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THE RELATIONSHIP BETWEEN DECISION-MAKING HEURISTICS AND PERCEIVED QUALITY OF LIFE

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Abstract

The purpose of this research is to provide some insights into relationship between decision-making heuristics and perceived quality of life. Using the purposive sampling technique, data collection was carried out, in Bosnia and Herzegovina, from June to October 2020, yielding a sample of 319 valid responses. To gain a better understanding of the relationship between decision-making heuristics and the perceived quality of life, we, primarily, use descriptive statistical analysis, chi-square test and probit regression model. The research findings have revealed positive association between all three decision-making heuristics, i.e. representativeness, anchoring, availability, and perceived quality of life. Furthermore, the group with above-average perceived quality of life have higher representativeness, anchoring, and availability scores comparing to the group with below-average perceived quality of life. These differences are statistically significant. Furthermore, out of three decision-making heuristics components, availability, or a heuristic whereby people make judgments about the likelihood of an event based on how easily a similar example comes to mind, seems to be the strongest predictor of the perceived quality of life. Memories that are easily recalled are often insufficient for estimating likelihood of occurring similar events again in the future. In that respect, availability may produce low-quality information in the decision making process. Ultimately, this may lead to bad decisions.

Keywords: Heuristics, Perceived Quality of Life, Decision-Making

1. Introduction

Quality of life is a multidimensional concept that is broader than economic output and living standards. As such, it includes many factors that people value in life, beyond its material aspects. Among many factors, heuristics are very important factor that may have influence on quality of life. Heuristic, as a mental shortcut that allows people to make decisions quickly and efficiently, influences the decisions and therefore the quality of life.

While extensive research has been conducted into the empirical and theoretical dimensions of quality of life and heuristics, most of these studies typically concentrate on developing countries. Taking this into account, the authors decided to select the subject of this paper on the ground that not many relevant publications, focused on the relationship between heuristics and quality of life in countries dealing with the transitional economy, can be found in the current literature. Based on this research gap, the purpose of this research is to provide some insights into relationship between decision-making heuristics and perceived quality of life.

Key research objectives are as follows: to investigate a possible perceived quality of life gap in respect to decision-making heuristics, to determine the relationship between decision making heuristics and perceived quality of life, and to investigate a possible impact of decision-making heuristics on likelihood of positively perceived quality of life.

The paper is organized as follows. Following the introduction, Section 2 offers a summary of the literature review that is important to the paper's main objective. Section 3 discusses the methods of data and analysis. The core of the paper is Section 4, which involves review and discussion of initial empirical findings. Some final remarks and conclusions are found in Section 5.

2. Literature review and hypothesis development

Decision making, generally, could be defined as process of choosing the best one among the several alternatives, or choosing the alternative which will increase the most our utility. This process is fully rational in case if we have all the information about the probability and outcomes of each alternative. But more often we do not have all this information. That is why many decisions are based on beliefs concerning the likelihood of uncertain events. In other words, sometimes beliefs concerning uncertain events are expressed in subjective probabilities. The real question is how do people evaluate probabilities of an uncertain events.

The study of biases and heuristics has proceeded along interlocking paths in psychology and economics (Roberts and Wernstedt, 2019). Heuristics are often perceived as tools for uncertainty (Mousavi and Gigerenzer, 2017). According to Tversky and Kahneman (1981), people rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations. These heuristics are representativeness, availability, adjustment, anchoring. In the heuristic of representativeness probabilities are evaluated by the degree to which one object is representative of other, that is, by the degree to which one object resembles other. It can be defined as insensitivity to prior probability of outcomes. Heuristic of availability is when people assess the frequency of a class or the probability of an event by the ease with which instances or occurrences can be brought to mind. Heuristic of adjustment is present when people make estimates by starting from an initial value that is adjusted to yield the final answer. Anchoring heuristic is present when we have general tendency to overestimate the probability of conjunctive events what leads us to unwarranted optimism in the evaluation of the likelihood. The same authors concluded that loss aversion is one of the basic characteristics of decision making behavior. Kahneman and Tversky (1979) suggest that people would typically reject gambles which offer a 50/50 chance of gaining or losing the same amount of money because losses might generate bigger psychological utility than equivalent gains (Kahneman and Tversky, 1981; Kahneman and Tversky, 1984; Kahneman *et al.* 1991; Ariely *et al.* 2005). The opposite behavior is pseudosecurity, where they have concluded that people will more likely choose the option which promise sure gain, then the option of same utility which has some degree of uncertainty.

Simon (1983) criticizes the normative decision making theory, where he points out their shortcomings. His main argument is that the most decisions are being made in conditions of limited rationality. In his research, David (2014) notices that there is an increase in demand for insurance policies after natural disasters and that media coverage on these events have impact on increase of demand even in the areas where these disasters happen seldom or they have never happened before.

Barber and Odean (2007) have tested the hypothesis that investors are making decisions on purchase according the information which attract their attention. They have observed individual

investors where they have come to a conclusion that instead of looking on thousands of different stocks available for acquisition; they decide to buy among the group of stocks which initially attract their attention. In other words, they have come to a conclusion that preferences are determining choice after our attention has specified the group among which we are making the selection. Campo *et al.* (2016) have come to conclusion that decision making styles influence the use of heuristics. However, their experiments indicated that other, perhaps cultural, factors might be also important in usage of heuristics.

Barofsky (2011) tries to define the life quality, but he concludes that none of the approaches provide a comprehensive definition. He argues that quality of life represents a distinctive pattern of thinking. Ditlevsen and Friis-Hansen (2007) are questioning if the life quality index implies that there is a desired balance between free time and work time. They have shown that a time balancing principle leads to an explicit mathematical formula connecting work time and value productivity, which should take into account the expected life. According to Ditlevsen (2004), the derivation of the life quality index (LQI) is revisited for a revision. This revision should take into account the unpaid but necessary work time needed to stay alive in clean and healthy conditions to be fit for effective wealth producing work and to enjoyable free time. Other authors, like Nathwani *et al.* (1997) point out that we cannot claim to have the ultimate measure of the good life for all, because it is being valued on subjective responses. All the indicators are imperfect but may nevertheless be useful. They propose an approach which relies on two of the major indicators identified in the UN and OECD program on the development of social indicators. They are life expectancy as a measure of safety and real GDP per person as a measure of the quality of life. According to EUROSTAT (2020) quality of life is broader than economic output and living standards. It includes the full range of factors influencing what people value in life beyond its material aspects. EUROSTAT (2017) defines the following 8+1 dimensions as an overarching framework for the measurement of QoL: material living conditions, productive or other main activity, health, education, leisure and social interactions, economic security and physical safety, governance and basic rights, natural and living environment and overall experience of life.

To sum up, perceived quality of life is a multidimensional concept that usually refers to people's individual well-being and/or welfare (Andrew and Withey, 1976; Chamberlain and Zika, 1988; Diener, 1994) and that can, according to Campbell *et al.* (1976), be defined as a perception that reflects the subjective evaluation of the life experience. Heuristics, as some mental shortcuts that allow people to make decisions quickly and efficiently, influence the decisions and therefore may be considered as important factor that may have influence on perceived quality of life. Following the previous discussion, we propose the following hypotheses:

- H₁: There is a difference in the perceived quality of life concerning the decision-making heuristics.*
- H₂: There is a positive correlation between making heuristics and perceived quality of life.*
- H₃: Decision-making heuristics impact likelihood of positively perceived quality of life.*

3. Data and methodology

3.1. Data source and sample

Data collection was based on a nation-wide sample of citizens of Bosnia and Herzegovina aged 18 or older¹. Using the purposive sampling technique, data collection was carried out, by IPSOS BiH agency, from June to October 2020, yielding a sample of 319 valid responses.

Table 1 contains overview of basic characteristics of the sample. The data collection instrument is a structured questionnaire with closed questions, divided into two sections. The first section addresses the decision-making heuristics and perceived quality of life, whereas the second section considers specific socio-economic characteristics of the respondents.

¹Data collection was performed within the doctoral dissertation titled "Development of Household Decision-Making Models Based on the Bounded Rationality" whose author is the first author of the paper.

Table 1. Overview of basic characteristics of the sample

	Characteristic	Frequency	Per cent
Gender	Male	158	49.5
	Female	161	50.5
Household income	Up to 1,000 BAM ²	53	16.6
	From 1,001 to 1,500 BAM	83	26.0
	Above 1,500 BAM	183	57.4
Household life cycle	Household without children	47	15.9
	Household with children younger than 15 years	86	29.1
	Household with children older than 15 years	163	55.1
Household type	Agricultural household	16	5.0
	Non-agricultural household	223	69.9
	Mixed household	80	25.1
Head of Household	Yes	156	48.9
	No	163	51.1
Living environment	Urban	234	73.4
	Rural	85	26.6

Source: Authors' work

3.2. Constructs

As proposed by EUROSTAT, in this research the concept of perceived quality of life is measured by material living conditions, employment, education, health, leisure and social interactions, economic and physical safety, governance and basic rights, natural and living environment and overall life satisfaction. Decision-making heuristics were operationalized by three dimensions, i.e. representativeness, anchoring and availability. This part of the questionnaire was primarily based on the EUROSTAT (2019) and Kanagasabai (2020). Besides perceived quality of life and decision-making heuristics, one more construct was used, i.e. time/money pressure as an important factor of a decision-making process. This part of the questionnaire was primarily based on Sanz de Acedo Lizarraga *et al.* (2009).

3.3. Instrument validity

The scores for each subscale were calculated as total score for the items representing each dimension. However, before that we assessed whether the subscales had satisfactory reliability (Table 2).

Table 2. Scale statistics

Measure	N	Number of items	Mean	Standard deviation	Cronbach's Alpha
Perceived quality of life	319	30	75.44	10.66	0.731
Money-time pressure	319	8	53.31	14.23	0.971
Representativeness	319	3	11.15	2.66	0.772
Anchoring	319	3	11.21	2.55	0.732
Availability	319	2	6.62	1.89	0.623

Source: Authors' work

Cronbach's Alpha is a measure of reliability that ranges from 0 to 1, with values of 0.60 to 0.70 deemed the lower limit of acceptability (Hair *et al.* 2014). Having that in mind, it may be concluded that all scales had an acceptable level of reliability.

²The Bosnian Convertible Mark (BAM) is the currency of Bosnia and Herzegovina.

3.4. Methods

Besides socio-demographic variables, presented in Table 1, following dependent variable was created: *positive perception of quality of life*, as a binary dependent variable ($D = 1$ if the respondent has above average positive perception of quality of life, 0 otherwise).

The dependent variable has been created based on the median value of perceived quality of life score. If the perceived quality of life score was above median ($Mdn > 94$), the value of dummy variable was 1, and 0 if the score was equal and below median ($Mdn \leq 94$).

To get a better understanding of the factors that may influence likelihood of positive perception of life quality, the authors used a probit model as a primarily methodological approach where dependent variable presents the logit (ln of the odds) of positive perception of life quality. Estimation of the model was made by using STATA version 14.

3.5. Research design

The research is organized in three phases. The first phase brings an analysis of basic parameters of descriptive statistics of the selected variables. These results have been considered of immense importance in terms of proper understanding of specificities of the sample. In the second phase, prior to estimating probit model, the authors will use correlation analysis, independent samples t-test, and chi-square test. In the last phase, the empirical results of the research have been presented.

4. Results and discussion

In the first step of the analysis, we examined the correlation between decision-making heuristics and all dimensions of perceived quality of life. Results of the Pearson correlation indicated that there was a significant, positive association between all three decision-making heuristics, i.e. representativeness, ($r = 0.174$, $p = 0.002$), anchoring, ($r = 0.202$, $p = 0.000$), availability, ($r = 0.247$, $p = 0.000$), and perceived quality of life. When it comes the specific dimension of perceived quality of life, results of the Pearson correlation indicated that there was a significant association between representativeness, ($r = -0.128$, $p = 0.022$), anchoring, ($r = -0.143$, $p = 0.001$), and leisure and social interactions. Next, there was a significant association between representativeness, ($r = 0.222$, $p = 0.000$), anchoring, ($r = 0.257$, $p = 0.000$), availability ($r = 0.304$, $p = 0.000$) and education. Finally, a statistically significant correlation has been confirmed between representativeness, ($r = 0.183$, $p = 0.001$), anchoring, ($r = 0.146$, $p = 0.009$), availability ($r = 0.151$, $p = 0.007$) and governance and basic rights.

In the next step of the analysis, representativeness, anchoring and availability scores of two groups of respondents with a different perceived quality of life were compared. Table 3 presents a short overview of the selected scores and selected factor.

Table 3. Overview of selected scores and selected factor

	Below average and average perceived quality of life					Above average perceived quality of life				
	N	Min	Max	Mean	Std. Dev.	N	Min	Max	Mean	Std. Dev.
Representativeness	162	3.00	15.00	10.86	2.71	157	3.00	15.00	11.45	2.56
Anchoring	162	3.00	15.00	10.80	2.80	157	5.00	15.00	11.63	2.19
Availability	162	3.00	15.00	8.83	2.74	157	4.00	15.00	9.79	2.26
Valid N (listwise)	162					157				

Source: Author's research

On average, the group with above-average perceived quality of life had higher representativeness, ($M=11.45$, $SD=2.56$), anchoring, ($M=11.63$, $SD=2.19$), and availability, ($M=9.79$, $SD=2.26$), scores comparing to the group with below-average perceived quality of life. These differences were statistically significant ($p<0.05$).

Next, a chi-square test of independence was performed to examine the difference between perceived quality of life and variables presented in the previous table. Table 4 presents a short overview of selected discrete independent variables. We have only found a statistically significant difference between perceived quality of life and household income, $\chi^2(2, N=319)=17.999$, $p<0.01$.

Table 4. Overview of discrete independent variables

Variable		Below average and average perceived quality of life		Above average perceived quality of life	
		Frequency	Per cent	Frequency	Per cent
Individual characteristics	Loss aversion	98	60.5	106	67.5
	Pseudo-security	117	72.2	108	68.8
	Male	79	48.8	79	50.3
	Female	83	51.2	78	49.7
Household income	Up to 1,000 BAM	41	25.3	12	7.6
	From 1,001 to 1,500 BAM	37	22.8	46	29.3
	Above 1,500 BAM	84	51.9	99	63.1
Household life cycle	Household without children	29	17.9	18	11.5
	Household with children younger than 15 years	43	26.5	43	27.4
	Household with children older than 15 years	78	48.1	84	54.1
Strategic household decisions	Purchase of durable goods	107	66.0	101	64.3
	Savings	34	21.0	43	27.4
	Investments	21	13.0	13	8.3
Living environment	Urban	122	75.3	112	71.3
	Rural	40	24.7	45	28.7

Source: Author's research

4.1. Model performance analysis

To evaluate the impact of selected factors on the perceived quality of life, probit model was used. The goodness-of-fit was evaluated using the following measures: Pearson chi-square statistics, Hosmer and Lemeshow (1980) goodness-of-fit test, classification tables and pseudo R². Pearson chi-square statistics results confirmed the entire model (with all predictors included) as statistically significant ($p=0.000$). In other words, the model as a whole fits significantly better than a model with no predictors. This was also confirmed by the Hosmer and Lemeshow (1980) goodness-of-fit test ($p=0.286$). According to the classification tables, the model correctly classifies 64.53% of cases. As expected, probit models, in general, produce a low value of pseudo R² (0.1258). Table 8 displays the results of the estimated model with marginal effects included.

Table 8. The estimated model with the marginal effects

	<i>B</i>	<i>S.E</i>	<i>Sig.</i>	<i>MEMs</i>	<i>MEMsS.E</i>	<i>MEMsSig</i>	<i>AMEs</i>	<i>AMEsS.E</i>	<i>AMEsSig</i>
<i>DECISION-MAKING HEURISTICS</i>									
Representativeness	-0.0450	0.0410	0.2730	-0.0179	0.0164	0.2730	-0.0155	0.0141	0.2700
Anchoring	0.0702	0.0434	0.1050	0.0280	0.0173	0.1050	0.0242	0.0148	0.1010
Availability	0.0745	0.0356	0.0360	0.0297	0.0142	0.0360	0.0257	0.0120	0.0320
<i>DECISION MAKING</i>									
Strategic household decisions									
Savings	0.4337	0.1987	0.0290	0.1712	0.0767	0.0260	0.1487	0.0659	0.0240
Investment	-0.0506	0.2536	0.8420	-0.0199	0.0994	0.8410	-0.0175	0.0879	0.8420
Decision making factor									
Time-money pressure	0.0223	0.0065	0.0010	0.0089	0.0026	0.0010	0.0077	0.0021	0.0000
<i>INDIVIDUAL CHARACTERISTICS</i>									
Loss aversion	0.1595	0.1676	0.3410	0.0634	0.0664	0.3400	0.0552	0.0580	0.3410
Pseudo-security	-0.2211	0.1792	0.2170	-0.0880	0.0711	0.2160	-0.0760	0.0610	0.2120
<i>Gender</i>									
Female	-0.0163	0.1615	0.9200	-0.0065	0.0643	0.9200	-0.0056	0.0558	0.9200
<i>HOUSEHOLD CHARACTERISTICS</i>									
<i>Household life cycle</i>									
Household with children younger than 15 years	0.2235	0.2446	0.3610	0.0867	0.0937	0.3550	0.0767	0.0834	0.3580
Household with children older than 15 years	0.4129	0.2278	0.0700	0.1621	0.0869	0.0620	0.1423	0.0771	0.0650
<i>Household income</i>									
from 1,001 to 1,500 BAM	0.7716	0.2728	0.0050	0.2835	0.0917	0.0020	0.2579	0.0844	0.0020
over 1,500 BAM	0.8298	0.2566	0.0010	0.3067	0.0828	0.0000	0.2785	0.0767	0.0000
<i>Living environment</i>									
Rural	0.1274	0.1874	0.4970	0.0508	0.0746	0.4960	0.0439	0.0644	0.4950
_cons	-3.2635	0.6251	0.000						

Note: MEMs – Marginal effect at the mean; AMEs – Average marginal effects

Source: Authors' work

As can be seen from Table 8, following variables prove to be statistically-significant: availability ($p < 0.05$), savings ($p < 0.05$), decision-making factor ($p < 0.01$), certain categories of a household life cycle ($p < 0.10$) and household income ($p < 0.01$).

A heuristic is a simple decision rule that allows one to make judgments without integrating all the information available (Raue and Scholl, 2018). Out of three decision-making heuristics components, availability is the strongest predictor of the perceived quality of life. Availability is basically a heuristic whereby people make judgments about the likelihood of an event based on how easily a similar example comes to mind. People employ the availability heuristic when they assess how likely it is that something occurs by focusing on the ease with which they can think of instances or occurrences of it (Stolwijk and Vis, 2020). Speaking of marginal effects, and when it comes to continuous variable, they show that for one-unit increase in the dependent variable from the baseline, the probability of an event is expected to increase/decrease. This means that, one-unit increase in the availability score, from baseline, the likelihood of an above average positive perceived quality of life increases by 2.97%. The expected change is statistically significant ($p < 0.05$). The importance of availability as decision-making heuristic has already been confirmed in consumer research, where availability can play a role in various estimates, such as store prices

(Ofir *et al.* 2008) or product failure (Folkes, 1988), in online consumer reviews (Nazlan *et al.* 2017), in investment performance (Abdin *et al.* 2017; Shah *et al.* 2018; Rasheed *et al.* 2018; Evans and Sun, 2021), etc. When it comes to availability, the typical experiments show that direct experience of a particular event increases the probability that one assigns to related events (Dhami *et al.* 2019).

Speaking of the most important household decisions, the predicted likelihood of an above average positive perceived quality of life is 17.12% greater for those individuals whose household decided to save comparing to those whose household decided to purchase a house or a flat. The expected change is statistically significant ($p < 0.05$). When it comes to factors of decision-making, one-unit increase in time-money pressure score, from baseline, the likelihood of an above positive average perceived quality of life increases by 0.89%. The expected change is statistically significant ($p < 0.01$). Speaking of the household cycle, the predicted likelihood of an above average positive perceived quality of life is 8.69% greater for households with children older than 15 years comparing to those that do not have children at all. The expected change is statistically significant ($p < 0.10$). Speaking of household income, the predicted likelihood of an above average positive perceived quality of life is 28.35% greater for individuals whose household income ranges from 1,001 to 1,500 BAM, and 30.67% greater for individuals whose household income is over 1,500 BAM, comparing to those with the household income up to 1,000 BAM. The expected change is statistically significant ($p < 0.01$).

5. Conclusion

Perceived quality of life usually refers to people's individual well-being. As such, this multidimensional concept is very important because it reflects the subjective evaluation of the life experience. On the other hand, heuristics influence the decisions and therefore may be considered as important factor that may have influence on the perceived quality of life. It is probably true to say that so far little attention has been paid to relationship between perceived quality of life and decision-making heuristics. Based on this research gap, the purpose of this research was to provide some insights into relationship between these two concepts. The research findings have revealed positive association between all three decision-making heuristics, i.e. representativeness, anchoring, availability, and perceived quality of life. Furthermore, out of three decision-making heuristics components, availability seems to be the strongest predictor of the perceived quality of life. The study has several implications for academics and practitioners by providing new insights into both perceived quality of life and heuristics decision-making in one transition economy. Both concepts are multidimensional. Therefore, our research may have some potential limitations. The first one refers to the problem of omitted variables. In addition to selected variables, there are many other variables that influence perceived quality of life. The study's other drawback is that the available data is cross-sectional rather than longitudinal. One of possible limitations is non-probabilistic type of sample.

To sum up, presented results call for unpacking the relationship between perceived quality of life and decision-making heuristics. In that respect, further research is necessary to understand this interrelation. This study can serve as a solid base for the development of further similar research studies focusing, in particular, on examining the impact of personality factors, and psychological factors on the perceived quality of life. Furthermore, it would be interesting to examine the gap between perceived quality of life and quality of life measured by gross domestic product as a traditionally used measure of economic and social development.

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