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Do ambiguity avoidance and the comparative ignorance hypothesis depend on people's affective reactions?

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Abstract Previous work has showed that people are averse to ambiguity and prefer to bet on known probabilities over unknown probabilities. There is also evidence that ambiguity aversion is stronger in comparative contexts rather than in non-comparative contexts. In the present paper we suggest that ambiguity aversion depends on people's affective reactions and therefore the effect is more evident in comparative contexts because the comparison between the clear and ambiguous alternatives leads to more positive affective reactions toward the former rather than the latter. The present study extends the previous findings while, at the same time, supporting the "comparative ignorance hypothesis".

Keywords Affect · Ambiguity · Judgment · Evaluation context

JEL Classification D81

On many occasions people make decisions in conditions where some critical information is lacking. For instance, they may have to decide between different alternatives characterized by a high level of ambiguity of the outcomes. This means that even if the decision maker knows the possible outcomes of an alternative she is not able to attach a probability to these events. As a consequence, it becomes quite difficult to understand which alternative entails the best chance to get a satisfactory

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outcome, let alone understanding which alternative is objectively the best. How people deal with conditions of ignorance or ambiguity is a relevant issue not only for the individuals who face such conditions but also for those who study how people make decisions. Not surprisingly ambiguity has attracted quite a lot of attention from both economists and psychologists since real decision makers are often confronted with a decision environment where the probabilities of potential outcomes are not explicitly stated. Many common decisions, such as whether or not to undergo a surgical intervention or how to invest money, are usually made ignoring the exact chances with which the decision maker's goal can be obtained.

Previous work has led to the distinction between known and unknown probabilities. Knight (1921) distinguished between measurable uncertainty (or risk), which can be represented by precise probabilities, and unmeasurable uncertainty, which cannot be expressed using probabilities. Alternatively, Keynes (1921) distinguished between probability and weight of evidence. In Keynes' view, probability represents the balance of evidence in favor of a particular proposition whereas the weight of evidence represents the quantity of evidence supporting the balance. As a consequence, people should be more willing to act if the probability of an outcome is supported by a larger weight of evidence.

The Ellsberg Paradox has been considered as the best demonstration of people's tendency to bet on known rather than unknown probabilities (Ellsberg 1961). Ellsberg showed that people prefer to draw a ball from an urn that is characterized by having an explicit probability of the outcomes rather than drawing a ball from an urn characterized by unknown probabilities of the outcomes. This result is in contrast with the Expected Utility Theory. After Ellsberg's initial evidence about ambiguity avoidance, several other studies confirmed this result (see Becker and Brownson 1964; MacCrimmon and Larsson 1979; Slovic and Tversky 1974).

Ambiguity avoidance has been investigated using different types of manipulations (see Camerer and Weber 1992) and the phenomenon has been confirmed in studies investigating experienced individuals (Hogarth and Kunreuther 1989) and using experimental markets (Sarin and Weber 1993). Moreover, the Ellsberg Paradox has been replicated using many different variations of the original paradigm (see Camerer and Weber 1992), therefore showing that people have a definite preference for risk over ambiguity. Despite all the evidence in favor of ambiguity avoidance for modest probabilities some studies have observed both ambiguity aversion and ambiguity seeking decisions (e.g., Viscusi and Chesson 1999).

In a series of experiments, Fox and Tversky (1995) proposed what they called the "comparative ignorance hypothesis" to take into account ambiguity avoidance. This hypothesis followed earlier results suggesting that people are more willing to bet on their vague beliefs in situations in which they feel particularly competent or knowledgeable, whereas they prefer to bet on clear probabilities when they do not feel especially competent (Heath and Tversky 1991). Fox and Tversky replicated the Ellsberg paradox in joint evaluation (JE), a condition in which the ambiguous bet can be directly compared with the clear one, but not in separate evaluation (SE), a condition in which two different groups evaluate either one bet or the other. Therefore, they concluded that the Ellsberg Paradox depends on the evaluation mode (joint versus separate) and, in particular, is triggered by the comparison between a clear, risky, bet and an ambiguous one.

Subsequent studies by Chow and Sarin (2001) and Fox and Weber (2001) provided additional evidence in favor of the comparative ignorance hypothesis. Chow and Sarin showed that the results found by Fox and Tversky are not always as strong as they suggested. In fact, Chow and Sarin found a smaller, but still significant, difference in SE compared with JE. Therefore, they suggested that the comparative ignorance may be a more fragile effect than previously thought, but, at the same time, their results confirmed that ambiguity avoidance is stronger in JE than in SE. Furthermore, Fox and Weber (2001) showed that comparative ignorance extends beyond the comparative versus non-comparative evaluation context and suggested that it refers to a state of mind of the decision maker rather than to the context in which people are asked to judge a bet.

Starting from the studies on the comparative ignorance hypothesis we aim to show that the ambiguity aversion usually found in JE is caused by people's affective reactions. Accordingly we hypothesize to find that people's affective reactions toward a clear bet should be significantly more positive than the affective reactions toward the ambiguous bet in JE but not in SE. Furthermore, we expect to find that the clear bet induces a clearer feeling and is easier to evaluate than the ambiguous one in JE but not in SE. Numerous studies in the last few decades showed that people's preferences are heavily influenced by the affective reactions they experience toward the alternatives they are asked to evaluate (see: Loewenstein et al. 2001; Slovic et al. 2002; Zajonc 1980). Those studies showed the presence of a strong link between people's affective reactions and their subsequent behaviors (for a review see Peters 2006). Therefore if the evaluation context influences people's preferences for clear and ambiguous bets it is also reasonable to think that there is a similar effect on the affective reactions experienced by the individuals in the different conditions (JE and SE). If the results confirm this hypothesis then it would be possible to propose an "affective explanation" for the comparative ignorance hypothesis and for the ambiguity avoidance.

In the following sections we will describe two experiments in which we measured people's affective reactions toward different bets. In Experiment 1, participants evaluated two pairs of clear and ambiguous bets presented either in JE or SE. We were able to replicate Fox and Tversky's (1995) results using a different dependent measure (affective reactions instead of willingness to pay). In JE, our participants showed a more positive reaction toward the clear bet than toward the ambiguous one. However, the difference was not significant in SE. Therefore, Experiment 1 offered stronger support to the comparative ignorance hypothesis and suggested that the affective reactions can explain the difference between comparative and non comparative evaluation modes.

In Experiment 2, participants were presented with two non ambiguous bets: a high probability bet versus a low probability bet. Results replicated previous findings by Chow and Sarin (2001) measuring participants' affective reactions instead of willingness to accept. We also replicated the data found in Experiment 1. The high probability bet induced more positive affective reactions than the low probability bet in JE but not in SE.

Overall, our findings suggest that people's affective reactions help explain not only ambiguity aversion (Experiment 1) but, more in general, the evaluation of bets

in comparative versus non comparative domains (Experiment 2). Apparently people are more able to use their affective reactions to differentiate between different bets when these stimuli are presented side by side (JE) rather then when no comparison is available (SE). This result is somewhat in contrast with the literature suggesting that people use their affective reactions as a feedback in contexts in which they lack critical information (e.g., Peters 2006).

1 Experiment 1

To test our hypothesis we investigated the same bets that Fox and Tversky (1995) used in their Experiments 1 and 4. We decided to replicate these two studies because they use different types of bets. In their first experiment Fox and Tversky tested the materials originally used by Ellsberg. It should be a compelling result to show, using the materials most widely employed to test ambiguity avoidance, that people's affective reactions have the same pattern as the willingness to pay measured in past studies. In addition, we decided to use the bets from Fox and Tversky's Experiment 4 because these materials do not deal with known and unknown probabilities but with how competent individuals feel about different events. As a consequence, those bets should allow us to provide a stronger support for the role played by the affective reactions in causing comparative ignorance and, in turn, ambiguity avoidance.

Participants were presented with a pair of bets composed by an ambiguous bet and a clear one (like in Fox and Tversky 1995). They were also presented with a second pair of bets composed by an unfamiliar bet and a familiar one (like in Fox and Tversky's study 4). Participants were asked to rate the attractiveness of each bet (two bets for each pair in JE and only one of them in the two separate conditions). We expect to find that the clear (familiar) bet is rated significantly more attractive than the ambiguous (unfamiliar) one in JE but not in SE. In addition, we hypothesize to find that the feeling induced by the clear (familiar) bet should be clearer and more positive than the feeling induced by the ambiguous (unfamiliar) bet in JE but not in SE. Finally, the clear (familiar) bet should be judged easier to evaluate than the ambiguous (unfamiliar) one, but only in JE.

1.1 Participants and design

One hundred fifty university students (50% females; mean age 22 years) at the University of Padova in Italy took part in the study. They were randomly assigned to one of the three conditions (50 students in each condition: JE, SE-clear bet, and SE-ambiguous bet).

1.2 Materials and procedure

Participants were presented with either both or only one of the two bets from each pair. The materials were partially modified to make them more suited to the affective reactions measure employed here as it is different from both the willingness to bet measure tested by Fox and Tversky and the willingness to accept measure tested by

Chow and Sarin. However, there were no major differences between our materials and those used in previous studies. The first pair of bets investigated the Ellsberg Paradox. In JE, the two bets were presented as follows:

> Imagine that there is a bag on the table (Bag A) filled with exactly 50 red poker chips and 50 black poker chips, and a second bag (Bag B) filled with 100 red and black poker chips, but you do not know their relative proportion. Imagine that someone offered you two tickets (priced €20 each). The first ticket allows you to draw a chip from Bag A, whereas the second ticket allows you to draw a chip from Bag B. In both cases the game will be played as follows: First, you are to guess a color (red or black); next, without looking, you are to draw a poker chip out of the bag. If the color that you draw is the same as the one you predicted, then you will win €100; otherwise you win nothing.

BAG A:	*BAG B:*
50 red chips	*? red chips*
50 black chips	*? black chips*
100 total chips	*100 total chips*

Participants in the two SE conditions saw basically the same description but with only one of the two bets.

The second pair of bets investigated ambiguity inducing people to feel different levels of knowledge about the events on which they were supposed to bet. In their study Fox and Tversky asked people for their willingness to pay in order to play two different gambles. The first gamble offered people the chance to win $100 if the temperature in San Francisco a week later was at least 60 degrees Fahrenheit (familiar bet), whereas the second bet offered the same amount of money if the temperature in Istanbul a week later was at least 60 degrees Fahrenheit (unfamiliar bet). For the respondents, who were tested at the University of California at Berkeley, the first bet induced a feeling of higher knowledge and familiarity than the second one. Since they were not familiar with Istanbul they should have perceived the second bet as vaguer than the first one regardless of the fact that the two cities have similar climate. In the present study, we modified the bets in order to make them more suitable for Italian respondents. Therefore the familiar bet asked people to bet on the future temperature in Padova, the city where the participants attend the university, whereas the unfamiliar bet asked people to bet on the future temperature in Portland, Oregon, a place with similar climate but unfamiliar to most Italian people. In JE, the two bets were presented as follows:

> BET A: Imagine that you have been offered a ticket (which costs €20) to play a bet that will pay you €100 if the afternoon high temperature in Padova is at least 15 degrees Celsius one week from today.
>
> BET B: Imagine that you have been offered a ticket (which costs €20) to play a bet that will pay you €100 if the afternoon high temperature in Portland, Oregon, is at least 15 degrees Celsius one week from today.

Participants in the two SE conditions saw basically the same description but with only one of the two bets respectively.

Dependent variables were the same for both pairs of bets. In JE, participants were presented with each question and answered it rating both bets within each pair before advancing to the following question. In the first question, participants were asked to judge how attractive they found each alternative on a 9-point Likert scale ranging from −4 ("very unattractive") to 4 ("very attractive"). The second question asked to rate how clear a feeling participants had toward each alternative. They rated the alternatives on a 7-point scale ranging from 0 ("not clear at all") to 6 ("very clear"). After rating the clarity of the feeling participants were asked to rate the intensity of their good/bad feeling on a 9-point Likert scale ranging from −4 ("very bad") to 4 ("very good"). Finally, the last question asked to rate how easy or difficult participants found to evaluate each alternative. Once again the ratings were provided on a 9-point Likert scale ranging from −4 ("very difficult") to 4 ("very easy").

In the analyses we coded the three −4 to +4 Likert scales as dichotomous variables, therefore the participants who gave a negative rating were coded as 0 (e.g., "unattractive") and those who gave a positive rating were coded as 1 (e.g., "attractive"). Participants who provided a rating of 0, meaning indifference toward the alternative, were discarded from the analyses. For the clarity of feeling, we broke the 0 to 6 Likert scale coding the participants who gave a rating between 0 and 2 as 0 ("not clear feeling"), while those who gave a rating of 3 or higher were coded as 1 ("clear feeling").

Therefore, we analyzed the data comparing the percentage of times that an alternative was evaluated using the upper half of a scale versus the percentage of times that participants evaluated the same alternative using the lower half of the scale.

2 Results

2.1 Clear/ambiguous bets

Results showed that participants' ratings of the two alternatives in JE and SE followed the hypothesized pattern (see Table 1). In JE, there was a significant difference between the clear and the ambiguous bet for all dependent variables: respectively, t (43)=3.33; $p<.01$ for attraction, t (49)=1.94; $p<.06$ for clarity of feeling, t (29)=3.53; $p<.01$ for feeling, and t (36)=3.17; $p<.01$ for ease of evaluation. On the other hand, in SE, none of the comparisons between the clear bet and the ambiguous one was significant. On three of the four measures the clear bet was judged in similar way regardless of the evaluation mode. The only significant difference was found for the ease of evaluation, t (77)=3.08; $p<.01$. The ambiguous bet was found significantly more attractive and better in SE than in JE: respectively, $t(88)=-2.60$; $p<.02$ for the attractiveness and t (72)=−2.26; $p<.03$ for the good/bad feeling. The difference was not significant for the clarity of feeling and for the ease of evaluation. The same results were found using the Likert scales as continuous variables rather than dichotomous ones.

Table 1 Mean ratings for the clear and ambiguous bet in Experiment 1[a]

Dependent variable	Bet	Joint evaluation			Separate evaluation		
		N	Mean	SD	*N*	Mean	SD
Attractiveness[a]	Clear bet	*44*	.86[b]	.35	*45*	.82	.39
	Ambiguous bet	*44*	.66	.48	*45*	.90	.31
Clarity of feeling	Clear bet	*50*	.46	.50	*50*	.30	.46
	Ambiguous bet	*50*	.34	.48	*50*	.28	.45
Good/bad feeling	Clear bet	*32*	.84	.37	*35*	.80	.41
	Ambiguous bet	*42*	.43	.50	*32*	.69	.47
Easiness of evaluation	Clear bet	*41*	.85	.36	*38*	.55	.50
	Ambiguous bet	*42*	.48	.51	*28*	.54	.51

[a] The interaction between the evaluation mode and the type of bet was statistically significant only for the attractiveness: F (1, 81)=7.40; η^2 =.08; p<.01

[b] All entries represent the percentage of times that an alternative was judged: "attractive", "inducing a clear feeling", "inducing a positive feeling", and "easy to evaluate"

2.2 Familiar/unfamiliar bets

Results for the familiar and unfamiliar bets provided further evidence in support of our hypotheses (see Table 2). Once again, in JE, more people judged the familiar bet better than the unfamiliar one on all the four scales (for attractiveness, good/bad feeling and easiness of evaluation: p<.01; for clarity of feeling: p<.05), whereas in

Table 2 Mean rating for the two familiar and unfamiliar bets in Experiment 1

Dependent variable	Bet	Joint evaluation			Separate evaluation		
		N	Mean	SD	*N*	Mean	SD
Attractiveness[a,b]	Familiar bet	*45*	.84[c]	.37	*45*	.62	.49
	Unfamiliar bet	*41*	.39	.49	*43*	.58	.50
Clarity of feeling[b]	Familiar bet	*50*	.56	.50	*50*	.46	.50
	Unfamiliar bet	*50*	.38	.49	*50*	.44	.50
Good/bad feeling[a,b]	Familiar bet	*39*	.90	.31	*35*	.60	.50
	Unfamiliar bet	*50*	.28	.46	*33*	.46	.51
Easiness of evaluation[a,b]	Familiar bet	*42*	.88	.33	*41*	.78	.42
	Unfamiliar bet	*40*	.40	.50	*37*	.73	.45

[a] The interaction between the evaluation mode and the type of bet was statistically significant for, respectively: attractiveness, F (1, 76)=6.48; η^2 =.08; p<.02; good/bad feeling, F (1, 54)=7.81; η^2 =.13; p<.01; easiness of evaluation, F (1, 65)=6.14; η^2 =.09; p<.02

[b] Testing the scales as continuous variables showed a significant interaction for all the variables (in all cases: p<.02)

[c] All entries represent the percentage of times that an alternative was judged: "attractive", "inducing a clear feeling", "inducing a positive feeling", and "easy to evaluate"

SE we did not find any significant difference. In addition, the familiar bet was judged always in a better way in JE than in SE. Even if the attractiveness and good/bad feeling were the only two significant differences ($p<.02$ for both dependent variables), all differences were in the expected direction. The unfamiliar bet was judged in a better way in SE than in JE and, despite the only significant difference was found for the ease of evaluation ($p<.03$), these differences are always in the expected direction. Once again, results remain substantially unchanged when considering the Likert scales as continuous rather than dichotomous variables.

3 Discussion

Results of Experiment 1 supported our hypotheses and replicated, using different measures, the same results already described by Fox and Tversky (1995). However, to our knowledge this is the first time that the affective reactions are proposed as the potential mechanism causing ambiguity aversion and, potentially, people's inconsistent preferences between joint and separate evaluation conditions. We believe that the present results, together with the numerous findings linking people's feelings with their behaviors and decisions (Loewenstein et al. 2001; Slovic et al. 2002), provide convincing evidence about the role played by the affective reactions in determining the ambiguity aversion. In fact, several studies have demonstrated that the affective reactions are usually perceived in a fast and unconscious way and, therefore, they can have an impact on the decision maker's analysis about the features of the alternatives as this analysis is usually slow and starts after the affective reactions have been activated (e.g., Epstein 1994; Zajonc 1980).

A partially unexpected result was found with the clear and ambiguous bets in SE since the latter bet did not induce a clearer feeling and was not judged easier to evaluate compared with JE. However, this result is reasonable as the ambiguity of that bet is still salient in SE and the probabilities associated with the possible outcomes (winning €100 or not) are still unknown. It is therefore surprising that people found the ambiguous bet significantly more attractive and better in SE than in JE even if the ambiguity of this bet was still influencing the clarity of participants' feelings and the easiness of their evaluation. Similarly surprising is, therefore, the fact that both Fox and Tversky (1995) and Chow and Sarin (2001) found a difference in willingness to pay (WTP) and willingness to accept (WTA) despite the fact that the present results show that, in SE, people are still influenced by the vagueness of the ambiguous bet. On the other hand, the results found for the familiar/unfamiliar pair followed the expected pattern as in this second case the unfamiliar bet induced a clearer feeling and was rated easier to evaluate in SE than in JE. This difference between the two pairs of bets is likely to depend on the fact that the degree of familiarity of the two bets should depend largely on the chance to compare the Padova-bet with the Portland-bet whereas, for the first pair, the knowledge or ignorance of the probabilities should be perceived in both evaluation modes.

Overall, we believe that Experiment 1 supported the hypothesis that the ambiguity avoidance is driven by the affective reactions induced by the clear and ambiguous bets in JE. In the next study we will try to replicate the same JE/SE inconsistency but

presenting people with two clear bets. In other words, for both bets the probabilities of the outcomes will be stated explicitly.

4 Experiment 2

Chow and Sarin (2001) showed that people are willing to accept higher sums of money to play a clear bet offering a 2/3 chance to win (high-probability bet) than to play a clear bet offering a 1/3 chance to win (low-probability bet) when they are presented side-by-side. However, they also found that the difference is significantly reduced when the two bets are presented to different groups of people. The aim of Experiment 2 is to show the same pattern of results but testing for people's affective reactions instead of their WTA. By doing so it should be possible to show that the affective reactions may be relevant to understand the JE/SE inconsistency altogether rather than just a special case such as the ambiguity aversion.

Experiment 2 hypotheses are similar to those tested in the previous study. We expect to find that the high-probability bet is rated more attractive and induces a more positive feeling than the low-probability bet in JE but not in SE. In addition, we expect to find that the high-probability bet induces a clearer feeling and is rated easier to evaluate than the low-probability bet in JE.

4.1 Participants and design

Ninety university students (69.7% females; mean age 22 years) at the University of Padova in Italy took part in the study. They were randomly assigned to one of the three conditions (30 students in each condition: JE, SE high-probability bet, and SE low-probability bet).

4.2 Materials and procedure

Participants were presented with either two or only one bet. The two bets were similar to the clear bet in the Ellsberg Paradox. The high-probability bet offered to draw a ball from a bag containing 30 balls of which 20 were white and 10 were yellow. The low-probability bet offered to draw a ball from a bag containing 30 balls of which 10 were white and 20 were yellow. In JE the two bets were described as follows:

> Imagine that there is a bag on the table (Bag A) filled with exactly 20 white balls and 10 yellow balls, and a second bag (Bag B) filled with 10 white balls and 20 yellow balls. You will draw a single ball from one of the bags without looking. If the ball you draw is white you win €100. If it is yellow, you receive nothing

BAG A:	*BAG B:*
20 white balls	*10 white balls*
10 yellow balls	*20 yellow balls*
30 total balls	*30 total balls*

In SE, people were presented with only one of the two bets. Procedure and dependent variables were the same as in Experiment 1.

5 Results

Results supported the hypothesis for all the dependent variables but the easiness of the evaluation (see Table 3). In JE, the high-probability bet was judged more attractive, induced a clearer and more positive feeling than the low-probability bet (for the attractiveness the result was only close to significance: $p=.096$; for the clarity of feeling and the valence of feeling: $p<.05$). In SE, none of the differences were significant. As shown in Table 3, the high-probability bet was judged significantly more attractive in SE than in JE ($p<.04$), whereas the difference was not significant for the other three measures. On the other hand, the low-probability bet was judged significantly more attractive and induced a significantly more positive feeling in SE than in JE (respectively, $p<.01$ and $p<.01$). No significant difference was found for the clarity of the feeling induced by the low-probability bet in the two evaluation modes as well as for the easiness of evaluation.

As shown in Table 3, there was a ceiling effect for the attractiveness of the high-probability bet and for the good/bad feeling of the low-probability bet. In both cases, this happened in SE and means that all participants gave a positive rating in the −4 to +4 Likert scale, conditionally on the elimination of those who gave a rating equal to 0. Coding the participants who gave a rating of 0 as part of the group who provided negative ratings allowed avoidance of the ceiling effect and did not change the results either in JE or in SE. The pattern of results does not change using the Likert scales as continuous variables.

Table 3 Mean rating for the high-probability and low-probability bets in Experiment 2

Dependent variable	Bet	Joint evaluation			Separate evaluation		
		N	Mean	SD	*N*	Mean	SD
Attractiveness[b]	High probability	*28*	.86[c]	.36	*29*	1.00	.00
	Low probability	*26*	.65	.49	*28*	.96	.19
Clarity of feeling	High probability	*30*	.60	.50	*30*	.67	.48
	Low probability	*30*	.47	.51	*30*	.62	.49
Good/bad feeling[a,b]	High probability	*26*	.96	.20	*22*	.90	.29
	Low probability	*24*	.58	.50	*22*	1.00	.00
Easiness of evaluation	High probability	*26*	.85	.37	*20*	.85	.37
	Low probability	*25*	.84	.37	*24*	.83	.38

[a] The interaction between the evaluation mode and the type of bet was statistically significant: $F(1, 39)=12.75$; $\eta^2=.25$; $p<.01$

[b] Testing the scales as continuous variables showed a significant interaction for both attractiveness and good/bad feeling ($p<.02$)

[c] All entries represent the percentage of times that an alternative was judged: “attractive”, “inducing a clear feeling”, “inducing a positive feeling”, and “easy to evaluate”

6 General discussion

In both experiments the data supported the hypotheses and showed that people's affective reactions in JE and SE parallel the results previously found by Fox and Tversky (1995) using willingness to pay and by Chow and Sarin (2001) using willingness to accept. In Experiment 2, participants rated the high-probability bet more attractive and better than the low-probability bet in JE but not in SE. Moreover, the high-probability bet induced a clearer feeling than the low-probability one, but only when they were presented side by side.

As suggested by the comparative ignorance hypothesis, people usually avoid ambiguous/unfamiliar stimuli when there is a chance to directly compare them with clear/familiar alternatives. However, the same does not happen in SE. Coherently, in Experiment 1, individuals showed different affective reactions toward these two types of stimuli in JE and SE. Therefore, the present results strongly suggest that ambiguity avoidance depends on the affective reactions people perceive towards clear/familiar stimuli and ambiguous/unfamiliar stimuli in JE. Interestingly, in SE people's feelings seem less useful at differentiating between stimuli characterized by different degrees of ambiguity, despite the fact that those stimuli have distinctive characteristics that should be recognizable regardless of the specific decision context and are generally thought to have an impact on people's affective reactions.

Results from the separate condition in Experiment 1 look especially interesting since many studies have suggested that the affective reactions are used as a feedback or a clue when people do not have enough information to evaluate the stimuli (e.g., Peters 2006). However, ambiguous and unfamiliar stimuli induce less definite affective reactions therefore making this feedback less reliable and highly influenced by the evaluation context. Furthermore, results from Experiment 2 suggest that, even with clear stimuli, the affective reactions help to differentiate among alternatives only when there is a chance to directly compare them. Hence, such a finding may indicate that in many conditions, like the SE condition in the present studies, people are almost clueless about how to judge the quality of a stimulus and also their own preferences as they cannot compare among different stimuli and the affective feedback is not reliable.

Future research should further clarify whether this is a general result or if it only applies to specific circumstances. However, Experiment 2 allows us to draw some preliminary conclusions. The absence of a clear preference between uncertain bets, which differ only for the probability of the win, suggests that affective reactions can explain the JE/SE inconsistency even for stimuli that are characterized by the same levels of ambiguity or familiarity.

A possible extension of the present results is to investigate whether the same inconsistency is present when people are presented with sure and uncertain outcomes. Kahneman and Tversky (1979) showed that people are often averse to losses. Loss aversion is usually tested by asking people to choose between sure outcomes (wins or losses) and gambles under conditions in which the two alternatives are presented side-by-side. The present findings suggest that, for positive outcomes, the preference given to a sure win in JE should not be found in SE. We think it is reasonable to expect that a sure outcome induces more positive affective reactions in JE because compared with an uncertain gamble it is less risky. However, such a conclusion is not possible in SE as the comparison between the two

outcomes is not available. As a result, the absence of a direct comparison should damper people's affective reactions toward the sure gain.

Coherently with the above reasoning, if loss aversion is influenced by both people's affective reactions and the evaluation context we should also find that, in JE, individuals prefer a gamble offering either a loss or nothing to a sure loss. On the other hand, no difference should arise in SE. However, for the negative frame condition we cannot provide any clear hypothesis as the present experiments have only dealt with potential wins and not with negative outcomes. Therefore, new studies are required to clarify if the present findings are generalizable to other phenomena such as loss aversion.

Moreover, further evidence is needed to improve our understanding of how affective reactions induce people to show inconsistent preferences in JE and SE. Nonetheless, we believe that the present work shows convincingly the impact that people's affective reactions exert on a cognitive process like the comparative ignorance hypothesis, which is thought to cause ambiguity avoidance.

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