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Fatalistic Thinking and Ambiguity Attitudes

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Abstract
Fatalistic beliefs denote the perception of one's life trajectory as predetermined by fate and a consequent attitude of resignation in the face of the unknown. Piloting one's coping mechanisms employed under challenging circumstances, fatalism underlies the orientations involved in decision making. When it comes to the assessment of attitudes towards ambiguity, the ubiquitous context of such cognitive aspects renders their impact on choices a promising research field. This thesis questioned the effect of fatalistic outlooks on ambiguity attitudes in a sample of 58 individuals via an online survey. The emergent findings implied a weak positive association between the two concepts, but the outputs missed statistical significance. The insufficient evidence of an effect in this study, encompasses the constraint of a small sample size and the obtained results cannot be relied on as an accurate reflection of the "true" population association. The employment of a larger sample could have the potential to enhance the evidential value of the findings.

Chapter I

Introduction

Unpredictable contexts and uncontrolled conditions increase choice complexity and impact decision making. People often try to overcome judgmental conflicts by employing decision aids. In the face of the unknown, cultural biases underlie patterns of poor judgment and encourage rationalization processes. Superstitious beliefs and attribution errors stemming from cultural worldviews and religious affiliations, influence behavior when people may not feel entirely in control.

The cultural orientations integrated in the cognitive processes of the global psyche, have been widely analyzed by philosophers under the notion of fatalism: one's perception of life trajectory as predetermined by the dominance of a higher principle. Being accountable for core beliefs and social life patterns across the globe, fatalism has been piloting the human behavior from ancient times until today. However, fatalistic beliefs have only occasionally participated in studies on the decision making under uncertainty and little is known on the relationship to ambiguity attitudes.

Etner and Jeleva (2014) showed that people who underestimate modifications in probabilities, are less likely to invest in preventive measures that reduce their susceptibility to certain types of risks. They referred to these individuals as fatalists and ascertained that fatalistic mindsets hinder self-protection decisions in the face of monetary loss. On the other hand, fatalism has been conceptualized as multidimensional and in a context of health beliefs as manifested in attitudes of predetermination, luck and pessimism (Shen et al.,2009). In this regard, fatalistic beliefs were presented as an inhibiting factor on the adoption of health-conscious behaviors for the prevention of health risks.

Such instances of findings imply economic and psychological approaches to the construct of fatalism and while operating in different contexts, one could assume that a broader relationship seems to emerge: a general association between fatalistic beliefs and poor engagement in preventive behaviors. At the same time, preventive practices have been shown to be consistent with ambiguity averse attitudes stemming from health uncertainties (Etner & Tabo, 2013). Could then be inferred that fatalistic individuals are less likely to be ambiguity averse? Despite its prominence in the philosophical field, fatalism has not been of an extensive and structured focus to social and economic researches to enhance the evidential value of such assumptions.

The way we deal with uncertainties determines, to a great extent, the way we live. The ubiquitous fatalism and prevailing uncertainty in daily life, render the fatalistic determinants of decision making a research field of social significance. Contemplating on the broader context of the respective behavioral patterns, the theme that seems to emerge is whether fatalistic beliefs relate to ambiguity attitudes and in what way. Could it be inferred that fatalistic individuals are more likely to manifest ambiguity

seeking behaviors? That questionable association triggers the research question of this thesis: Do fatalistic outlooks influence people's attitudes towards ambiguity?

The results of the study implied a weak positive association between fatalistic and ambiguity attitudes but the outputs were not statistically significant. The objective of this research to identify a significant relationship settles for less conclusive findings.

Chapter II: Literature Review

Part I: Fatalism

2.1 Conceptualization of fatalism

Defined in a framework of attribution bias, fatalistic beliefs connote the perceptual aspects that human beings have been demonstrating for ages: a persistent yearning for discovering the meaning of life.

In its elementary form as the most antecedent means of speculative expression, mythological fatalism has emerged in search of the power that controls the cosmic unity. Similarly, through its ensuing form, philosophical fatalism identified fate as the governing authority underlying the unfolding of events ("Fate and Fatalism", 2020). In its different manifestations, the broad notion of fatalism embraces the idea that life is pre-determined and therefore unchangeable. Within the history of religious views and philosophical thinking, fatalism has assumed an assortment of variants that were sustained until today as a ubiquitous cultural presence.

Kuhr (1975), referred to fatalism as the belief that being is foreordained by fate and associated its origin with feelings of hopelessness. Similarly, Intisar Al Haq (1969) portrayed the notion as the submission to the implacable forces that rule the occurrence of events in nature where the paramountcy of destiny is beyond human control. It is the will of theological authorities or laws of fate that drive the unfolding of the future and any mortal control is excluded. One's passivity can be then ascribed to the supremacy of fate rather than the accountability of one's weaknesses.

In a comparable cosmological framework and a manifestation of naïve social phycology, fatalism was conceptualized as one's causality in the face of the unknown, where any personal deficiencies are perceived as preordained by supernatural agents. The individual's resignation is then rationalized on account of the supremacy of the higher powers (Shaffer, 1984).

2.1.1 Structural-cosmological fatalism

Despite the abundance of theories honoring the notion, fatalism has been unspecified in the psychology literature lacking in comprehensive theory. Some structure in the conceptual vagueness was established by the sociological approach of Acevedo (2005a). Following the perspectives of Durkheim and Marx who associated fatalistic outlooks with the societal structure of excessive regulation, the author set the origins of

the doctrine in social stratification (for instance slavery) and further proposed a cognitive orientation. In this regard, fatalism was classified into two types: structural and cosmological.

Structural fatalism was defined as a sense of helplessness that stems from oppressive regimes. Hesitating attitudes and/or the lack of an exit option to change the social status or standard of living could also be involved. In this regard, structural fatalism may emerge from the over-regulation by social structures (like enslavement or poverty), but it can also occur with a perceived lack in self-efficacy.

On the other hand, Acevedo's cosmological fatalism portrayed the apprehension of future uncertainty as a resignation to cosmological or supernatural powers for the regulation of life outcomes. Further, the willingness to grant authority to divine control implied a concurrent context of "internalization" wherein the beliefs and actions are in accordance: there is voluntary resignation because of the belief to the supernatural.

Despite the distinct differences between the two types, structural and cosmological fatalism are not to be considered mutually exclusive (Acevedo, 2005a).

2.2 Consequences of fatalistic attitudes

2.2.1 Fatalism and perception of accidents – risks

Several mental models employed under uncertainty reveal the prevailing cultural context integrated in cognitive development. In the same manner, deeply held fatalistic beliefs passed down through generations may favor judgmental biases in the perception of risk taking. In this respect, Kouabenan (1998) emphasized on the influence of cultural beliefs and the related animist practices when interpreting the uncertainty concurring with risky situations. Here, the perceived severity of the circumstances and the adoption of any preventive measures were shown to be conditioned by the predominant cultural framework. Fatalistic individuals were found to display risk seeking attitudes either because they believed that the inevitable could not be prevented, or that the danger would be eventually avoided if they are consistent with certain rites. In such a context, any security precautions and preventive actions are more likely to be neglected.

2.2.2 Fatalism and mortality salience

In another instance of submissive attitudes and external attributions ascribing to culture, fatalism was found to operate over the perception of mortality. Yen (2013) highlighted the impact of culture-specific beliefs on the psychological processes employed in the face of death, showing that fatalism can enhance the acceptance of the inevitable finality of life. Further, cultural worldviews wherein the course of life is "in God's hands" were recognized as an effective mechanism to copy with the existential uncertainty and fear of mortality.

When dealing with death related stimuli, subjects apt to fatalistic beliefs were found to be compliant with their destinies, rather than fighting against a perceived predetermined life trajectory.

2.2.3 Fatalism and mental health

2.2.3.1 Fatalistic orientations affecting the mental health of the lower social strata individuals

Ross et al. (1983) demonstrated that individuals living at a poverty threshold are more prone to fatalistic outlooks, which are in turn associated with higher levels of psychological disorders. Here, fatalism was shown to serve as an influential mechanism wherewith the social rank upsets the psychological wellbeing. In this regard, a lower social status was associated to cognitive orientations of low-self-worth and an impaired coping against the perceived uncontrollable environmental challenges. Such uncertain contexts emerging from the social structure were found to provoke a fatalistic conception of reality, undermining one's perceived efficacy and provoking mental distress experiences like anxiety and depression.

2.2.3.2 Stress modifying role

In line with Ross et al. (1983), Wheaton (1983) highlighted the impact on wellbeing and perceived fatalism in the diminishing of self-tolerance when dealing with environmental stressors. Here, fatalistic outlooks were introduced as a stress modifying tool that enhances a mental adjustment of resilience under stressful encounters. Further, a scaling down in fatalism demonstrated a weak effect on the likelihood to develop depression and schizophrenic-like traits. On that account, the diminishing of fatalistic views was delineated as a potential to reduce the vulnerability to the acute stress conditional to depression (i.e. anxiety induced by delimited time stimuli) and the chronic stressor effects related to schizophrenia.

2.2.4 Fatalism and health outlooks

2.2.4.1 A general note

A considerable body of literature conceptualizes fatalism in a framework of health beliefs. Such outlooks can be perceived as defense attitudes to deal with health uncertainties as they fuel a sense of meaning in the unknown nature of health matters.

Shen et al. (2009) demonstrated the multidimensionality of the construct as manifesting through predetermination, luck and pessimism. Attitudes of genetic determinism triggered by poor heath heredity patterns and attributions of one's wellbeing to luck and pessimistic outlooks on health affairs, were found to induce low both response- and self-efficacy. Further, being prominent in the anticipation of negative health outcomes, such perspectives were found to hinder the engagement in a healthy lifestyle.

2.2.4.2 Stress modifying role

On the other hand, Keely et al. (2009) inferred that fatalism does not exclude the performance of health behaviors, but on the contrary serves as a functional modus operandi against health uncertainties. Here, fatalistic beliefs were perceived as a means of stress relief coming with the acceptance of the future, and a mechanism of uncertainty management via a realistic outlook on the unexpected. Further, fatalism was shown to operate as a sense making tool when coping with situations subjected to the health behaviors of the past. On that account, fatalistic individuals may not disregard the consequences of a prior lifestyle on the present-future health state, but do not overlook the potential of engaging in health behaviors either.

2.2.4.3 Fatalism and cancer screening

The perception of fatalism with regard to health behaviors was further postulated through beliefs and attitudes on cancer screening. Focusing on African Americans, Powe and Johnson (1995) viewed fatalism as a two-factor concept that encompasses the notions of angst and nihilism, accounting for the deep-rooted powerlessness and despair that derive from a sad history of human oppression, racism and slavery. In the face of the uncertainty of an impending cancer, such outlooks were found to induce modes of coping that refrain from any preventive behaviors or medical interventions. In this regard, the practical significance of fatalistic views was shown to hinder screening behaviors and account for the increasing cancer mortality rates in these populations.

In a similar vein, Straughan and Seow (1998) perceived fatalism in a context of predestination, fortune and destiny manifesting with the onset of a serious disease. Such attitudes were found to generate low levels of perceived self- efficacy and in turn affect health seeking behavior. Focusing on women, the authors demonstrated that perceptions of personal inadequacy are discouraging the participation in cancer screening tests.

Powe and Finnie (2003) referred to “cancer fatalism” as the belief that death is certain once cancer is present. The authors associated these outlooks with the uncertainty governing the disease and the aversion to any preventive measures for an early diagnosis. The most susceptible groups to that type of fatalism were found to be women, the elderly, individuals of low education, low-income and racial minorities, determining the target groups that any interventions should be directed to.

Similarly, Drew et al. (2011), contended that fatalism is an explanatory construct for the decision making about hysterectomy. Delays or even denial to cancer treatments, can stem from fatalistic mindsets that promote the idea that the destiny of the human body is predetermined and beyond one’s control.

2.2.4.4 Fatalism and HIV

In another research, fatalism was conceptualized in a broader context alongside the notions of life dissatisfaction, short term perceived life expectancy, low self-esteem and pessimistic views on the uncertainty of the future. Such attitudes were found to induce HIV risk taking behaviors among homosexuals, who were shown to perceive any preventive measures as futile and hence to neglect any precautionary action (Kalichman et al. 1997).

Sharing common ground, Varga (2001) demonstrated that fatalistic outlooks stemming from feelings of powerlessness and hopelessness induce naïve response strategies in the face of HIV. Focusing on the fatalistic philosophy dominating the Durban sex industry, the author showed that the disease is viewed as one of the job's inevitable hazards and thus, any preventive action or behavioral modification in work practices is disregarded.

2.2.4.5 Fatalism and diabetes

In line with Powe and Johnson (1995), Egede and Bonadonna (2003) associated fatalism with attitudes of despair, hopelessness, powerlessness and loss of meaning. Focusing on a context of self-management and the coping strategies employed in the face of type 2 diabetes, the authors conceptualized the doctrine as multidimensional, extending to the meaning, experience and coping related to the disease, and the religious/spiritual beliefs of the individual. Centering on the African Americans of the American deep South, the authors associated fatalism with negative response strategies but highlighted that fatalistic beliefs may differ conceptually from the perspectives of certain dimensions. In this regard, individuals resolving the uncertainty of the illness with religious/spirituals cognitive components, were shown to manifest a positive coping.

2.2.4.6 Genetic fatalism

Other studies have emphasized on a perceived genetical behavior as manifested in the idea that the paramountcy of genes dominates one's manners.

Alper and Beckwith (1993) conceptualized ''genetic fatalism'' as the belief that one's behavior is controlled by the hereditary nature of their genes. That genetic bias was perceived as a behavioral rigidity accountable for one's resistance to changes and free will. In this regard, individuals ascribing the basis of their behavioral traits to genes, were found to discharge responsibility for their behavior perceiving it as beyond control.

Similarly, Parrott et al. (2004) described genetic determinism as the idea that one's attitudes and life courses are solely ascribed to their genes and demonstrated the impact of such mentalities on perceived control. Individuals believing they have inherited a

"bad" genetic makeup, were shown to identify genes as the predominant determinant of their health and, hence, to reject a healthy lifestyle for being "futile".

2.2.5 Fatalism and decision under uncertainty

The instances of fatalism in literature deliver insights about the multitude of behaviors manifested in the face of uncertainty. A considerable number of studies associate fatalistic attitudes to negative coping when it comes to the unknown and the challenges of life. Pessimistic traits may also be involved. On the flip side, other studies display how fatalism serves as mental aids to alleviate the experience of life obstacles or effectively deal with uncertainties. Research has shown that the nature of mental attitudes has a direct impact in decision making under uncertainty. Optimistic individuals were found to be more ambiguity seeking (Pulford, 2009). However, fatalistic individuals may operate also with pessimistic outlooks. As seen above in 2.2.1, fatalism was also shown to induce risk seeking (Kouabenan, 1998). The diverse findings and their implications suggest that when investigating how decision making might be impacted by such beliefs, one must consider the most prominent dimension of the particular context that fatalism may operate in (ranging from negative to positive outlooks). Further, measuring both the fatalistic and uncertainty attitudes of a subject pool, may provide additional insights about the relationship between the two notions in decision making.

2.3 Fatalism measurement

Despite being deeply rooted in the global psyche, fatalism has received increasing research attention only over the last 36 years.[1] The concept has been of interest to both health and personality psychology, where an extensive body of studies has captured its essence on a broad scope whilst lacking structure and consistency. On that account, the fatalism measures employed in a plethora of studies have presented incompatible results for the same behaviors. That heterogeneity may be attributable to the diversity of the measurement scales used together with a questionable validity and reliability. Further, the approach of different fatalism constructs may also be accountable for the inconsistent results.

A literature search performed by Esparza (2005) retrieved 51 different measurement scales for fatalism. In a later study, Esparza et al. (2014) performed an exploratory factor analysis on the 29 most commonly used scales and ascertained that the 239 items obtained were loading into 5 main factors: fatalism, helplessness, internal control, luck and divine control, whereas some of the items were not loading to any factor (108 items). Further, the retrieved items were shown to measure five different (but correlated) constructs than solely fatalism. On that account, the diversity of the emergent findings and the employment of assorted scales with poor consistency, pave the way to develop an instrument of a unified construct validity, enhancing a better comprehension of fatalism and its association to other constructs.

A review of recent efforts to measure fatalism reveals two newly developed scales focusing on health beliefs and diabetes. Shen et al. (2009) adopted a three-dimensional approach and analyzed the effects of predetermination, luck and pessimism on health behaviors. Egede and Ellis (2010) employed also a three-dimensional scale but focused solely on diabetes. Here, the effects of emotional distress, religious and spiritual coping were analyzed.

In an endeavor to bring unity in fatalism measurement, Esparza et al. (2014) developed a multidimensional instrument based on their exploratory factor analysis on the most widely used scales. As aforementioned, the factors to emerge from the items with the highest loadings were those of fatalism, helplessness, internal control, luck and divine control (measures close to the 3 dimensions proposed by Shen et al.:2009, but here not specific to health beliefs). Further, the underlying factor structure attained from the retrieval of the items with the highest loadings, determined six items per factor for the scale inclusion.

For the next phase, a confirmatory factor analysis validated the factor structure, generating a valid and reliable fatalism measure of cross-cultural validity and satisfactory psychometric properties. The scale is considered to have the potential to bring clarity in emergent findings and is presented as follows:

Divine control

1. Everything that happens is part of God's plan.
2. Everything that happens to a person was planned by God.
3. Whatever happens to me in my life, it is because that is the way God wanted it to happen.
4. God controls everything good and bad that happens to a person.
5. God has a plan for each person, and you cannot change his plan.
6. No matter how much effort I invest into doing things, at the end, God's decisions will prevail.

Luck

1. When I get what I want, it's usually because I'm lucky.
2. How successful people are in their job is related to how lucky they are.
3. Some people are simply born being lucky.
4. When good things happen to people, it is because of good luck.
5. The really good things that happen to me are mostly because of luck.
6. Luck does not exist

[1] Esparza et al.(2014): 80 published studies from 1985 to 1994, 169 from 1995 to 2004, and 334 studies from 2005 to 2014

Helplessness

1. I feel that nothing I can do will change things.
2. Sometimes I feel there is nothing to look forward to in the future.
3. I feel that I do not have any control over the things that happen to me.
4. No matter how hard I try, I still cannot succeed in life.
5. I often feel overwhelmed with problems, since I do not have any control over solving these problems.
6. There's nothing I can do to succeed in life, since one's level of success is determined when one is born.

Internality

1. I feel that when good things happen, they happen as a result of my own efforts.
2. What happens to me in the future mostly depends on me.
3. My life is determined by my own actions.
4. What people get out of life is always due to the amount of effort they put into it
5.What happens to me is a consequence of what I do.
6. I can do almost anything if I really want to do it.

Fatalism

1. I have learned that what is going to happen will happen.
2. If something bad is going to happen to me, it will happen no matter what I do.
3. If bad things happen, it is because they were meant to happen.
4. There is no sense in planning a lot; if something good is going to happen, it will.
5. Life is very unpredictable, and there is nothing one can do to change the future.
6. People die when it is their time to die and there is not much that can be done about it.

Fig. 1

In this thesis, the fatalism scale introduced by Esparza et al. (2014) will be employed. Considering that the sole focus of the present survey is to determine the relationship between fatalistic attitudes and ambiguity, only the items corresponding to the "Fatalism" factor will be used. These factor items are capturing the core of the construct as it is given by the modern lexicon: the tendency to perceive all events as predetermined and inevitable without necessarily expecting a specific outcome. Thus, the first factor of the scale is sufficient to examine fatalism, whereas the other dimensions are capturing related notions (Esparza et al., 2014).

Part II: Ambiguity

2.4 First approaches to ambiguity

2.4.1 Ambiguity and risk

Being the first to explicitly distinguish between uncertainty and risk, Knight (1921) perceived uncertainty as the subjective estimates on unique circumstances, wherein the distribution of possible contingencies is unknown and, hence, it cannot be classified in a group of instances. On the other hand, risk was defined as a quantity susceptible to measurement because of an extent of quantitative knowledge available. Ambiguity was then conceptualized as a non-quantitave type of uncertainty and therefore an unmeasurable effect, whereas risk was defined as a "measurable uncertainty" emerging from the availability of objective probabilities: either by their theoretical deduction (a priori probabilities), or determined by an empirical evaluation (statistical probabilities).

2.4.2 Savage's theory

Focusing also on the subjectivity integrated in decision making, a latter study by Savage (1954) contended that statistical theory cannot exclude the subjective probabilities employed in uncertain occurrences. In this regard, individuals were shown to operate as if they maximize expected utility with respect to some subjective probability when facing uncertainties. On that account, the author combined the expected utility theorem with "personal" probabilities and introduced a set of axioms intended to foresee human behavior.

2.4.3 Criticism: Deviation from expected utility

On the other hand, Ellsberg (1961) was the first to ascertain that choices do not conform to theories that measure uncertainty in terms of probabilities. In this regard, decision makers cannot be considered as utility maximizers when dealing with ambiguous circumstances, since they do not perpetually assign – or act as if they assigned – probabilities to uncertain events. Instead, Ellsberg centered on one's possession of knowledge when estimating relative likelihoods and referred to the ambiguity of that knowledge: a condition determined by the quantity and nature of the information available, accounting for the extent of one's certainty. Ellsberg associated high levels of ambiguity with low confidence on choice situations, outlining that high ambiguity can also occur in high informative contexts but of disputable accuracy or contradictory viewpoints and evidence.

Similarly, Fellner (1961) conceptualized uncertainty generated attitudes in a framework that deviates from the operational utility concept and postulated the distortion of genuine probabilities in terms of nonadditivity. On that account, reactions to uncertainty were perceived as slanting tendencies that provoke behaviors diverging from the standard mathematical processes of probability principles. To that context, the decision making under uncertainty was portrayed by the maximization of an impure

kind of utility grounded in the psychological weights (i.e. the distorted probabilities) attached to uncertain events: the utility or disutility of gambling.

On the other hand, Smith (1969) ascertained that in choice situations under uncertainty, individuals' eligibility limits itself to their preferences and does not extend to an additional definition of probabilities that deviates from that operating in "standard process" contingencies. Instead, the utility losses (or gains) are emerging from the concrete or imaginary factors that impel the subjective value to fluctuate between "win" or "lose" outcomes. Thus, decision-makers contemplate probabilities as probabilities and, hence, they alter merely their subjective values attached to the corresponding utility. The utility of rewards is then depended on the relevant framework and therefore it diverges from the "objective" reward concerned.

In a more recent study, Martinez-Correa (2012) conceptualized ambiguity in a framework of inadequate information wherein an explicit belief distribution is unattainable, or in more extreme cases where a probability distribution cannot be defined at all. The author referred to ambiguity as any situation in which decision-makers operate as if there are no clearly defined objective or subjective belief distributions.

2.5 Ambiguity attitudes

2.5.1 General mentions

Sherman (1974) distinguished between levels of susceptibility to ambiguity, indicating that subjects who are less tolerant tend to be less competitive and more risk averse than those of higher tolerance. One then should consider both the choice context and the individual's psychological state when predicting ambiguity attitudes.

Kahn and Sarin (1988) associated ambiguity with second-order uncertainty (uncertainty about uncertainty) and a distribution of odds emerging from perceived frequencies. Their empirical testing demonstrated that ambiguity generated attitudes are contextually specific and that the willingness to pay is an indicator of the subjects' consideration of the ambiguous context and attitude against (aversion or seeking).

2.5.2 Ambiguity attitudes as a source preference

An extensive body of literature has shown that ambiguity attitudes are depended on the source they stem from. Ambiguity aversion can then be interpreted as the individuals' preference to some uncertainty sources over others. Further, decision makers tend to exhibit a preference to sources of uncertainty where they consider themselves more competent or experienced, rather than in contexts they perceive themselves as less knowledgeable. Instances of such findings are mentioned below.

2.5.2.1 The comparative ignorance hypothesis

In a comparative context stemming from ambiguous stimuli, Fox and Tversky (1995) introduced the comparative ignorance hypothesis. In this regard, ambiguity aversion was shown to emerge from a contradiction between different states of perceived knowledge. Further, the lack of confidence, derived from either one's restricted knowledge on an ambiguous context or the superiority of more knowledgeable others, was found to generate ambiguity averse attitudes. One's dual considerations outlining the discrepancy in competence between two displayed alternatives was shown to accentuate ambiguity aversion, while the evaluation of isolated prospects in a noncomparative framework seemed to diminish such attitudes.

2.5.2.2 Criticism

Extending the comparative ignorance hypothesis beyond just a joint-isolated model, Fox and Weber (2002) demonstrated that ambiguity aversion is intensified in contexts wherein the distinction between states of knowledge is salient, without necessarily requiring an explicit comparison. Thus, the more prominent the gap between different levels of expertise, the more accentuated the ambiguity averse attitudes, without the need for a direct comparison framework.

2.5.3 Ambiguity Aversion

2.5.3.1 The paradox in decision theory

Ellsberg (1961), demonstrated through his famous paradox that people exhibit aversion to ambiguous situations. Employing a gamble-decision task, the author demonstrated that the response patterns violate the expected utility theorem and that the individuals tend to be reluctant to bet on unknown probabilities. Being considered as a groundbreaking contribution to the decision theory under uncertainty, Ellsberg's most referenced "Three-Color Paradox" has been replicated and extended in an abundance of studies. It is presented briefly as follows:

Presented with an urn containing in total 90 balls - 30 red balls together with 60 black and yellow, but these in unspecified distributions - the subjects were asked to choose between option I for betting on the red ball and option II for the black ball. Next, they had to consider options III and IV and choose respectively between the "red or yellow" and "black or yellow" bets.

	30 balls	**60 balls**	
	Red	**Black**	**Yellow**
I	$100	$0	$0
II	$0	$100	$0
III	$100	$0	$100
IV	$0	$100	$100

Table 1

Most response patterns were shown to favor option I for the first phase and option IV for the second. Such preferences were found to violate the subjective probability principle, considering that if the individuals assigned probabilities to the three color balls, the exhibited strict choice ranking between the first two options would imply the subjective probability ranking *prob(red) > prob(black)*, whereas the strict ranking between options III and IV (*IV>III)* would reveal a converse ordering for options I and II *(I<II).* Bets II and III were described as ambiguous due to involving unknown probability distributions and thus, the preference patterns of the individuals revealed ambiguity aversion.

2.5.3.2 Other extensions of the ambiguity aversion literature

In a latter study, Smith (1969) connoted a definition for ambiguity aversion by capturing the concept in terms of "utility losses''. On that account, ambiguity averse attitudes denoted a low tolerance against ambiguous stimuli due to the contemplation on the corresponding utility costs.

Pulford (2009), associated the manifestation of ambiguity averse attitudes with pessimism. Subjects portrayed by such personalities were found to diverge from choices of ambiguous options even in experimental setups wherein the deck was not clearly stacked against them. Conversely, optimists were more likely to opt for ambiguous odds because of positive outcome expectancies and the belief in good luck.

On the other hand, Charness et al. (2013) suggested that preferences favoring unambiguous bets, may reflect the individuals' preconception that the experimental setup is against them, rather than a choice behavior of genuine ambiguity aversion. Further, the study deviated from the majority of precedent remarks on ambiguity, suggesting that it is the neutral attitudes that are prevalent and not the averse, which, were presented to be as common as the ambiguity seeking attitudes.

2.5.3.3 Consequences of ambiguity aversion

Associating ambiguity aversion with the performance of financial markets, Easley and O'Hara (2009) referred to naïve investors as ambiguity averse individuals that lack the necessary expertise to speculate priors over the occurrence of the unknown. Such individuals were portrayed by non-participation to financial markets wherein the incapacity to contract over each potential outcome together with the disclosure of risks, were found to accentuate ambiguity averse attitudes.

Sharing common ground, Dimmock et al. (2016), associated ambiguity aversion with households' portfolio choices. Individuals perceiving themselves as incompetent in financial matters and investment choices, were shown to exhibit ambiguity averse attitudes by displaying denial to involve in equity markets. Such subjects were less likely to emerge as stock market investors, due to perceiving stock returns as considerably ambiguous and being ignorant of the long-term outcomes stemming from various asset classes.

2.5.4 A-insensitivity

In addition to the well-known ambiguity aversion, Dimmock et al. (2015) validated another ambiguity component: a-insensitivity. The concept was explicated in terms of an ambiguity-generated likelihood insensitivity, as exhibited in the tendency to treat events of opposite likelihoods as fifty-fifty and the inadequate distinction between different levels of ambiguity. Such tendencies were portrayed by an overestimation of low likelihoods as manifested by attitudes of ambiguity seeking and conversely, an underestimation of highly likely outcomes revealed by ambiguity averse choices. Further, in longshot contexts, a-insensitivity was shown to fortify ambiguity seeking.

In a study done by Maafi (2001) the ambiguity generated insensitivity was shown to be more pronounced when evaluating a prospect than choosing one. Once the price gap between the involved ambiguous bets was increased, subjects were more likely to choose the P-bet *(high likelihood of a small prize)* but perceived the $-bet *(low likelihood of a big prize)* as one of a greater value. The psychological validity of a-insensitivity has been further established by several researches and some of them are presented briefly as follows.

A similar concept was introduced in Hogarth's and Einhorn's (1990) venture theory wherein the contextual effects on differential weighting were illustrated in the overweighting of low probabilities and the underweighting of high chance events.

Tversky's and Kahneman's (1192) cumulative prospect theory shares a parallel consensus with a-insensitivity by means of the (under) overweighting of (high) low probabilities as reflected in nonlinear preferences: the accentuated risk averse attitudes between likely and sure gains and the risk seeking attitudes among likely and sure losses.

2.5.4.1 Consequences of a-insensitivity

Dimmock et al. (2015) demonstrated a negative association between a-insensitivity and stock market participation, indicating that individuals more susceptible to likelihood insensitivity are less likely to invest in stocks. That effect was more profound than ambiguity averse attitudes, which were only relevant for individuals who perceived themselves as incompetent investors.

2.6 Potential effects of fatalism on ambiguity attitudes

As presented above, the behavioral characterization of fatalistic individuals can range from the neglect of any preventive measures in the face of a disease, to an enhanced confidence in the face of existential uncertainty attributed to the supernatural. The low investment in prevention has been also analyzed in a probability perception context and explained by fatalistic attitudes as manifested in the underreaction to probabilities' modifications (Etner & Jeleva, 2014). In another study, ambiguity averse individuals were more likely to exhibit preventive behaviors under health uncertainties than those who were ambiguity neutral (Etner & Tabo, 2013). One could then imply that fatalistic

individuals may be less likely to display ambiguity averse attitudes. However, fatalism has been also perceived as a cognitive component enhancing a positive coping in challenges (Keely et al., 2009; Egede and Bonadonna, 2003) and in such instances it could be likely that it induces ambiguity seeking attitudes (Pulford, 2009). The majority of the studies reviewed in this thesis, associate fatalism with pessimistic-like attitudes and one could favor a negative association with ambiguity aversion in this regard. However, one should consider the core dimension of the particular fatalistic context examined before suggesting any potential effects on ambiguity attitudes.

2.7 Ambiguity measurement

Introducing a simple experimental design, Dimmock et al. (2016) demonstrated the sufficiency and reliability of matching probabilities to measure ambiguity attitudes and developed a tractable model of ambiguity measurement.

The matching probability of an event E is the probability m that makes the decision maker indifferent between an ambiguous prospect $X_E 0$ that pays a fixed amount X if event E happens and 0 otherwise, and a risky prospect $X_m 0$ that pays the same fixed amount X with probability m.

The authors employed a version of Ellsberg's paradox consisting of a known (K) and an unknown (U) box. To measure the matching probability of event P_U, drawing a purple ball from the unknown box, subjects were at first presented with the following choice dilemma:

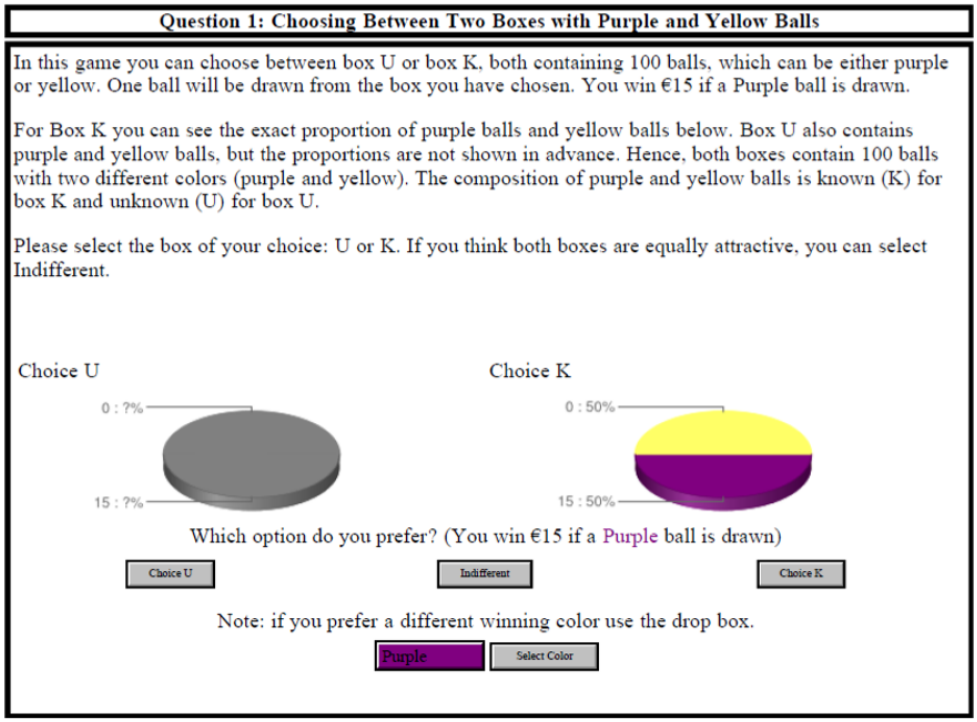

Fig. 2

Despite the proportion of purple balls in box U being unknown, by symmetry, the most plausible subjective probability of an ambiguity neutral decision maker in this case is 0.5. In Dimmock et al. (2016), the matching probability elicited above is denoted m(0.5): the matching probability of an event with subjective probability of 0.5. Ambiguity aversion would then imply $m(0.5)<0.5$.

Starting from that choice situation, a bisection procedure was then used to accommodate other indifference values. Thus, the unknown box (U) was kept fixed while the proportion of purple balls in the known box varied dependently according to the subjects' selection in the previous choice situation. If the subject denoted a preference for Choice K in Figure 2, he/she was presented with a less attractive version of Choice K. If instead, the subject opted for the unknown box, then Choice K was made more gainful in the next round. This procedure continued until the choice of the "indifferent" option.

The authors measured also m(p) for ambiguity neutral probabilities of p=0.1 and p=0.9, by employing two ten-color boxes: one of a known distribution consisting of 10 colors with each color containing 10 balls and one with 100 balls of 10 colors but in unknown proportions. Figures 3 and 4 illustrate respectively the first round of the second and third question.

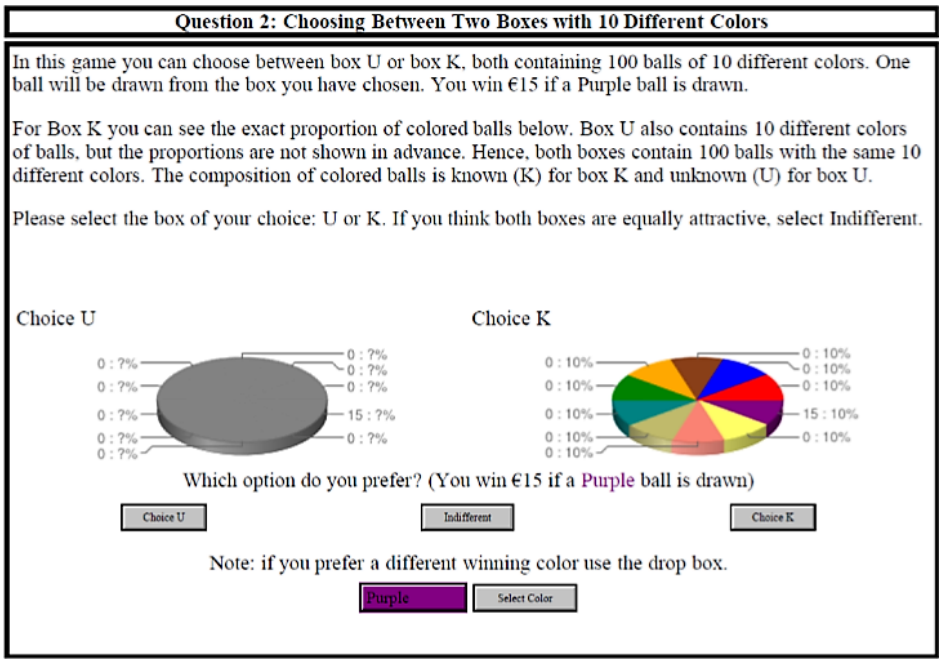

Fig.3

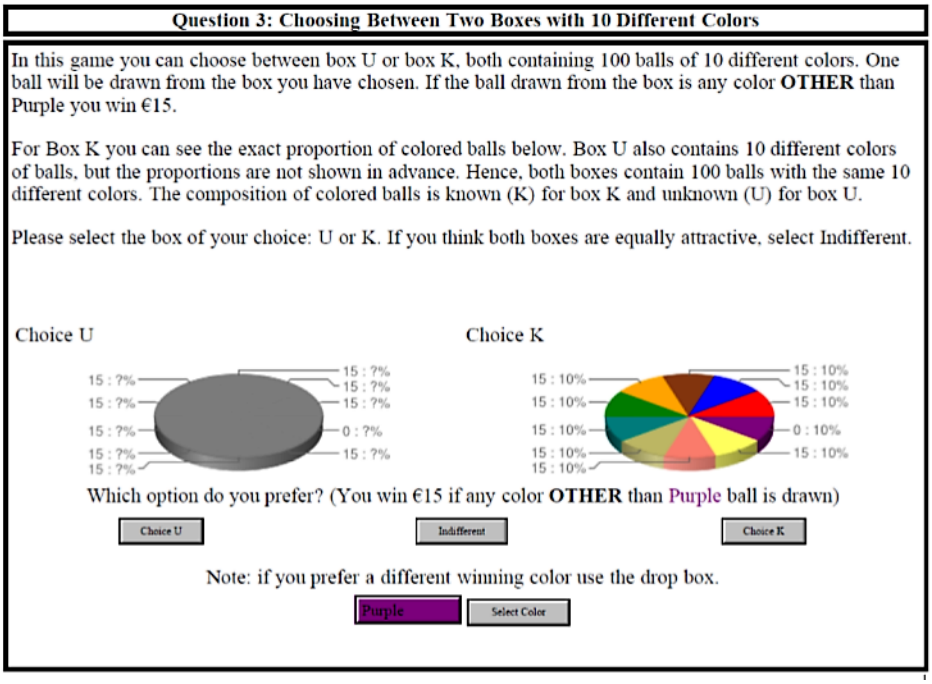

Fig.4

Based on the elicited matching probabilities, Dimmock et al. (2016) defined the following indices of ambiguity attitudes:

$AA_{0.1} = 0.1 - m(0.1)$

$AA_{0.5} = 0.5 - m(0.5)$

$AA_{0.9} = 0.9 - m(0.9)$

Ambiguity aversion implies positive values of the indices, where the matching probabilities are below the a-neutral. Also, values $AA_{0.9} - AA_{0.1} < 0.8$ account for a-insensitivity.

Further, the authors showed that both unknown boxes (2-color and 10-color) can be considered as one ambiguity source employing the same m function. Thus, betting on the unknown 10-color box is equivalent to betting on the unknown 2-color.Therefore, the two unknown boxes employ similar principles and illustrate a certain consistency with each other, indicating that the dependence on these two sources is not too general and that the condition of tractability is satisfied.

For the measurement of the ambiguity attitudes in this thesis, the design of Dimmock et al. (2016) will be used. Considering that the purpose of this study is not focusing on a-insensitivity, only the two-color condition will be employed.

Chapter III: Experimental design

3. Experimental design

In this research a within – subject experiment has been used and the sample was exposed to every condition of the survey.

3.1 Demographics

The first five questions were addressing the demographic attributes of the participants by asking them to indicate their gender, birth date, ethnicity, country of residence and whether they are religious or not.

3.2 Fatalism measurement

For the fatalism measurement, the fatalism scale proposed by Esparza et al. (2014) was employed (referred to above in 2.3) with the sole inclusion of the items corresponding to the fatalism construct. As the authors have stated: "We propose to use the fatalism factor of this measure to analyze the relationship between fatalism and other behaviors. The other four factors (helplessness, internality, luck, and divine control), even though some have used to measure fatalism, they should be analyzed separately and not to be confused with fatalism".

The subjects have been therefore asked to rank the following statements on a scale 1 to 5, ranging from Strongly Agree, to Strongly Disagree.

Fatalism
I have learned that what is going to happen will happen.
If something bad is going to happen to me, it will happen no matter what I do.
If bad things happen, it is because they were meant to happen.
There is no sense in planning a lot; if something good is going to happen, it will.
Life is very unpredictable, and there is nothing one can do to change the future.
People die when it is their time to die and there is not much that can be done about it.

Fig. 5

3.3 Measurement of ambiguity attitudes

For the assessment of the ambiguity attitudes of the sample, the subsequent questions employed matching probabilities which were measured by a bisection procedure. This section was based upon the elicitation method proposed by Dimmock et al. (2016) that was described above in 2.7.

For the first question of this part, the subjects were presented with two boxes: Box K and Box U, both containing 100 purple and yellow balls. For Box K, the proportion of the two colors was 50% for each, whereas the composition of the two colors in Box U was unknown. The respondents were instructed that a ball would be drawn from the box of their choice and that they would receive €50 if the ball is purple. They were

then offered a choice between the two boxes and an option of indifference, as illustrated below in Figure 6:

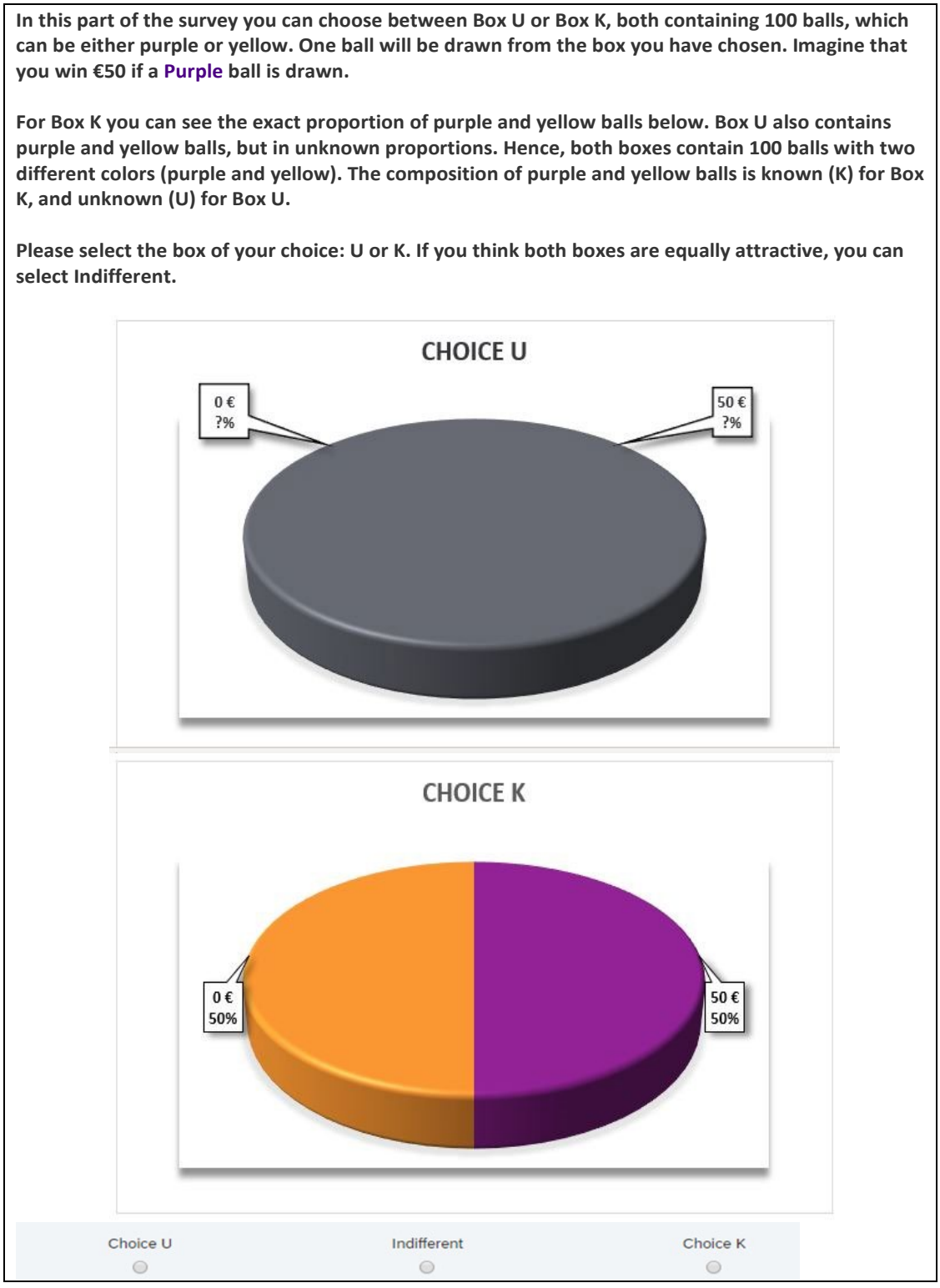

Fig. 6

Upon the selection of Choice K, a less attractive version of the known box was presented in the next question, as depicted in Figure 7 below:

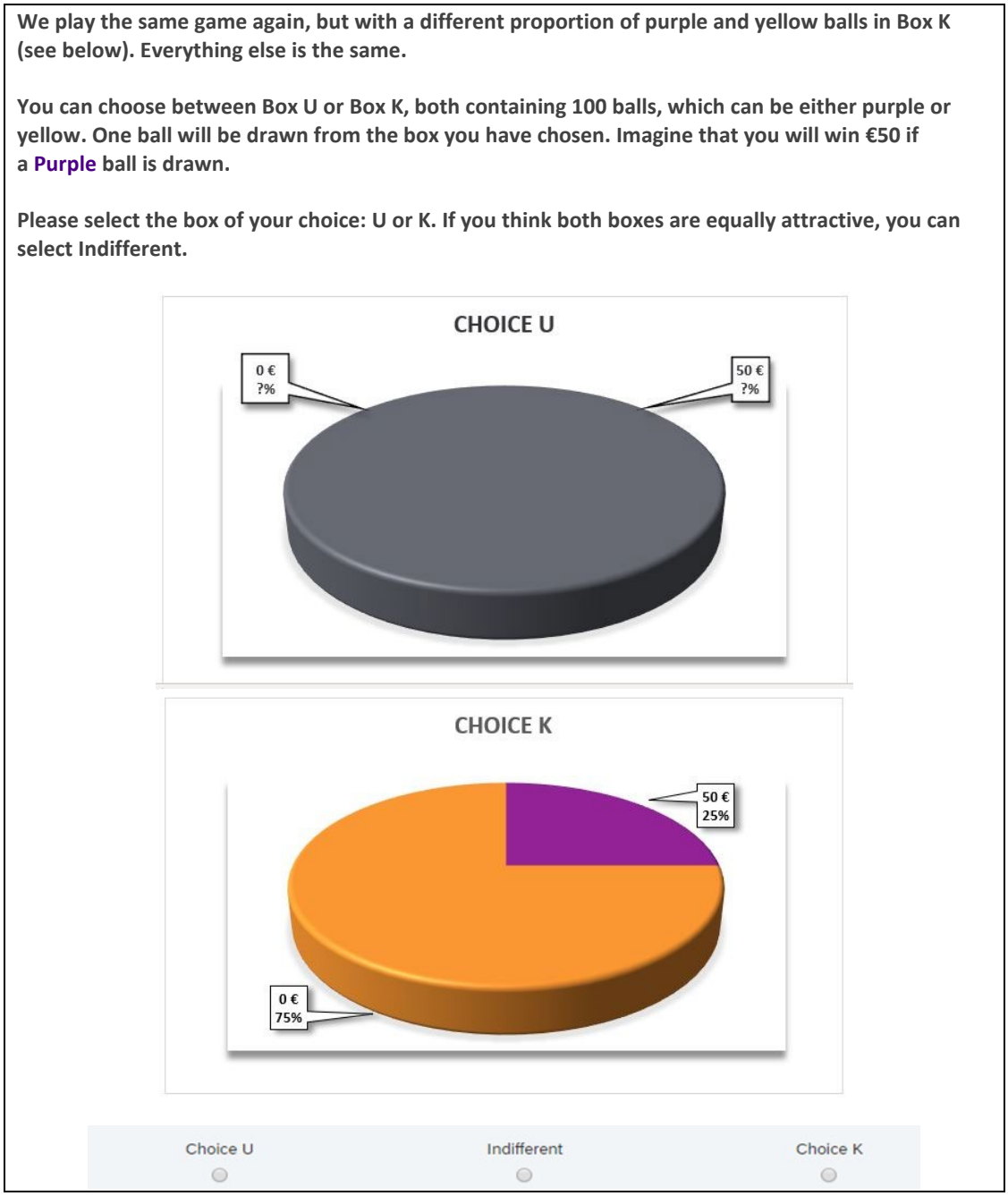

Fig. 7

If in Figure 7 the Choice K was selected again, Choice K was displayed once again as less attractive in the following question. If instead, the respondent selected Choice U, Choice K was presented as more gainful in the next question. That pattern continued until the selection of the "Indifferent" option. In the case that Indifference was not selected at all, the algorithm continued for three more iterations and then stopped. The

table below illustrates the transitions of the bisection algorithm, contingent on each previous response and starting from the first ambiguity question (q.9): after a choice of Box K q.10 was displayed, while q.13 followed in a selection of Box U. Upon a choice of indifference, the algorithm ceased, and the survey was coming to an end.

Iterations of winning probabilities in box K and mapping of transitions					
			Next Round		
Q Rounds	**Probability of purple ball drawn in (K) box (%)**	**Probability of orange ball drawn in (K) box (%)**	**If box K is selected**	**If box U is selected**	**Indifferent**
q.9	50	50	q.10	q.13	stop
q.10	25	75	q.11	q.16	stop
q.11	12	88	q.12	q.19	stop
q.12	6	94	stop	stop	stop
q.19	18	82	stop	stop	stop
q.16	38	62	q.17	q.18	stop
q.17	32	68	stop	stop	stop
q.18	44	56	stop	stop	stop
q.13	75	25	q.14	q.20	stop
q.14	62	38	q.15	q.21	stop
q.15	56	44	stop	stop	stop
q.21	68	32	stop	stop	stop
q.20	88	12	stop	stop	stop

Table 2

Chapter IIV: Results - Data analysis - Discussion

4.1 Demographics

The questionnaire employed in this study was hosted in Qualtrics and distributed via emails and social media (Facebook, What's app, Linkedn). The data collection has been conducted from the 20th of February 2020 until the 31st of March.

A total of 78 individuals accessed the link to this survey, among which 68 completed the demographic questions throughout (13% dropout rate).

Among the valid sample, 35 were females (51.5 %), 32 were males (47.1%), and one person was identified with another gender. The age of the participants ranged from 16 to 70 with an average of 38.5 years old. 58 of the respondents were of white descent (85.3%) and 5 of African American origins (7.4%). The majority of the participants reported to be living in Greece (41 respondents, 60.3% of the sample) and the

Netherlands (20 respondents, 29.4%). Among the remainder, there were responses listing Germany and Belgium (2 respondents per each), the UK, Oman and US (1 respondent per each). Last, the 51.5% of the sample reported to be religious.

4.2 Fatalism

4.2.1 Data

A total of 78 individuals participated in this survey, but there were missing data on the fatalism measures. The dropout rate was 15.4% and the respective 12 responses have been excluded from the below analysis. The valid answers were 66.

4.2.2 Methodology

The questions for the fatalism measurement were recoded to different variables where the score of the Likert scale items was reversed to a ranking from the most negative to the most positive (SD=1, D=2, N=3, A=4, SA=5). The new variables were labelled as Q.3rev, Q4rev, Q5rev, Q6rev, Q7rev and Q8rev, corresponding respectively to each of the fatalism questions as following the sequence of the survey.

In order to test for the internal consistency between the scale items, a Cronbach's a was employed and with a coefficient of .838 the reliability of the scale was established. The result implies that the internally consistent reliable variance in a composite score by combining the N=6 fatalism questions is 84%, signifying homogeneity in the composite scale.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,838	,837	6

Table 3

In order to assess the dimensionality of the scale, an exploratory factor analysis was performed. Both the ratio between the two highest eigenvalues (Component 1 is considerably larger than component 2: 3.3 vs .8) and the first factor accounting for the 55% of the total variance, implied the unidimensionality of the scale. The results are depicted in the table below.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,316	55,265	55,265	3,316	55,265	55,265
2	,887	14,784	70,049			
3	,676	11,272	81,321			
4	,542	9,035	90,356			
5	,332	5,530	95,886			
6	,247	4,114	100,000			

Extraction Method: Principal Component Analysis.

Table 4

4.2.3 Results - Discussion

The first question on fatalism *"I have learned that what is going to happen will happen"* was the only item wherein the choice of "Agree" was accounting for the response with the highest frequency. In all of the other items, the most prominent choice was the "Disagree" option implying an overall not fatalistic mindset.

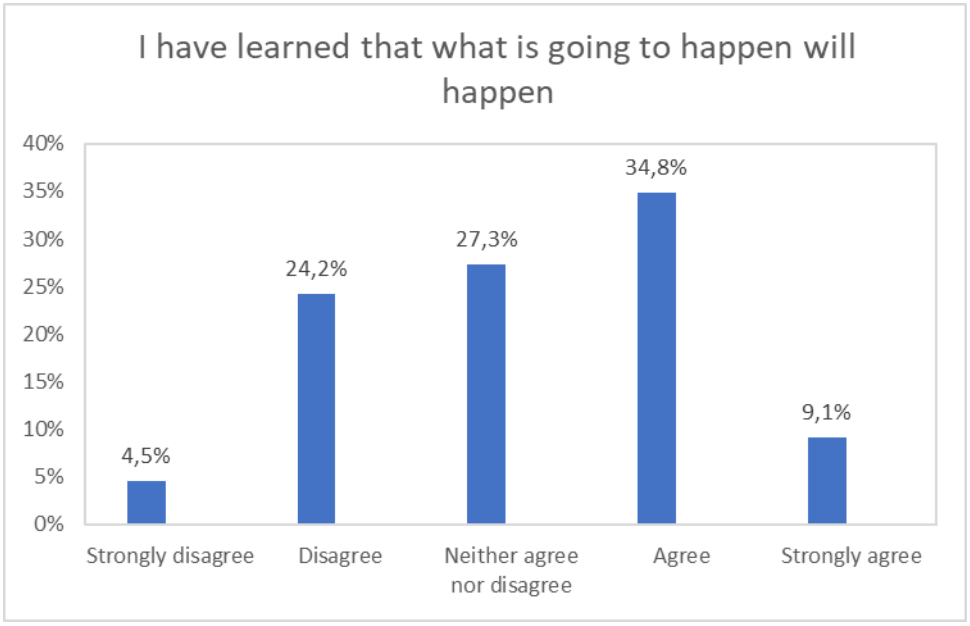

Fig. 8: Q3.0Rev

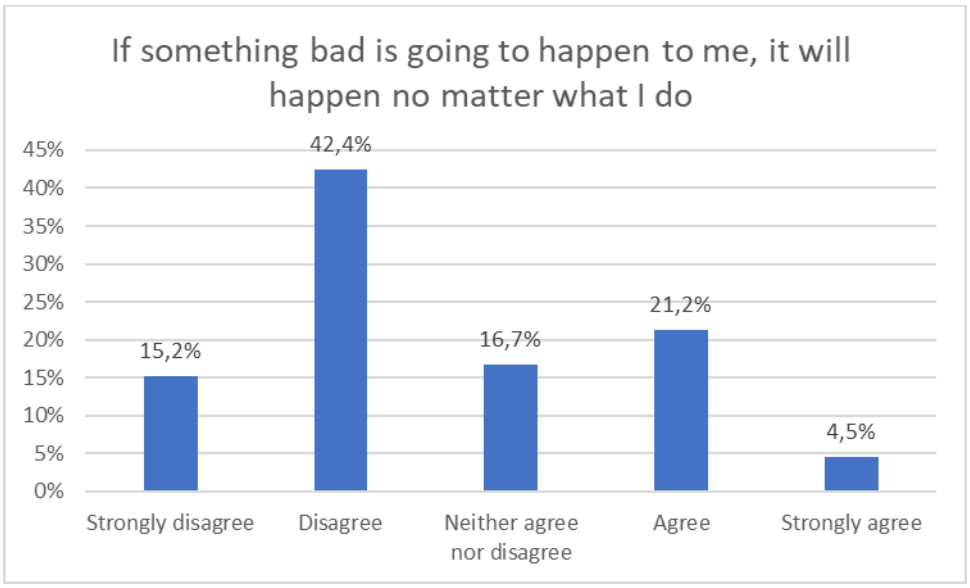

Fig. 9: Q4Rev

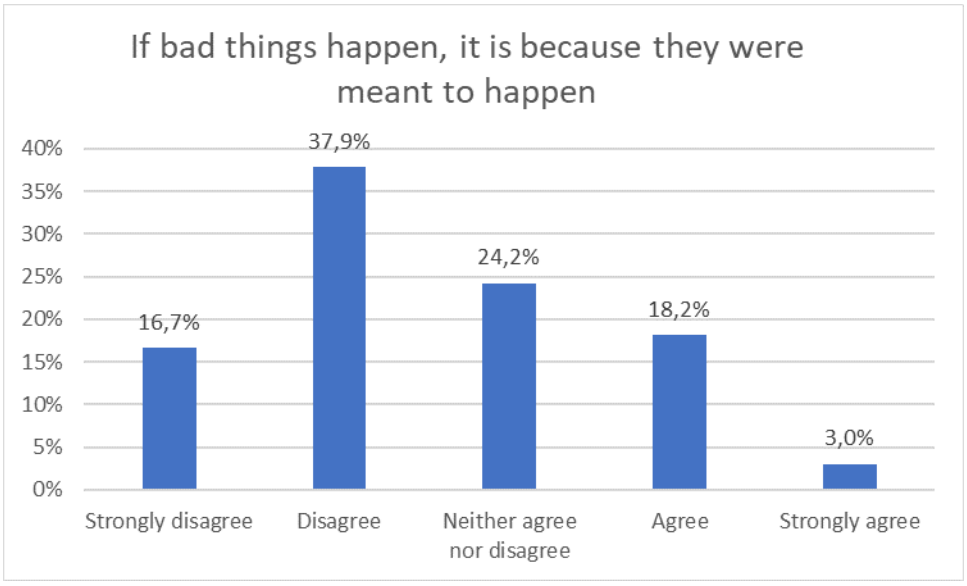

Fig.10: Q5Rev

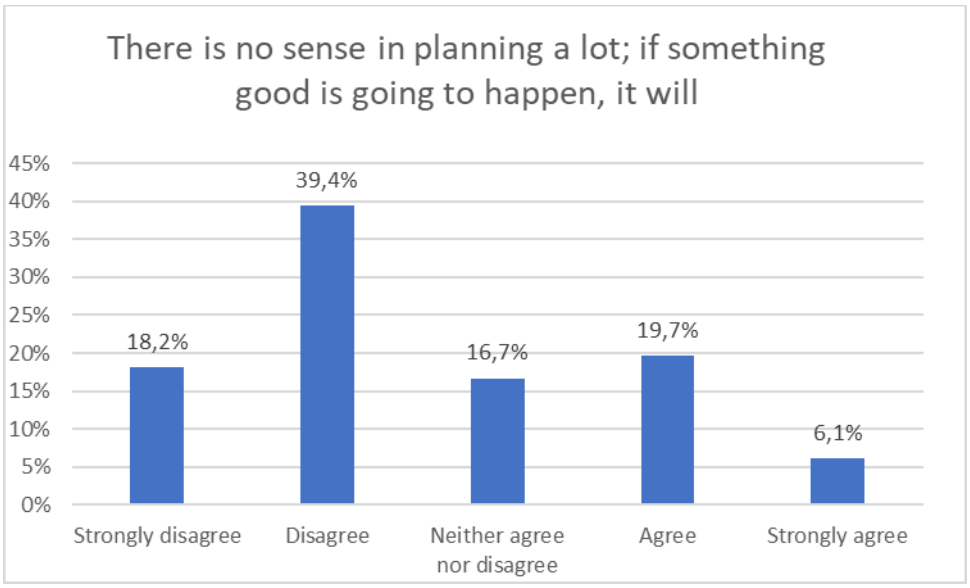

Fig. 11: Q6Rev

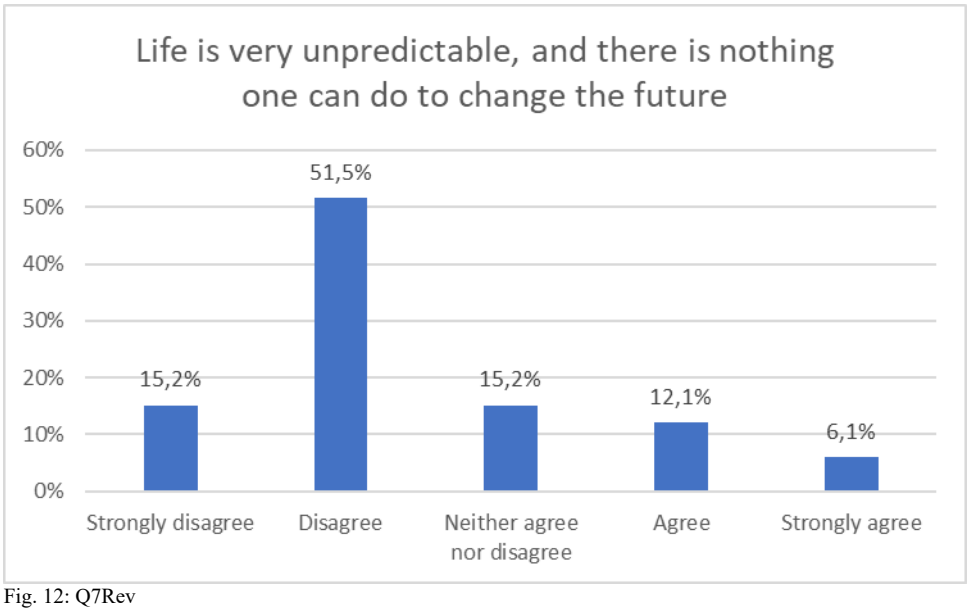

Fig. 12: Q7Rev

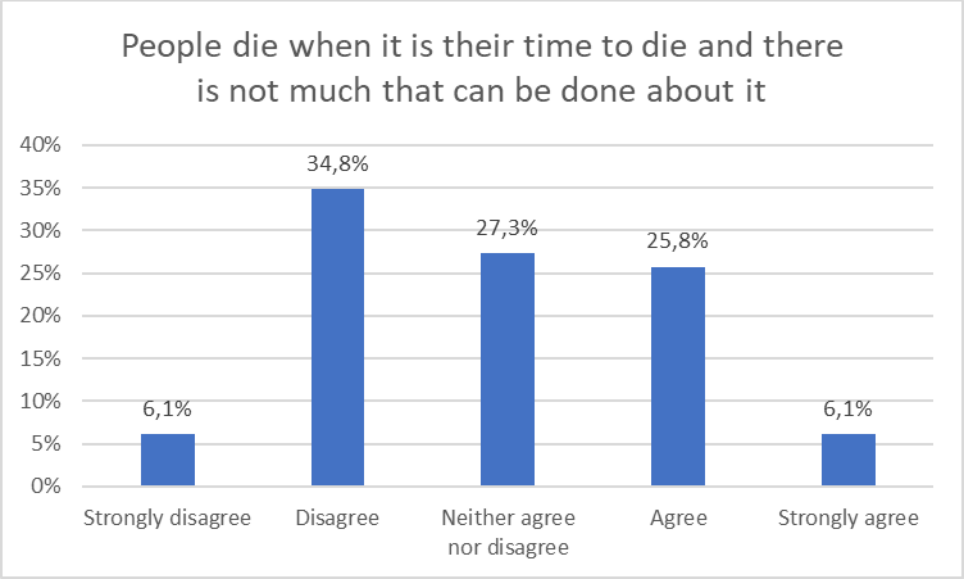

Fig.13: Q8Rev

In order to measure the central tendency and infer what the average respondent might think, the median was measured. For the spread of the responses, the Inter-Quartile Range was calculated. Both results are depicted below.

	Q3.0Rev	Q4Rev	Q5Rev	Q6Rev	Q7Rev	Q8Rev
Median	3	2	2	2	2	3
IQR	2	2	1	2	1	2

Table 5

The data sets for questions Q5Rev and Q7Rev implied more consistency around the median than the other questions (IQR=1) and most respondents indicated their disagreement with the respective fatalistic statements of the survey. For the other fatalism items there was a slight dissonance of opinion across the selected options.

4.2.3.1 Investigating the relationship between fatalism and religiosity

In order to assess the relationship between the religious and fatalistic beliefs of the participants, the Eta and Eta-squared values were measured. For fatalism, the variable Fatmerg is the median response of each respondent among all the questions. The columns of the table below represent all of the values that appeared in the merged variable (1=SD,2=D,3=N,4=A,5=SA).

*Are you religious? * Fatmerg Crosstabulation*

Count							
		Fatmerg					
		1	2	3	4	5	Total
Are you religious?	Yes	1	8	13	10	3	35
	No	4	18	6	3	0	31
Total		5	26	19	13	3	66

Table 6

Directional Measures

			Value
Nominal by Interval	Eta	Are you religious? Dependent	,546
		Fatmerg Dependent	,436

Table 7

Looking at the Eta value corresponding to the Fatmerg variable as dependent, a moderately low association with religious beliefs is inferred (Eta=.436). The calculation of the Eta^2 value (0.19) implies that approximately 20% of the variation in the Fatmerg variable is explained by variation in the question about religion, indicating a small effect size.

4.3 Ambiguity

4.3.1 Data

There were missing data on the ambiguity measurement. The dropout rate was 25.6% and the valid answers were 58.

4.3.2 Methodology

To assess the ambiguity attitudes of the sample, the matching probabilities were calculated. The table below depicts all of the response paths with the respective matching probabilities. The capital letters of each path denote the options selected in the series of the ambiguity questions (K-=Known box, U=Unknown box, I=Indifference) per order of choice. As aforementioned, the sequence of the ambiguity questions was contingent on the previous responses given (3.3, Table 2), starting from the first ambiguity question (q.9). In response paths ending with indifference, the matching probability is precise (it is the probability of a purple ball drawn in Box K in the last displayed question and wherein indifference is chosen). For all of the other response paths, the matching probabilities were calculated by the average value of the lower and upper bounds. For instance, for response path "KKKU", wherein Box K is selected x3 times in a row followed by a choice of Box U, the matching probability is (12%+6%) ←the bounds / 2 = 9**%.** Following the paradigm of Dimmock et al. (2016),

for the paths UUK and UUU which denote extreme ambiguity seeking, less accuracy is required and the algorithm was set up to stop after 3 iterations.

Response paths and their matching probabilities					
Path	**Matching probability q (%)**	**Path**	**Matching probability q (%)**	**Path**	**Matching probability q (%)**
KKKK	3	KUKI	32	UKKU	59
KKKI	6	KUKU	35	UKI	62
KKKU	9	KUI	38	UKUK	65
KKI	12	KUUK	41	UKUI	68
KKUK	15	KUUI	44	UKUU	71.5
KKUI	18	KUUU	47	UI	75
KKUU	21.5	I	50	UUK	81.5
KI	25	UKKK	53	UUI	88
KUKK	28.5	UKKI	56	UUU	94

Table 8

4.3.3 Results - Discussion

A new variable (mprob) was then calculated by incorporating all of the cases illustrated in the table above. The descriptive statistics of the new variable are depicted below:

Statistics

mprob		
N	Valid	58
	Missing	20
Mean		41,84
Median		47,00
Std. Deviation		23,574
Variance		555,747
Range		91
Maximum		94

Table 9

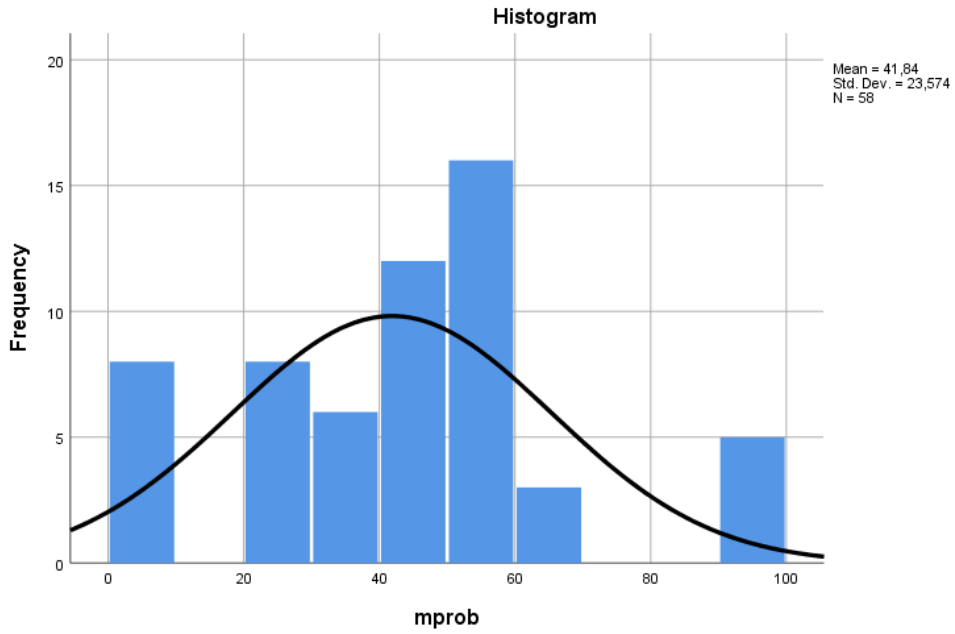

Fig. 14

As shown in the histogram above, most scores fall roughly in the middle of the distribution (mode=50) and there are more scores from 20-60 than 60-100. It is also inferred that the most common responses in the ambiguity questions denote a matching probability of 50% and hence an ambiguity neutral attitude (24% of the sample).

4.3.3.1 Investigating the relationship between fatalism and ambiguity

In order to determine the most suitable statistical analysis to test for the relationship between fatalism (Fatmerg) and ambiguity attitudes (mprob), the normality of the respective variables has been assessed by conducting a Shapiro-Wilk test. For both variables, the test showed a significant departure from normality (Fatmerg: W(66)=0.92, p=.001<.05, mprob: W(58)=0.91, p=.000<.05) and the null hypothesis that the variables are normally distributed in the sample has been rejected.

Tests of Normality

	Shapiro-Wilk		
	Statistic	df	Sig.
Fatmerg	,924	66	,001
mprob	,908	58	,000

Table 10

Further, the inspection of the scatterplot below indicates that the relationship between the variables is not monotonic.

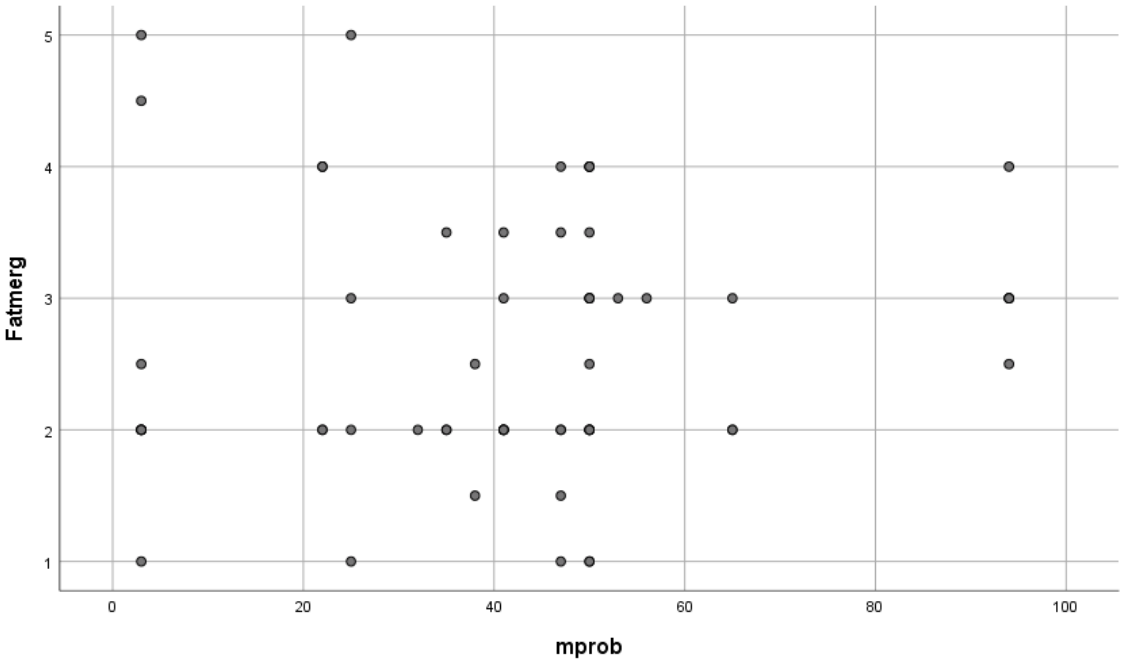

Fig. 15

In order to evaluate further that relationship and determine its strength, the non-parametric Spearman's correlation was employed. The test was based on the following hypotheses:

Ho: There is no association between fatalistic beliefs and ambiguity attitudes

H1: Fatalistic beliefs are positively associated with ambiguity attitudes

The results of the test are presented below:

Correlations

			Fatmerg	mprob
Spearman's rho	Fatmerg	Correlation Coefficient	1,000	,128
		Sig. (1-tailed)	.	,169
		N	66	58
	mprob	Correlation Coefficient	,128	1,000
		Sig. (1-tailed)	,169	.
		N	58	58

Table 11

With a coefficient $r_s(58) = .13$, $p > .05$, a weak positive, monotonic association between the two variables is inferred, implying that they do not quite relate by a similar rank between them, and this result is not statistical significant at the 5% level of significance. Thus, the null hypothesis cannot be rejected and there is not sufficient evidence to infer a positive association between the two variables.

Considering that the displayed results derive from a relatively small sample size, the correlation coefficient cannot be relied on as an accurate reflection of the "true" population association. That said, the degree of the relationship between the two variables emerging from this research, does not rule out a positive and significant correlation in the larger scale of a parent population. The current sample correlation, even though not significant, is close to be significant and given the small sample size, its effect is not to be seen as too small.

To further enhance the interpretability of the results, the factor analysis performed in 4.2.2 was employed. The Principal Component Analysis illustrated in the table below determines the strength of the relationship between each fatalism item and the component extracted in 4.2.2.

Component Matrix[a]

	Component
	1
Q3.0Rev	,698
Q4Rev	,804
Q5Rev	,745
Q6Rev	,803
Q7Rev	,729
Q8Rev	,672

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Table 12

The factor loadings imply that all of the items load in a meaningful way on the principal component (all of the component loadings> .5) and that the Q4Rev and Q6Rev, are the first two items loading the highest (.8 correlation with the component).

With this in consideration, the plausibility of the tested hypotheses was assessed further by a Spearman's rank order correlation between the mprob and the Q4Rev, Q6Rev variables.

For convenience of reference, the statements represented with the variables Q4Rev and Q6Rev are mentioned again.

Q4Rev: “If something bad is going to happen to me, it will happen no matter what I do”

Q6Rev: “There is no sense in planning a lot; if something good is going to happen, it will”

The results are presented as follows:

Correlations

			mprob	Q4Rev
Spearman's rho	mprob	Correlation Coefficient	1,000	,136
		Sig. (1-tailed)	.	,155
		N	58	58

Table 13

A correlation coefficient $r_{sQ4Rev}(58) = .14$, $p_{Q4Rev} > .05$, implies a weak positive association between the mprob and the Q4Rev variable and this result is not statistically significant at the 5% level of significance. The magnitude of the determined relationship is slightly higher than the correlation between the mprob and the Fatmerg variable ($r_{sQ4Rev}(58) = .14 > r_s(58) = .13$), and the obtained p value is slightly closer to significance than in the previous assessment ($p_{Q4Rev} = .16 < p = .17$). However, the obtained output infers failure to reject the null hypothesis and does not provide sufficient evidence to ascertain a positive association between fatalism and ambiguity attitudes.

The evaluation of the relationship between the mprob and the QRev6 variable follows below.

Correlations

			mprob	Q6Rev
Spearman's rho	mprob	Correlation Coefficient	1,000	,052
		Sig. (1-tailed)	.	,349
		N	58	58

Table 14

With a Rho close to 0 ($r_{sQ6Rev}(58) = .05$, $p_{Q6Rev} > .05$) a weaker, almost negligible association than the correlations displayed above is inferred, and this result is not statistically significant. Thus, there is absence of evidence not to reject the null hypothesis here too.

Lastly, for detecting any significant association between the matching probabilities and the ranking to each of the fatalism scale items, the relationships between the mprob and the Q3.0Rev, Q5Rev, Q7Rev, Q8Rev variables were assessed.

For ease of reference, the statements corresponding to each of the fatalism scale items are also listed below:

Q3.0Rev: *"I have learned that what is going to happen will happen"*

Q5Rev: *"If bad things happen, it is because they were meant to happen"*

Q7Rev: "*Life is very unpredictable, and there is nothing one can do to change the future"*

Q8Rev: *"People die when it is their time to die and there is not much that can be done about it"*

To facilitate any relationship comparisons, the correlations of the mprob variable with Q4Rev and Q6Rev examined above, are also included in the Spearman's test illustrated below.

Correlations

			mprob	Q3.0Rev	Q4Rev	Q5Rev	Q6Rev	Q7Rev	Q8Rev
Spearman's rho	mprob	Correlation Coefficient	1,000	,161	,136	,145	,052	,010	,033
		Sig. (1-tailed)	.	,114	,155	,138	,349	,470	,403
		N	58	58	58	58	58	58	58

Table 15

Component Matrix[a]

	Component
	1
Q3.0Rev	,698
Q4Rev	,804
Q5Rev	,745
Q6Rev	,803
Q7Rev	,729
Q8Rev	,672

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Table 16

The results denote a positive association of weak magnitude between the mprob and the Q3.0Rev, Q4Rev and Q5Rev variables, and these outputs are not statistically significant. Given though the effect of the small sample size N=58 on the Rho coefficients and the p values obtained, the correlations are not to be seen as too small. The investigation of the tested hypotheses in a bigger sample could increase the likelihood of obtaining statistically significant coefficient estimates.

$r_{sQ3.0Rev}$ (58) =.16, $p_{Q3.0Rev}$ =.11>.05

r_{sQ4Rev} (58) =.14, p_{Q4Rev} =.16>.05

r_{sQ5Rev} (58) =.15, p_{Q5Rev}=.14>.05

Looking at the last three obtained coefficients, weaker associations are inferred and the correlations are not statistically significant:

r_{sQ6Rev} (58) =.05, p_{Q6Rev}=.35>.05

r_{sQ7Rev} (58) =.10, p_{Q7Rev}=.47>.05

r_{sQ8Rev} (58) =.03, p_{Q8Rev}=.40>.05

The low statistical power of the outputs deriving from the small sample size, undermines the purpose of this thesis to detect a significant effect and the results settle for less conclusive findings.

Chapter V: Conclusion, limitations and suggestions for future research

5.1 Conclusion

The purpose of this research was to ascertain whether fatalistic outlooks associate with ambiguity attitudes. An extensive literature review on both concepts inspired the development of a model that was employed to assess the relationship among them. The emergent findings provide insufficient evidence on the effect of fatalism on people's ambiguity attitudes. The results suggested a weak positive effect, but the outputs missed statistical significance.

5.2 Limitations and suggestions for future research

Sample

The effect of the small sample size on the likelihood of obtaining statistically significant coefficient estimates should also account for the interpretation of the obtained results. This is the main limitation of this study. A larger sample size could have the potential to enhance the evidential value of the findings.

Further, the sample profile was mostly comprised of Greek respondents and the data on the fatalism measures may suffer from ethnocentric bias. The employment of a diverse subject pool with assorted demographic backgrounds could enhance the plausibility to generalize the assumptions made to the true population.

Hypothetical choice vs real incentives

The experimental setting employed hypothetical choice for the ambiguity measurement. Using real incentives and actual pay offs could improve the validity of this research.

Fatalism dimension

The literature review on fatalism implies that it can manifest as an optimistic or pessimistic outlook and such orientations were not assessed in this thesis. Researches on the decision making under uncertainty infer that optimism and pessimism impact ambiguity attitudes differently. Identifying the nature of the dominant dimension of the circumstantial context that fatalism operates in, could provide more insights as to how ambiguity attitudes are affected by each of such fatalistic mindsets.

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