in three different dimensions.

We summarise it in Table 1.

Domain subscales or life domains	Items number	Risk-taking (How respondents engage in risky activities.)	Risk perception (How respondents assess the level of risk in each activity.)	Expected Benefits of risk (What kind of benefit respondents obtain in each risky situation.)
Ethical	6 sentences	Instruction: *"For each of the following statements, please indicate the likelihood that you would engage in the described activity or behavior if you were to find yourself in that situation."* 7 points ranking scale	Instruction: *"We are interested in your gut level assessment of how risky each situation or behavior is."* 7 points ranking scale	Instruction: *"For each of the following statements, please indicate the benefits you would obtain from each situation."* 7 points ranking scale
Financial (Investment/Gambling)	6 sentences			
Health/Safety	6 sentences			
Recreational	6 sentences			
Social	6 sentences			
5 categories	30 items	30 items (from 5 categories) have to be evaluated 3 times = 90 scales		

Table 1 DOSPERT 30

Source: author's own table based on Center for Decision Sciences, Columbia Business School

This test contains 30 statements; the five subscales have six statements in each and, as the table shows, in three different contexts i.e. scales. Each response scale uses the same items from the five domain subscales or categories. That means all subjects need to read and answer three times the same 30 sentences since three different points of view are discussed (risk-taking, risk perception, expected benefits of risk).

The authors measured the validity of the test and offered scoring instructions, too (i.e. a concrete mathematical model as to how risk can be measured). To calculate risk-attitude they also offered a mathematical formula. Using this formula, they suggested calculating on expected benefits score and a perceived risk score (i.e. perceived risk regresses the three various dimensions) for any item. As the authors mentioned the test is not really respondent-friendly so we tried to observe which domain (E/F/H-S/R/S) should be left out or all three dimensions are necessary to influence a decision in a risky situation.

The test was translated into different languages including Hungarian, and most cultural differences had to be taken in consideration. Vasvári (2015) also handled the impact of different cultural backgrounds. The earliest comparison between cultural differences could be connected with Hofstede's work. Based on Hofstede's research, attitudes to uncertainty avoidance, and consequently judgments of risk, can be assumed to differ by culture. Hofstede defines uncertainty avoidance as the following: "the way that a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? This ambiguity brings with it anxiety and different cultures have learnt to deal with this anxiety in different ways. The extent to which the members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid is reflected in the score on Uncertainty Avoidance." (Hofstede Centre, 2017) It has to be underlined that Hofstede focused on uncertainty (i.e. "The Uncertainty Avoidance dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity.") and not on risk because risk is mainly a personal trait, i.e. how the probability of a positive or negative outcome of an event can be managed.
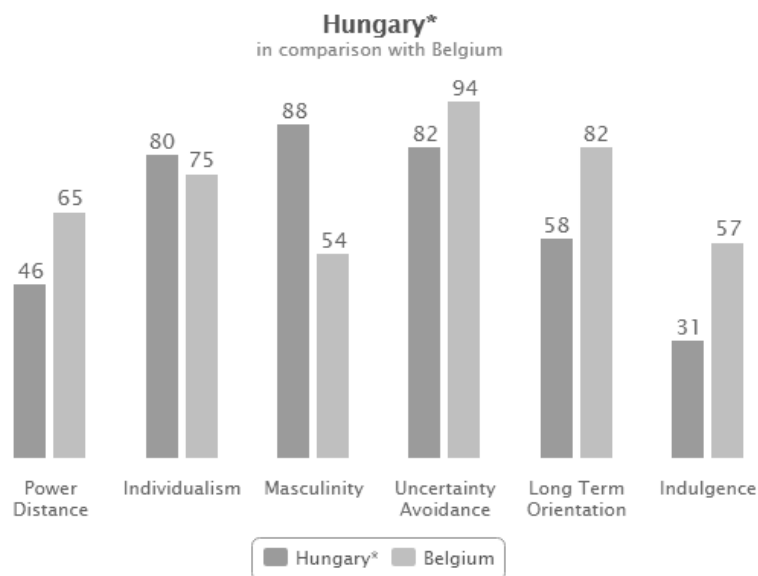

Figure 2 Cultural differences between Hungary and Belgium

Source: https://geert-hofstede.com/countries.html, Downloaded 24/02/2017

Hungary and Belgium scored quite close to each other on this dimension. It means in the view of the Hofstede Centre (2017) Hungarians need "rigid codes of belief and behaviour and are intolerant of unorthodox behaviour and ideas. In these cultures there is an emotional need for rules (even if the rules never seem to work) time is money, people have an inner urge to be busy and work hard, precision and punctuality are the norm, innovation may be resisted, security is an important element in individual motivation." What about Belgium? "At 94 Belgium has one of the highest scores on the UAI Index. Their history of frequently being ruled by others partly explains this score. Certainty is often reached through academic work and concepts that can respond to the need for detail, context, and background. Teachings and trainings are more deductive. In management structure, rules and security are welcome, and if lacking, create stress. Therefore planning is favoured, some level of expertise welcome, when change policies on the other hand are considered stressful."

So the research questions were given: are there any differences between the Belgian and the Hungarian students' risk-perceptions and definitions? How is risk defined in their minds? Last but not least, how can this validated survey be tailored to our population needs (i.e. university students from different cultures)?

Methodology

The survey was designed and tested earlier (see Kolnhofer-Derecskei and Nagy (2016)). It can be found in the Appendix. The survey contains four parts. The first part asked for the demographical background of respondents, like gender, age or nationality. In the second part respondents had to define risk in their own words (association). In the last half of the survey we used the categories of the previously mentioned scale, i.e. the items and categories of Blais & Weber (2006). Firstly (third part), the respondents had to evaluate which situation is more likely to happen to them. Then (forth part) they had to judge which aspect influenced their decision. These last two parts were handled and evaluated separately from each other. That helped us to rank any life domains (E/F/H-S/R/S). Domains, which are not really likely or common are not so necessary to measure. In a risky situation actors cannot be really rational although the mainstream economic model signifies that. We asked respondents which dimension would influence them to judge a risky situation. If a dimension is not so important, it could be removed from the survey. However, the two layers of our sample provide comparison between cultures.

Materials and procedure

The research was carried out at different universities in different semesters. The first respondents were the students of VIVES University in Kortrijk, Belgium, who participated at a guest lecture on 25th November 2016. The other research was done at Óbuda University. Paper questionnaires were given to Hungarian students at the first Economic psychology lesson. The instructions were general, and the papers were given personally to the participants. All of the responses were uploaded to an Excel spreadsheet. As all the answers were given in English, it was required that all of them be checked for spelling. For the evaluation procedures we used (online) content analysis software and SPSS Statistics. We mainly used descriptive statistics because most of the responses were measured on nominal or ordinal scales.

Sample

The aim of this study was to have an extrapolation so we did not monitor representativeness. We also tried to manage the problem of scientific reliability and validity. Moreover, this method does not provide exact representativeness. The frequency tables of the sample follow:

	Nationality		
	Belgian	Hungarian	Total
Age 18,00	1	0	1
19,00	13	1	14
20,00	8	0	8
21,00	0	3	3
22,00	1	2	3
23,00	0	2	2
24,00	2	4	6
25,00	0	4	4
26,00	0	1	1
32,00	1	0	1
Total	26	17	43

	Nationality		
	Belgian	Hungarian	Total
Gender Male	14	7	21
Female	12	10	22
Total	26	17	43

Table 2 Distributions of the two samples

As we can see in Table 2, both samples contain a respondent who is older and the average age is higher in the case of the Hungarian sample.

Results

The first thing we did was monitor the meaning of risk, i.e. what kind of expressions came into the respondents' minds. It is necessary to underline that none of the students speak English as a native language but they were allowed to use dictionaries during the research.

Content analysis

Online content analysis software (https://www.online-utility.org) coded the text automatically, which means regardless of the meaning of the words only the frequencies of the expressions are counted. Content analysis solutions give us opportunities for deeper text mining without explanation (Table 3).

Belgian		Hungarian	
Some top phrases containing 3 words (without punctuation marks)	Occurrences	Some top phrases containing 3 words (without punctuation marks)	Occurrences
to lose something	4	you have to	6
you don't know	4	risk is when	3
but you don't	3	you know the	2
you are not	2	make a decision	2
it is possible	2	to make a	2

Table 3 Frequencies of used three words long expressions

The automatic coding can be illustrated with word cloud diagrams (with tagcrowd.com); the size of the word shows its regularity. Gap-filling words (like "something") are not important, so they do not need to be considered.

Figure 3 Cloud diagram of Belgian automatic coding

Figure 4 Cloud diagram of Hungarian automatic coding

This analysis indicates that the subjects judged risk differently. The Belgian students used negative expressions like "danger" or "bad" more frequently than the Hungarian ones. The Belgian students focused on the negative situation or outcome, the Hungarian students used mainly expressions connected to the process of decision. Both of them chose examples describing risk. At least one member from both nations identified risk as out of their comfort zone. Frequently mentioned expressions provide a good base for open coding. (i.e. finding structures after extensive readings.) These structures are the following:

♦ The Belgian respondents used more negative adjectives; it seems they are afraid or keep their distance from risky situations. They define risk as a dangerous situation that ends in a loss.

♦ The Hungarian students focused on the outcome of a risky situation; they suggested that there is only one outcome, therefore they need to choose between options. Risky situations can be caused by missing information. The effect of risks was frequently mentioned in relation to business examples.

Frequency tables of aspects

The DOSPERT scale contains three separate response scales: 'Risk-Taking', 'Risk-Perceptions', and 'Expected Benefits'. All of them are divided into five different subscales (or dimensions): Ethical, Financial, Health/Safety, Recreational, and Social. The problem is that 30 sentences have to be judged three times. So this survey aims to rank the aspects of the decision when a risky situation is coming up. We would like to underline that scales and dimensions were handled separately from each other. Firstly, we just observed incidences of any subscales (E/F/H-S/R/S) (i.e. which situation is most likely in respondents' life). Secondary, we separated three various dimensions concentrating on which one will influence students' evaluations of a risky situation.

In this study there were no mathematical expression suggested by Blais and Weber (2006) used. The middle of the survey dealt with different types of risky situations. According to Blais and Weber (2006) there are five typical types of risk situation which are the source of uncertainty.

Nationality		N	Mean	Std. Deviation	Mode
Ethical	Belgian	25	3,2400	1,16476	4
	Hungarian	17	1,9412	,74755	2
Financial	Belgian	25	2,8400	1,34412	3
	Hungarian	17	2,0588	1,02899	3
Health	Belgian	25	2,7200	1,36991	3
	Hungarian	17	2,7647	1,64048	3
Social	Belgian	25	3,6400	1,62993	2
	Hungarian	17	3,4706	1,12459	4
Recreational	Belgian	25	3,1600	1,57268	2
	Hungarian	17	1,8824	,92752	2

Table 4 Given answers regarding subscales

Although the given examples could influence and confuse the ranking order, there were some interesting differences. The Belgian students face risky situation and mainly ethical problems more often. For the Hungarians the most risky situation was Social. Using a non-parametric hypothesis test for two independent samples (Mann-Whitney test, significance level is 0.05) there were significant differences between the groups in two cases. We compared the distributions and in cases of ethical and recreational situations there were group diversities.

The Independent sample median hypothesis test came up with the same results. In the last part we used frequencies and cross tabs analysis to determine sources and motivations of risk. Originally Weber and Blais (Blais & Weber, 2006) used multilevel modelling. Their empirical investigations provided a multiple risk construct which contains three observations of risk. They found:

1. differences in the perceptions of the riskiness of risky choice options (perception),
2. differences in the perceptions of perceived benefits of risk (benefit),
3. differences in willingness to take part in a risky situation (risk-taking).

DOSPERT Scale allows us to assess conventional risk attitudes (reported level of risk-taking), perceived risk-attitudes (reported willingness to engage in a risky activity) and outcome of risk (reported value of taking part in a risky situation). In our study we were interested in which aspects mostly influence students' decisions in a risky situation. The students needed to choose which options impact on their decision. The last table provides us an overview about the choices.

Perhaps the order of the questions influenced the assessments but the influence-factor most often mentioned was the benefit (outcome) of a decision. The second important aspect was personal traits depending on risk-taking or risk aversion traits but we were not interested in the direction of this trait.

Comparing the two groups we found medium strength relationships between risk perception and nationality (Cramer's V = 0.499 p=0.05). There were no other significant differences. These results underline that there are different risk perception types, which verifies Hofstede's findings.

Nationality * Benefit Crosstabulation

Nationality	Benefit			Total
	Yes	No	No Opinion	
Belgian	25	0	1	26
Hungarian	14	1	2	17
Total	39	1	3	43

Nationality * Perception Crosstabulation

Nationality	Perception			Total
	Yes	No	No Opinion	
Belgian	15	2	9	26
Hungarian	8	8	1	17
Total	23	10	10	43

Nationality * Risk taking Crosstabulation

	Risk taking			
Nationality	Yes	No	No Opinion	Total
Belgian	15	5	6	26
Hungarian	10	5	2	17
Total	25	10	8	43

Table 5 Frequency tables of each dimensions

Conclusions

The goal of this study was to have a comparison of what Belgian and Hungarian students think about risk. Content analysis results in a useful distillation of the risk associations of our two different national samples. Only some - and mainly the Hungarian students - evaluated risk as a positive term. At the same time, students gave a concrete example to define risk which can be used as a part or item of DOSPERT Scale's subscales.

DOSPERT scale contains 3*30 examples from different life situations. However, this scale is a validated solution to measure risk. Our preliminary studies showed that 90 statements altogether are difficult to handle. That is why we tried to evaluate the dimensions of the aforementioned scale. For that we asked our respondents to rank five different risky life situations and three different points of view. We could take into consideration all different dimensions of risky situations. However, different nations (cultures) face different risky problems (or they perceive them differently). So the original DOSPERT Scale must be used when we would like to compare cultural differences, as well.

The final benefit of a risky decision will be the biggest influence on respondents (in a similar way, outcome was a frequently mentioned expression in the association's part). Finally, it is necessary not to omit personality. We tried to pay attention to all limitations of this research; hopefully, it could be a good base for the future. One of the advantages that we had was feedback from our respondents' definitions which show some similarities with the DOSPERT Scale. To sum up, we found that cultural differences would colour the perception of risk so the entire DOSPERT Survey must be used.

Appendix

Risky survey

Some background questions:

- Your Gender:
    - ☐ Male ♂
    - ☐ Female ♀
- Your Age: I am …………. years old.
- Your nationality: …………………………………
- Actual Study: ☐☐ Bachelor ☐☐ Master ☐☐ Other: ………………………
- Main faculty: Business Tourism ☐☐ Engineering ☐☐ Other: ………………

What is risk? How can you describe it? (You can answer with your very first ideas, words which come in to your mind or you can draw as well.)

What do you think which situation is more likely to happen to you every day? How often do you face different types of risky situations? Please rate separately all of them (1: never, 2: extremely rarely … 5: extremely often 6: always, No opinion: 0)

	Ethical situations for example "Not returning a wallet you found that contains $200."
	Financial situations for example "Investing 10% of your annual income in a new business venture."
	Health or Safety situations for example "Riding a motorcycle without a helmet."
	Social situations for example "Choosing a career that you truly enjoy over a more secure one."
	Recreational situations for example "Bungee jumping off a tall bridge."

If you need to value a situation (regarding risk) which aspect influence your decision? (Y: yes, N: no, NO: No opinion)

	"Expected **Benefits** of the situations" the benefits/ advantages you would obtain from each situation.
	"**Perceptions** of these situations" In this case each situations have to be indicated (is the possibility of negative consequences) how risky you perceive it.
	"Risk-Taking": the **likelihood** that you would engage in the described activity or behavior if you were to find yourself in that situation.

Thank You for your answers!

Acknowledgement

References

Blais, A.-R., Weber, E. U., 2006. A Domain-Specific Risk-Taking (DOSPERT) sclae for adult populations. Judgement and Decision Making, Vol 1. No 1., pp. 33-47.

Center for Decision Sciences, DOSPERT ORG. [Online] Available at: https://sites.google.com/a/decisionsciences.columbia.edu/dospert/ [October 2016].

Faragó, K., 2008. Siker, kockázatvállalás és versengés a szervezetekben. Alkalmazott Pszichológia, pp. 7-29.

Hansson, Sven Ove 2005. Decision Theory A Brief Introduction. Department of Philosophy and the History of Technology, Royal Institute of Technology (KTH) Stockholm pp. 26-28. (http://web.science.unsw.edu.au/~stevensherwood/120b/Hansson_05.pdf)

Hofstede, G., 2017. The Hofstede Centre [Online] Available at: https://geert-hofstede.com [February 2017].

Kahneman, D., Tversky, A., 1979. Prospect Theory: An Analysis of Decision under Risk. Econometrica. Vol 47. No 2., pp. 263-292.

Kádár, B., Reicher, R. Z., 2016. Education Supported by SME vs. SME Supported by Education. Proceedings of FIKUSZ 2016 pp. 73-79

Kolnhofer-Derecskei, A., Nagy, V. 2016. Under Risk. Proceedings of FIKUSZ '16 Symposium for Young Researchers, pp. 161-172 Online] Available at: https://kgk.uni-Óbuda.hu/sites/default/files/16_Derecskei_Nagy.pdf [February 2017].

Luce, R D., Raiffa H. 1957, Games and Decisions. John Wiley and Sons, Inc. p. 13

Oakshott, Les, 2014, Quantitative methods. Palgrave MacMillan, p.69

Tversky, A., Kahneman, D., 1974. Judgement Under Uncertainity: Heuristics and Biases. Science, pp. 1124-1131.

Vasvári, T., 2015. Risk, Risk Perception, Risk Management – a Review of the Literature. Public Finance Quarterly, pp. 29-48.

Weber, E. U., Blais, A.-R., Betz, N., 2002. A domain-specific risk attitude scale: Measuring risk perceptions and risk behaviors. Journal of Behavioral Decision Making, 15., pp. 263-290.