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Incentivised experimental investigations of the affect heuristic

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**Incentivised experimental investigations
of the affect heuristic**

by

Ian J. Bateman, Paul Slovic, and Chris Starmer

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Abstract:

In recent years there has been increasing interest in using the related concepts of affect and evaluability to understand a wide range of decision behaviours. However, a common feature of studies to date is that they have adopted hypothetical payoff designs. Such an approach is open to criticisms of non-consequentiality. In this paper we address this criticism, presenting a series of incentivised, real payoff, experimental studies examining the roles of affect and, the related concept of evaluability in judgments and decisions across a range of contexts including money gambles and the purchase of and preference for various market goods. We demonstrate that the affect heuristic remains a feature of decision making in the contexts considered within this experiment.

Keywords:

Affect heuristic, evaluability, real payments, auction

1. INTRODUCTION

In recent years there has been increasing interest in using the related concepts of affect and evaluability to understand a wide range of decision behaviours (see review in Slovic et al., 2002). However, a common feature of studies to date is that they have adopted hypothetical payoff designs. Such an approach is open to criticisms of non-consequentiality (Carson, Groves and Machina, 1999). In this paper we address this criticism, presenting a series of incentivised, real payoff, experimental studies examining the roles of affect and, the related concept of evaluability in judgments and decisions across a range of contexts including money gambles and the purchase of and preference for various market goods.

In section 2, we provide some theoretical background on the key concepts. In Section 3 we set out our experimental design and discuss hypotheses and tests. Section 4 presents results from our experiment while Section 5 presents an ancillary study suggested by preceding results. Section 6 discusses our result and concludes. Full experimental instructions and respondent materials are presented in Appendices to this paper.

2. BACKGROUND: AFFECT AND THE EVALUABILITY PRINCIPLE

In this paper, following Slovic et al (2002), we use the term *affect* to refer to experienced feeling states associated with positive or negative qualities of a stimulus. Slovic et al. (2002) present a wide range of evidence supporting the notion that images, marked by positive and negative affective feelings, guide judgment and decision making. In light of this they propose that people use an *affect heuristic* to make judgments. That is, in the process of making a judgment or decision, people consult or refer to an “affect pool” containing all the positive and negative tags consciously or unconsciously associated with the mental representations of the task. Then, just as imaginability, memorability, and similarity serve as cues for probability judgments (e.g., the availability and representativeness heuristics), affect may serve as a cue for many important judgments. *Affective responses* occur rapidly and automatically – note how quickly you sense the positive and negative feelings associated with the stimulus words *treasure* or *hate*. As such, using an overall, readily available affective impression can be quicker and easier – and so sometimes more efficient – than weighing the pros and cons or retrieving from memory many relevant examples, especially when the required judgment or decision is complex or mental resources are limited.

Perhaps the most striking example of affect given by Slovic et al., is given by a study of individuals assessments of simple gambles. Here three samples are taken, each being asked to assess the attractiveness of playing a single gamble, either g^1 , g^2 or g^3 as detailed below:

Gamble g^1 (7/36, +\$9.00) (29/36, nothing)
Gamble g^2 (7/36, +\$9.00) (29/36, -\$0.05)
Gamble g^3 (7/36, +\$9.00) (29/36, -\$0.25)

From an expected utility perspective gamble g^1 offers the highest expected value and therefore should be the most attractive of the three gambles. However, from an affective perspective gamble g^1 is difficult to evaluate as the \$9.00 gain in the payoff element of the bet does not have a clear comparator, i.e. the default ‘nothing’ outcome has no clear affective message. Conversely gambles g^2 and g^3 both have well defined loss element comparators. Furthermore, these are both small losses relative to the potential \$9.00 gain. Therefore, while gamble g^1 is difficult to assess, the affective message of gambles g^2 and g^3 is that for a modest potential loss (a ‘stake’) the subject can potentially obtain a relatively large gain; a highly attractive proposition with a clearly positive affective content.

Slovic et al present the possible outcomes of each gamble to subjects via the modified roulette wheel illustrated in Figure 1 (which depicts gamble g^2). The figure also reproduces the response vehicle used by Slovic et al to elicit respondents assessments of these gambles. This was a 20 point rating scale in which a rating score of 0 was labelled as “Not at all an attractive bet”, a score of 10 was labelled as a “Moderately attractive bet” and a score of 20 was labelled an “Extremely attractive bet”.

Figure 1: Description and rating task for gamble g^2

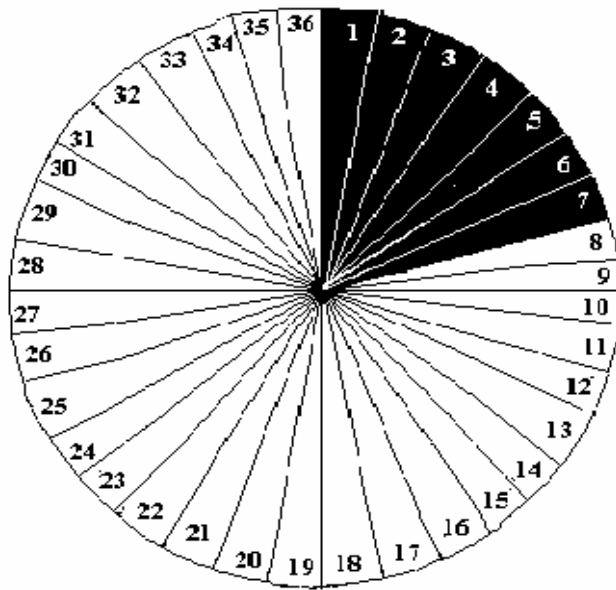
Evaluating the Attractiveness of a Bet

We would like you to rate how attractive the prospect of playing the following bet is to you

7/36 to win **\$9.00**
 29/36 to lose **\$0.05**

This means that there are 7 chances out of 36 that you will win the bet and receive **\$9.00** and 29 chances out of 36 that you will lose **\$0.05**

Visualise the roulette wheel on the left with 36 numbers along the circumference. If a ball lands on any of the 7 numbers between 1 and 7 inclusive, you win **\$9.00**. If it lands on numbers 8-36, you lose **\$0.05**



Indicate your opinion of this bet's attractiveness by **circling** one number on the rating scale below.

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of playing this bet.

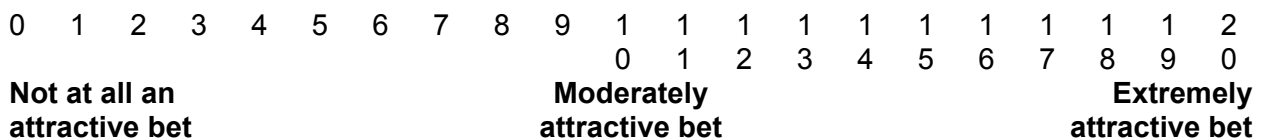


Table 1 presents results from this experiment showing that gamble g^1 is rated significantly worse than either g^2 or g^3 . While this result runs contrary to the predictions of expected value, it conforms to expectations based upon the affect heuristic.

Table 1: Split sample ratings of the attractiveness of three gambles

Gamble	Attractiveness Rating (0 to 20 scale)	Significance of difference from gamble g
g^1 (7/36, +\$9.00), (29/36, 'nothing')	9.4	-
g^2 : (7/36, +\$9.00), (29/36, -\$0.05)	14.9	$p < 0.001$
g^3 : (7/36, +\$9.00), (29/36, -\$0.25)	11.7	$p < 0.050$

Source: Adapted from Slovic et al. (2002).

Affective impressions vary not only in their valence, positive or negative, but in the precision with which they are held. There is growing evidence that the precision of an affective impression substantially impacts judgments. In particular, more precise affective impressions may carry more weight (Mellers et al., 1992). Developing this idea, Hsee (1996a, 1996b, 1998) has proposed the notion of evaluability to describe the interplay between the precision of an affective impression and its meaning or importance for judgment and decision making. Evaluability is illustrated by an experiment in which Hsee asked different groups of people to assume they were music majors looking for a used music dictionary. Hsee presented different subsamples with either one or other or both of the dictionaries described in Table 2.

Table 2: Attributes of Two Dictionaries

	Year of Publication	Number of Entries	Defects
Dictionary A	1993	10,000	No, it's like new
Dictionary B	1993	20,000	Yes, the cover is torn; otherwise it's like new

Source: Adapted from Hsee (1998).

In a joint-evaluation condition, participants were shown both dictionaries, A and B, and asked how much they would be willing to pay for each. Willingness-to-pay was far higher for Dictionary B, presumably because of its greater number of entries. However, when one group of participants evaluated only A and another group evaluated only B, the mean willingness to pay was much higher for Dictionary A. Hsee explains this reversal by means of the *evaluability principle* (we will refer to this as EP for short). He argues that, without a direct comparison, the number of entries is hard to evaluate, because the evaluator does not have a precise notion of how good or how bad 10,000 (or 20,000) entries is. However, the defects attribute is evaluable in the sense that it translates easily into a precise good/bad response and thus it carries more weight in the independent evaluation. Most people find a defective dictionary unattractive and a like-new one attractive. Under joint evaluation, the buyer can see that B is far superior on the more important attribute, number of entries. Thus the number of entries becomes *evaluabile* through the comparison process.

According to the EP, the weight of a stimulus attribute in an evaluative judgment or choice is proportional to the ease or precision with which the value of that attribute (or a comparison on the attribute across alternatives) can be mapped into an affective impression. In other words, affect bestows meaning on information (cf., Osgood, Suci, & Tannenbaum, 1957; Mowrer, 1960a, 1960b) and the precision of the affective meaning influences our ability to use information in judgment and decision making. EP can thus be seen as an extension of the general relationship between the variance of an impression and its weight in an impression-formation task (Mellers et al., 1992).

Hsee's work on evaluability is noteworthy because it shows that even very important attributes may not be used by a judge or decision maker unless they can be translated precisely into an affective frame of reference. Moreover, while Hsee (1998) finds evaluability effects with familiar attributes such as the amount of ice cream in a cup, Slovic et al. (2002) demonstrate similar effects relating to concepts such as numbers of human lives. However, as mentioned in our introduction, both of these experiments as well as Hsee's original 'dictionary' experiment, used non-incentivised designs and are therefore vulnerable to the criticism of non-consequentiality. To address this problem we now present an incentivised experiment which, in short, confirms that the prior findings of both Hsee and Slovic et al., do indeed transfer over into a real payoff, incentivised environment.

3. EXPERIMENTAL DESIGN

The experiment sought to build upon the approach of Slovic et al., (2002) in their simple but striking demonstration of affect within ratings of simple gambles and to combine this with elements of the EP work of Hsee. The 0-20 rating scale response format used by Slovic et al., and illustrated in Figure 1 was used throughout the experiment. This was incentivised via a simple and transparent mechanism which was explained to subjects prior to them undertaking any rating tasks. Subjects were shown the rating scale and told that they would be asked to use this to rate a series of objects including money gambles, money certainties and a range of everyday goods. In total subjects rated 13 such objects, each of which had a separate identifying number. After all objects had been rated, each participant drew two discs from a bag of 13 discs each relating to one of the rated objects. Subjects ratings of the two chosen objects were then inspected and subjects received whichever of this pair of objects they had given the highest rating (full details of the experimental protocol, including instructions to subjects and definitions of all objects are given in Appendix 1 of this paper). If the object involved a certainty, either the exchange of goods or sure amounts of money, then this has given to the subject. If the chosen object was a gamble then this was played out for real.

As with the original Slovic et al., work a split sample design was adopted. In the present study two samples were used, which we denote as samples A and B. Each sample rated a somewhat different set of objects as detailed in Table 3.

Examining Table 3 one can see that the first object rated by Sample A was gamble g^1 from the Slovic et al., study, while the first object rated by sample B was gamble g^2 . Comparison of response to these two rating tasks gives us the simplest incentivised test of the Slovic et al., affect result. In the absence of any direct evaluability comparator, the affect expectation is that here we will find gamble g^2 rated higher than gamble g^1 a result which runs contrary to economic predictions based upon the expected value of these gambles.

Object 9 reverses the presentation of the two gambles across our samples. We can therefore differentiate gambles not only in terms of their probability/payoff mix, but also in terms of their order of presentation. We can now denote any gamble as g_j^i where $i = 1,2$ denotes the gamble type as before and $j = 1,2$ when this is the first gamble seen by a respondent and $j = 2$ when it is the second gamble rated.

Table 3: Object list for Samples A and B

Object No.	Sample A	Sample B
1	is a bet which you would play for real money. $7/36$ to win £9.00 [g_1^1]	a bet which you would play for real money. $7/36$ to win £9.00 $29/36$ to lose £0.05 [g_1^2]
2	that you receive a free Mars bar.	that you receive a free Mars bar.
3	the opportunity for you to purchase a new toothbrush, for 5 pence, if you want to (or you can keep your money and not receive the toothbrush)	the opportunity for you to purchase a new toothbrush, for 20 pence, if you want to (or you can keep your money and not receive the toothbrush)
4	that you receive a free, unused, single tea bag.	that you receive a free, unused, single tea bag.
5	that you receive an envelope containing £5	that you receive an envelope containing £10
6	that you receive a standard sized (415g) tin of Heinz baked beans for free.	that you receive two standard sized (415g) tins of Heinz baked beans for free.
	BREAK	BREAK
7	that you receive a box of handmade Belgian chocolates from Digby's of Holt. Digby's usually make boxes of twelve chocolates but currently have a range with just eleven chocolates in, which is what we would give you.	that you receive a box of handmade Belgian chocolates from Digby's of Holt. Digby's usually make boxes of ten chocolates but currently have a range with 10% free, so that instead of getting ten chocolates you would get an additional one free, i.e. a box of eleven chocolates, which is what we would give you.
8	that we give you two 100g jars of Marmite for free.	that we give you a 100g jar of Marmite for free.
9	a bet which you would play for real money. $7/36$ to win £9.00 $29/36$ to lose £0.05 [g_2^2]	a bet which you would play for real money. $7/36$ to win £9.00 [g_2^1]
10	allows you to pick an envelope from a bag of envelopes of which equal numbers contain either nothing or £10	allows you to pick an envelope from a bag of envelopes of which equal numbers contain either £5 or £15
11	a free copy of next Friday's Independent newspaper given to you in next Friday's lecture	free copies of both next Friday's Independent newspaper and the previous days (Thursday's) Independent newspaper given to you in next Friday's lecture
12	the opportunity to purchase a medium sized (750g) box of Cornflakes for 1 penny, if you want to (or you can keep your money and not receive the Cornflakes)	a free medium sized (750g) box of Cornflakes.
13	a free medium sized (750g) box of Cornflakes.	the opportunity to purchase a medium sized (750g) box of Cornflakes for 1 penny, if you want to (or you can keep your money and not receive the Cornflakes)

The conflicting expectations of the economic and psychological view of preference revelation or construction suggested quite differing patterns of results in the ratings of these gambles allowing us to test and discriminate between these hypotheses. The economic view, based on expected value (EV), is always that $g_j^1 \geq g_j^2$ for any j (where \geq means is preferred to or insignificantly different from). The affect expectation reverses this such that $g_j^2 \geq g_j^1$ for any j . However, the introduction of a second rated gamble brings into play the EP. While this does not apply when $j = 1$, it would run counter to the affect heuristic when $j = 2$ where EP would push ratings back in the direction of $g_j^1 \geq g_j^2$. Given the conflict between affect and EP when $j = 2$, one further possible pattern of ratings is for affect to determine the first rating task (giving $g_1^2 \geq g_1^1$) but for affect and EP to cancel each other out when the latter is introduced at the second rating task. This would give a pattern where, initially $g_1^2 \geq g_1^1$ but then, within any sample, first and second ratings are roughly similar giving $g_1^1 \approx g_2^2$ within sample A and $g_1^2 \approx g_2^1$ within sample B. However, taking these results together implies that, looking across samples at the second gamble rated, we will observe $g_2^2 \geq g_2^1$.

While such a pattern of ratings might provide evidence of an initial reliance upon the affect heuristic supplemented at the second rating task by the EP, an alternative interpretation might be that the results from the second rating task merely reflect anchoring (on the initial ratings) rather than the introduction of the EP. If affect is indeed found to increase the rating of g_1^2 over g_1^1 then this may anchor subsequent ratings for other non-gamble objects, resulting in Sample B ratings being higher than those of Sample A *ceteris paribus*.

In order to assess this possibility, a number of the objects presented between the two gambles were designed to detect any anchoring within ratings. Two types of anchoring test were applied. First, objects 2 and 4 were identical across the samples. An anchoring account would suggest that if one sample gave a high rating to object 1 then this might upwardly anchor the rating of objects 2 and 4. So, if the positive affect of gamble g_1^2 induced Sample B respondents to give higher ratings to this than Sample A gave to their first object (the affect-neutral gamble g_1^1) then, if anchoring was at work, this might lead sample B respondents to give higher ratings to common objects 2 and 4 than do Sample A respondents.

The second set of tests combine possible anchoring effects with changes in the quantity (or 'scope') of common goods. Here objects 3, 5, 6 and 8 all concern different quantities of common goods. For objects 3 and 8 Sample A are offered higher quantities or lower price goods, whereas for objects 5 and 6 Sample B are presented with higher quantities. Together with the more straightforward comparisons of common objects 2 and 4 this permits a full examination of any anchoring effects derived from the rating of the initial gamble seen as object 1. This allows us to judge whether anchoring or EP might be impacting upon the rating of the gambles presented as object 9.

Object 7 provides an assessment of a potential affective response within a qualitative rather than quantitative context. For both samples object 7 is, from an objective standpoint, identical, being a box of eleven handmade chocolates. However, for Sample A this is described in negative terms as less than the usual 12 chocolates. Conversely, for Sample B we attempt to induce positive affect by describing this as 10% more than a box of 10 chocolates.

Object 10 permits a further cross sample investigation of anchoring in the presence of a scope change. Within sample-comparisons of the ratings of objects 5 (a certainty amount) and 10 (a risky amount with the same expected value as object 5) allow us to examine within-sample rates of risk aversion. Comparisons of these rates across samples allows us to examine the influence that any affect-induced anchoring might have upon risk aversion.

Object 11 provides a further and arguably milder form of the qualitative affect test seen in object 7. Now a mild negative effect is induced by giving Sample B respondents a copy of an old newspaper, alongside the present day's copy.

Objects 12 and 13 provide a qualitative analogue of our gambles experiment except that now the good (a box of cornflakes) is a certainty rather than a risky prospect. Furthermore we run against the tide of any anchoring from the initial gamble ratings by giving Sample A the positive affect good (a box of Cornflakes for one penny) while Sample B is given the affectively neutral good (just a box of Cornflakes). The final object simply swaps these two goods over. Here both anchoring and any EP effect would work in the same direction to increase the already affectively positively ratings given of object 12 given by Sample A. For the same reasons we would expect that Sample B would reduce its rating of object 12 below the relatively depressed levels of ratings given to object 11. Therefore, we might expect a 'fanning-out' of ratings across samples, becoming less similar as we move from ratings of object 11 to ratings of object 12.

The design was implemented by recruiting a sample of 84 subjects contacted via general email recruitment from students at the University of East Anglia in March 2003. These subjects were then randomly allocated into two sub-samples; 39 being allocated to Sample A while the remaining 45 were allocated to Sample B. Each respondent was given a unique identification number which was clearly written on the space provided on the front page of the instructions as reproduced in Appendix 1.

For both samples the pages prior to the rating task for Object 1 were initially handed out to subjects and participants followed those instructions as the facilitator read through them line by line, stopping repeatedly to check participants understanding and provide any required clarification. These instructions laid out the general structure of the experiment including and introduction to the rating scale and details of the incentive compatible procedure for selecting which task was to be for real. Once this was completed to the satisfaction of all participants, the single sheet containing the rating task for Object 1 was handed out to participants. Subjects were told to write their personal identification number at the top of the sheet and the incentive compatibility reasons for so doing were explained; namely that those who did not write their number on each sheet could not receive a prize should that task be selected as the real play item (this instruction was repeated after each new task was handed out).

Subjects then rated Object 1 (the initial gamble) and response sheets were collected in prior to the rating sheet for Object 2 being handed out. This procedure was repeated until Object 6 had been rated. At this point a break was taken and an irrelevant but constant distraction item was introduced. This consisting of the chief facilitator reading out an extended passage from the introduction to Baumol and Oates (1975). This was intended to reduce any anchoring induced by the definition of the initial gamble rated as Object 1. This took around ten minutes to complete after which the rating sheet for Object 7 was handed out to subjects and completed. This was collected and the sheet for Object 8 handed out and so on until all 13 rating tasks had been completed and collected. The 'Background Information' sheet was then handed out to participants. The questions were designed in part to collect information which in other work we have found to be pertinent to explaining individual level variation in ratings (Bateman et al., 2005). However, in the present paper we restrict ourselves to conventional sample level investigations and here the data collected in the 'Background Information' sheet allows us to examine whether the two samples were comparable in terms

of their personal characteristics. Once this was completed and collected this ended the response elicitation phase of the experiment.

4. RESULTS

Tests were undertaken to check the comparability of samples across three factors which, in previous (currently unpublished) studies using hypothetical gambles we have found to lead to different ratings of those gambles. These factors were: gender; prior training in economics; and prior training in psychology. All factors were found not to differ significantly across samples ($p=0.337$; $p=0.816$; and $p=0.556$ respectively). Tests also showed no significant difference between within treatment ratings of individual gambles across the two sampling days.

Table 4 presents descriptive statistics for the rating scale responses of each of the 13 objects as given by each of the two samples. The first column details the object being rated while the last column reports tests of the significance of rating differences between each sample for each object in turn.

Table 4: Summary rating scores for each object by each sample¹ and tests of the significance of differences

Object	Mean	Median	StDev	Min.	Max.	t , Z and (p) values ²
A1: a bet which you would play for real money. 7/36 to win £9.00	7.795	6	3.792	2	16	t = 5.542 (p<0.000) Z = 4.682 (p<0.000)
B1: a bet which you would play for real money. 7/36 to win £9.00, 29/36 to lose £0.05	12.911	14	4.665	2	20	
A2: that you receive a free Mars bar.	7.667	7	5.278	0	20	t = 3.452 (p=0.001) Z = 3.330 (p=0.001)
B2: that you receive a free Mars bar.	12.067	13	6.261	0	20	
A3: the opportunity for you to purchase a new toothbrush, for 5 pence, if you want to (or you can keep your money and not receive the toothbrush)	6.641	6	4.848	0	16	t = 0.871 (p=0.386) Z = 0.796 (p=0.426)
B3: the opportunity for you to purchase a new toothbrush, for 20 pence, if you want to (or you can keep your money and not receive the toothbrush)	7.578	8	4.975	0	19	
A4: that you receive a free, unused, single tea bag.	2.359	1	3.065	0	15	t = 2.491 (p=0.017) Z = 2.100 (p=0.036)
B4: that you receive a free, unused, single tea bag.	4.422	4	4.475	0	19	
A5: that you receive an envelope containing £5	16.744	17	2.541	11	20	t = 3.858 (p<0.000) Z = 4.354 (p<0.000)
B5: that you receive an envelope containing £10	18.733	20	2.126	10	20	
A6: that you receive a standard sized (415g) tin of Heinz baked beans for free.	5.308	4	4.396	0	16	t = 3.683 (p<0.000) Z = 3.410 (p=0.001)
B6: that you receive two standard sized (415g) tins of Heinz baked beans for free.	9.156	10	5.081	0	18	
A7: that you receive a box of handmade Belgian chocolates from Digby's of Holt. Digby's usually make boxes of twelve chocolates but currently have a range with just eleven chocolates in, which is what we would give you.	13.051	14	3.920	4	20	t = 2.423 (p=0.018) Z = 2.868 (p=0.004)
B7: that you receive a box of handmade Belgian chocolates from Digby's of Holt. Digby's usually make boxes of ten chocolates but currently have a range with 10% free, so that instead of getting ten chocolates you would get an additional one free, i.e. a box of eleven chocolates, which is what we would give you.	15.267	16	4.459	0	20	
A8: that we give you two 100g jars of Marmite for free.	5.820	2	6.600	0	17	t = 0.740 (p=0.461)

B8: that we give you a 100g jar of Marmite for free.	6.867	5	6.294	0	20	Z = 0.883 (p=0.377)
A9: a bet which you would play for real money. 7/36 to win £9.00, 29/36 to lose £0.05	8.513	7	5.078	0	19	t = 4.076 (p<0.000) Z = 3.803 (p<0.000)
B9: a bet which you would play for real money. 7/36 to win £9.00	13.067	14	5.132	0	20	

A10: allows you to pick an envelope from a bag of envelopes of which equal numbers contain either nothing or £10	13.821	14	3.817	4	19	t = 4.769 (p<0.000) Z = 4.414 (p<0.000)
B10: allows you to pick an envelope from a bag of envelopes of which equal numbers contain either £5 or £15	17.222	18	2.467	10	20	
A11: a free copy of next Friday's Independent newspaper given to you in next Friday's lecture	6.308	6	4.663	0	18	t = 0.182 (p=0.855) Z = 0.337 (p=0.736)
B11: free copies of both next Friday's Independent newspaper and the previous days (Thursday's) Independent newspaper given to you in next Friday's lecture	6.489	6	4.414	0	17	
A12: the opportunity to purchase a medium sized (750g) box of Cornflakes for 1 penny, if you want to (or you can keep your money and not receive the Cornflakes)	9.077	10	5.508	0	20	t = 1.128 (p=0.263) Z = 1.065 (p=0.287)
B12: a free medium sized (750g) box of Cornflakes.	7.867	7	4.099	1	17	
A13: a free medium sized (750g) box of Cornflakes.	9.974	10	5.504	0	20	t = 2.142 (p=0.036) Z = 2.091 (p=0.037)
B13: the opportunity to purchase a medium sized (750g) box of Cornflakes for 1 penny, if you want to (or you can keep your money and not receive the Cornflakes)	7.644	9	4.275	0	16	

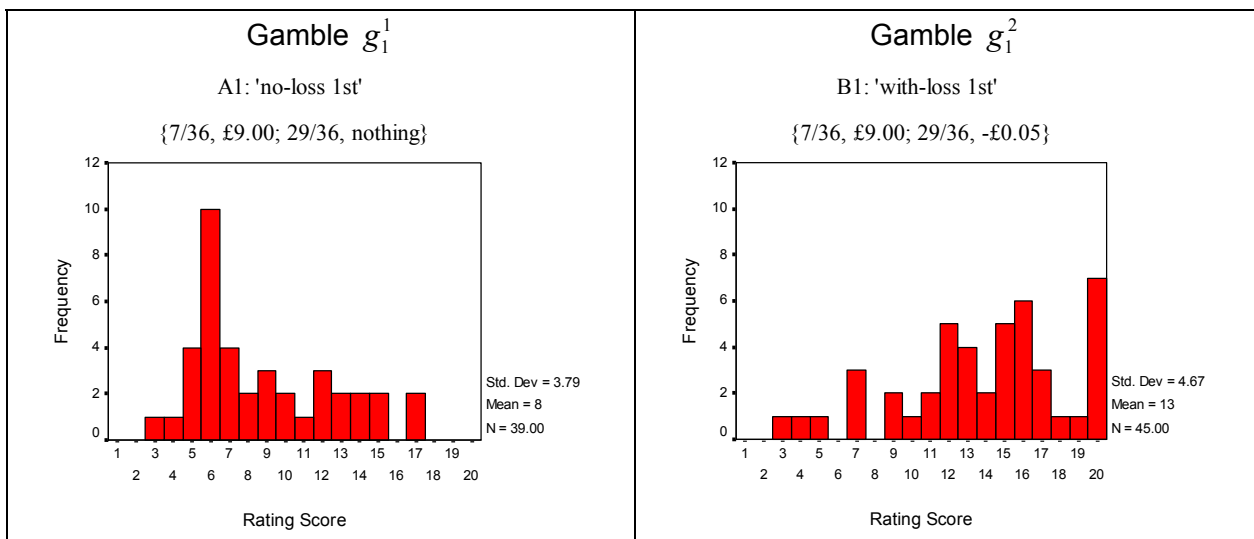
Note: 1. Sample sizes were 39 for Sample A and 45 for Sample B.

2. Modulus t-values are calculated without assuming equal variances using 2 tailed tests; modulus Z scores are calculated from non-parametric (Mann-Whitney) tests.

Our key test concerns the rating of the gambles presented as the first object to be rated. These were for Sample A the 'no-loss' gamble g_1^1 and for Sample B the positive affect 'with-loss' gamble g_1^2 . Given the incentive compatible, real-play nature of this experiment, this constitutes arguably the strongest test of the affect heuristic hypothesis to date. As can be seen from Table 4 the results very strongly conform to the expectations of the affect heuristic with 'no-loss' gamble g_1^1 being given a much lower mean rating of 7.8 than the positive affect 'with-loss' gamble g_1^2 with a mean value of 12.9. Median values are even more dissimilar at 6 and 14 respectively. Both parametric and non-parametric testing confirm that these differences are highly significant ($p < 0.001$).

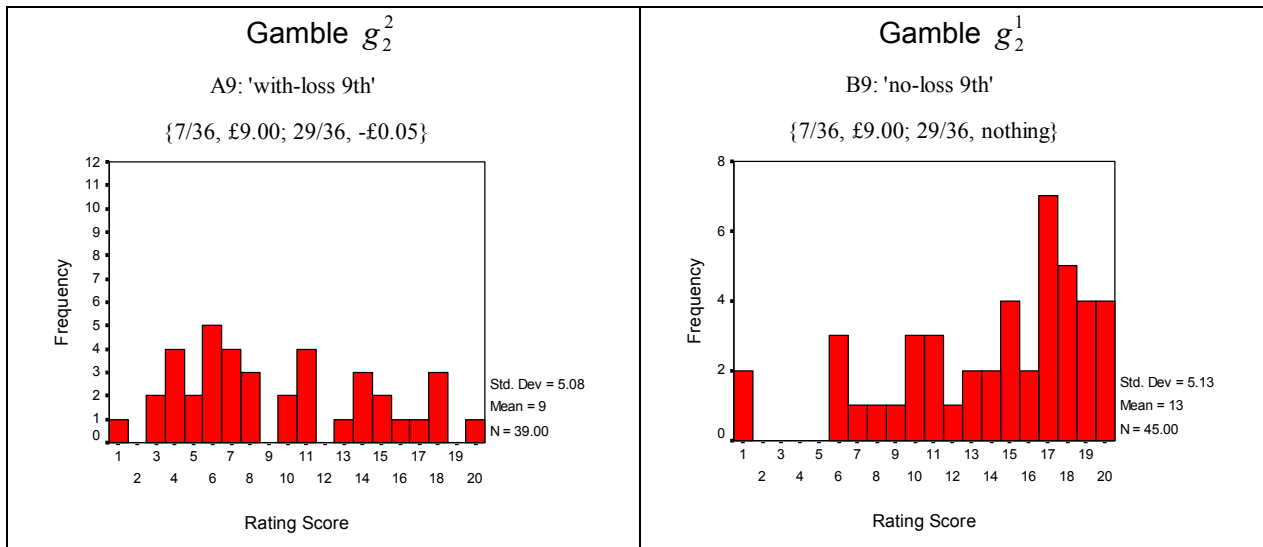
Figure 2 provides details regarding the distribution of ratings for these two gambles, showing that they are radically different with a modal value of 6 for g_1^1 compared to a mode for g_1^2 of 20, the highest possible value. Together with the above formal tests this provides the strongest evidence to date of the affect heuristic at work, rejecting the EV expectations of standard economic theory.

Figure 2: Rating distributions for gambles g_1^1 (affect neutral) and g_1^2 (positive affect)



As mentioned previously, Object 9 provided an opportunity for respondents to rate whichever gamble they had not seen as Object 1. However, the ratings given at Object 9 are radically different from those given for the initial gamble. Now we find the 'no-loss' gamble g_2^1 more highly rated ($p < 0.001$) than the 'positive affect' gamble g_2^2 , apparently a complete reversal of the initial result. Figure 3 presents rating distributions for these responses which confirm the significance of these differences.

Figure 3: Rating distributions for gambles g_2^2 and g_2^1



Having rejected the EV explanation at the first object and finding that affect alone cannot explain the pattern of ratings at both Object 1 and 9 we are therefore forced to consider some of the other explanations hypothesised in the previous section. Taken together we have observed $g_1^2 > g_1^1$ and $g_2^1 > g_2^2$ (note the similarity of distributions between these respective measures when comparing Figures 2 and 3). Such a pattern could be explained by the introduction of the EP for rating the second set of gambles. However, as speculated, this could also arise as a result of simple anchoring where respondents base their ratings of the second gamble strongly upon their ratings of the first such that $g_1^1 \approx g_2^2$ within sample A and $g_1^2 \approx g_2^1$ within sample B. This would yield the inequalities observed.

Testing these within-sample ratings (comparing A1 with A9 and B1 with B9) we do indeed find that that ratings of object 1 are insignificantly different from ratings of Object 9. Within sample A g_1^1 is insignificantly different from g_2^2 ($p=0.478$) while within Sample B g_1^2 is insignificantly different from g_2^1 ($p=0.880$).

Taking these findings together it would appear that it is Affect which dominates responses to the first rating task, but anchoring which dominates the subsequent gamble ratings. This 'affect then anchoring' is further tested through the series of anchoring tests outlined previously. First, we consider the impact of affect-led anchoring, induced by the ratings of Object 1, upon the ratings of Objects 2 and 4 which are common to both samples. Object 2 was, for both sample, a free 'Mars' bar (a well known confectionary). As Table 4 shows, ratings for this good were significantly higher ($p<0.000$) in Sample B, which faced the positive affect gamble g_2^2 as Object 1, than for Sample A which rated the neutral affect gamble g_1^1 . Further investigation of this anchoring effect compared ratings for the first and second objects showing these to be virtually identical within samples but clearly different across samples (mean ratings for A1 and A2 were 7.795 and 7.667 respectively, while for B1 and B2 means were 12.911 and 12.067 respectively). Given that all responses are given within an incentive compatible framework this provides clear evidence that the affect induced difference between the first responses of each sample do indeed provide an anchor for

subsequent responses. Indeed ratings for A1 and A2 are insignificantly different ($p=0.902$) as are ratings for B1 and B2 ($p=0.470$)¹.

Similar evidence of anchoring is found within ratings of items A4 and B4, which, despite being the 'wooden spoon' prize of receiving "a free, unused, single tea bag" is still accorded a significantly higher rating by positive initial affect Sample B respondents ($p=0.017$).

This evidence of anchoring needs to be borne in mind when we assess other cross-sample comparisons. For example, while we find expected risk aversion in the comparison of the rating for £10 for sure (B5: mean = 18.73) and the equivalent expected value but risky gamble {0.5, £10; 0.5, £0} (A10: mean = 13.82) this highly significant difference ($p<0.000$) might well be enhanced by the affect-induced higher initial anchoring point of Sample B ratings. Indeed the relative depression of Sample A ratings might well explain why their ratings of £5 for sure (object A5) are not significantly higher ($t=0.87$; $p=0.386$) than Sample B's ratings of the risky prospect {0.5, £15; 0.5, £5}. However, such anchoring concerns do not impinge upon within-sample tests such as the Sample B comparison of £10 for sure (B5) and the gamble {0.5, £5; 0.5, £15} (B10). Here we observe expected risk aversion with the sure-thing rated significantly higher than the equivalent expected value gamble ($p=0.003$).

A number of the cross sample comparisons concern differing levels or differing descriptions of goods. However, it seems perfectly plausible that the affect-induced anchoring detected within early responses may have persisted to either confound or exacerbate difference within these tests. Therefore the lack of price sensitivity in ratings of the opportunity to buy a toothbrush (comparison of A3 and B3; $p=0.386$) again appears to reflect anchoring which in this case would work in the opposite direct of the price effect. Similar confounding may affect the comparison of object A8, two free jars of Marmite, and object B9, one jar of Marmite. However, while ratings are insignificantly different ($p=0.461$) it is interesting that the one jar offered to Sample B receives a higher rating than the two jars offered to Sample A. While this doubtless in part reflects anchoring, another factor may be that (as the makers of Marmite proudly advertise), many people strongly dislike Marmite. Further confounding may have occurred in the free newspaper treatment (comparison of A11 and B11; $p=0.855$) where the higher anchoring of Sample B responses operates counter to the hypothesized negative effect of having to have yesterdays as well as today's newspaper. Conversely other comparisons may have had hypothesized differences exacerbated by anchoring. While object A6 offered Sample A respondents one tin of beans, object B6 offered Sample B two tins. While ratings for the latter are nearly twice that for the former ($p<0.000$) it is unclear to what extent this reflects scope sensitivity or anchoring.

While tests such as those involving Marmite and newspapers involved differing goods being offered to the two samples, this was not the case for the last two objects. These tests involve the same good, a box of Cornflakes, which in the case of Sample A was initially offered for the cost of just 1 penny (object A12) while for Sample B it was offered for free (object B12). While both objects would generally be considered desirable, the apparently very cheap 'price' of object A12 endows it with a positive affective aura. Therefore the affect expectation would be that object A12 might be rated higher than object B12. However, any residual anchoring from the initial responses would work in the opposite direction, enhancing ratings from Sample B (which encountered the positive affect 'with-loss' gamble as their first item). In the event we see that the positive affect of object A12 gives it a mean rating of 9.077 which is higher than that for object B12 which is 7.867. However, perhaps due to the muting effect of residual anchoring, this difference is not statistically significant ($p=0.267$). These ratings provide a new anchor point for the final ratings of objects A13 (which is the same as object B12) and B13 (which repeats object A12). Indeed tests show that the ratings of A12 and A13 are not significantly different ($p=0.477$) as are the ratings of B12 and B13

¹ Both results are confirmed by non-parametric Mann Whitney tests with $p = 0.780$ and $p = 0.756$ respectively.

($p=0.802$). Nevertheless, for both samples, the direction of movement between objects 12 and 13 is as predicted by evaluability (ratings of the 'free' box are above those of the 'box for a penny' when the respondent is aware of and can compare both of these goods).

Finally, we turn to Objects A7 and B7. While both are, from a rational perspective, an identical box of eleven handmade chocolates, the description of A7 mentions that the chocolatier's typically make boxes of twelve, while B7 suggests that ten is a more usual size. From the perspective of economic rationality this contextual information is irrelevant, but from an affective perspective this adds a somewhat negative tinge to the description of A7 and a positive hue to B7. Given this, the significantly higher rating accorded to B7 ($p=0.018$) appears consistent with the Affective account. However, as we can see from our earlier results, this finding is confounded by a potential anchoring effect which also runs in the affective direction.

5. A FURTHER EXPERIMENT: A REAL-PLAY, SEALED BID AUCTION FOR NEGATIVE AND POSITIVE AFFECT GOODS

Given the potential confounding of affect and anchoring within ratings of items A7 and B7 it was decided to examine the goods concerned via a separate experiment using a new set of 57 subjects. This was a simple split sample, real-play experiment in which two groups of UEA students were shown an identical box of eleven handmade chocolates. They were then asked to submit sealed bids for such a box using a form which contained a written description of this box. For Sample 1 (N=30) this description was as per object A7 (negative affective description that the chocolatier “usually make boxes of twelve chocolates but currently have a range with just eleven chocolates, which is what we would give you.”). For Sample 2 (N=27) the description was as per object B7 (positive affective description that the chocolatier “usually make boxes of ten chocolates but currently have a range with 10% free, so that instead of getting ten chocolates you would get an additional one free, i.e. a box of eleven chocolates, which is what we would give you”). Full details of the procedure used in this experiment are presented in Appendix 2.

Table 5 presents descriptive statistics for the willingness to pay bids received for the box of eleven chocolates described using either the negative affective frame (for Sample 1) or the positive affective frame (for Sample 2). As can be seen, the positive affective description generates both higher mean and median values. Testing the hypothesis that positive affect resulted in higher bids² showed this difference to be statistically significant ($p=0.069$).

Table 5: Willingness to pay (£) for a box of chocolates

Sample (description of box of chocolates)	N	Mean	Median	StDev	Min.	Max.
Sample 1 (negative affect)	30	2.31	2.00	1.51	0.00	5.00
Sample 2 (positive affect)	27	2.97	3.00	1.71	0.00	7.00

² As we have a clear expectation regarding the direction of the effect we test this hypothesis using a one tailed test.

6. DISCUSSION AND CONCLUSIONS

Our real-play experiments reveal two anomalies within the rating scale responses; affect and anchoring. The anchoring phenomena is well established elsewhere and its presence here, while marked, is not remarkable. The evidence of the affect heuristic, demonstrated so clearly within the initial rating responses for the 'no-loss' and 'with-loss' gambles and reinforced by our subsequent sealed-bid auction is a more interesting and novel finding. Indeed this paper reports the first incentive compatible evidence of the affect heuristic in operation.

The strength of the affect heuristic in first response ratings is compelling. Furthermore, this translates directly to the single response auction. However, this heuristic can be quickly abandoned in the presence of other points of reference be they anchoring effects as in subsequent responses within our rating experiment, or evaluability effects as in the work of Hsee. An interesting line of future research therefore is to define out the circumstances in which affect can be either induced or abandoned.

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Appendix 1: Procedure for the real-play rating experiment

This appendix reports the handouts seen by Sample A participants in the UEA real play 2003 experiments. The version used for Sample B participants is identical except for the order in which tasks were presented. Each respondent was given a unique identification number which was clearly written on the space provided on the front page of the instructions. For both streams the pages prior to the rating task for Object 1 were initially handed out to subjects and participants followed those instructions as the facilitator read through them line by line, stopping repeatedly to ask if participants followed or any questions or points of clarification. Once this was completed to the satisfaction of all participants the single sheet containing the rating task for Object 1 was handed out to participants. Subjects were told to write their personal identification number at the top of the sheet and the incentive compatibility reasons for so doing were explained, namely that those who did not write their number on each sheet could not receive a prize should that task be selected as the real play item (this instruction was repeated after each new task was handed out). Subjects then rated Object 1 and response sheets were collected in prior to the sheet for Object 2 being handed out. This procedure was repeated until Task 6 had been completed. At this point a distraction item was inserted consisting of the chief facilitator reading out an extended passage from the introduction to Baumol and Oates (1975). This took around ten minutes to complete after which the rating sheet for Object 7 was handed out to subjects and completed. This was collected and the sheet for Object 8 handed out and so on until all 13 objects had been rated and sheets collected. The 'Background Information' sheet was then handed out to participants, completed and collected. This completed the response elicitation phase of the experiment.

**Making Decisions:
An Experiment with Real Rewards**

Identification and Receipt Form

DO NOT LOSE THIS FORM !!!!!

**IF YOU DO LOSE THIS FORM YOU WILL NOT GET THE PRIZE WHICH IS DUE TO YOU
!**

We will be handing out peoples prizes during the lecture on Friday so make sure you bring this with you on that day so you can claim your prize.

***YOUR IDENTIFICATION NUMBER IS* _____**

----- RECEIPT -----

PRINT (IN CAPITALS) YOUR NAME HERE: _____

ADDRESS (fill in either your term time or home address on the lines below):

I ACKNOWLEDGE RECEIPT OF (specify on the line below):

SIGNED: _____

DATE: _____

Preparations

This exercise is going to involve you answering a set of questions. On the basis of your answers you may receive a reward as specified in the questions. Because of this we want to observe high quality experimental procedures throughout this session. This means that:

1. All students must space out away from each other so that no one can see anyone else's answers.
2. There must be no talking between students throughout the course of the experiment

Anyone failing to observe these requirements may lose their reward and may be asked to leave the session.

Making Decisions

Much of social science research into how to make decisions, including decisions about the environment, is concerned with finding out how attractive people find a given object.

In this class we are going to undertake some original research, looking at how attractive certain objects are to you.

To do this we are going to present you with a series of objects. For each object we simply want you to indicate how attractive you feel that object is. You should indicate this level of attractiveness using the 20 point rating scale shown below. Here a value of 0 indicates that the object is "Not at all attractive", whereas a value of 20 indicates that the object is "Extremely attractive".

Attractiveness rating scale

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Not at all										Extremely										
Attractive										attractive										

Now we are interested in your first impressions of each object and as there is quite a series of objects we are going to go through them fairly quickly.

To make this exercise more interesting to you, once you have rated all the objects, two of them will be selected at random. We will then give you whichever one of these two things you said was more attractive to you. This is for real, no catches!

Details of how the object you get to keep is selected are given overleaf.

The details of how the object you get to keep is selected are as follows.

- Each of the objects has an identifying number, e.g. Object X
- This number is written onto a series of slips of paper.
- There are the same number of slips for each of the objects you will encounter.
- All of the slips for all of the objects are placed into a bag
- You put your hand into the bag and pull out two slips indicating two objects (if they both have the same letter then you replace one and draw again until you hold two different letters)
- We look at the ratings which you gave to each of these objects.
- You get to keep the object to which you gave the higher attractiveness rating.
- If both the objects chosen happen to have the same rating (i.e. you said you liked them equally well) then we will flip a coin to determine which one you get (i.e. it will be random which of these two you get).

The important consequences of this random process are that:

1. When you are rating each object you should remember that it has an equal chance of being one of those drawn from the bag.
2. It is in your own best interest to give each object the most appropriate attractiveness rating for you.

Is anyone unclear about any of the above instructions?

OK, there are three further instructions as follows:

1. For convenience we are going to hand all the objects to people at the same time, during the lecture on this Friday. Therefore you must bring your identification number and receipt with you to the lecture on Friday. However, you will find out today what your prize is going to be.
2. Some of the objects involve the opportunity for you to purchase things. Therefore, you need a small amount of cash in order to undertake this experiment. Has everyone got at least 20p? If not then I am afraid that you cannot partake in the experiment and will just have to observe.
3. Each of the objects you rate is presented on a separate sheet of paper. It is obviously vital that we can match up the objects you choose from the bag with your rating of those objects. Otherwise we won't know which of those two objects your rated highest. Therefore we have given each of you a personal identification number. This is shown on the front page of this handout.

YOU MUST WRITE YOUR PERSONAL IDENTIFICATION NUMBER AT THE TOP OF EACH OF THE OBJECT RATING SHEETS – OTHERWISE YOU MAY LOSE OUT FROM OBTAINING YOUR REWARD.

Is anyone unclear about any of the above instructions?

We are now ready to begin the rating exercise.

Let me remind you that the objects you are going to see are for real, they are not hypothetical and one of these objects will be selected and random and constitute your prize on Friday.

As explained above, each of the objects to rate are detailed on a separate piece of paper which we will give out to you now.

The first thing you should do is write your identification number in the space shown at the top of the page. Repeat this every time you get a new task sheet otherwise you may not get a prize on Friday.

It should not take you long to rate each object and as soon as one rating exercise is completed we will come around and take that in and hand out the next task.

OK, we will now hand out the first object rating task.

<FACILITATOR HANDS OUT FIRST TASK>

WRITE YOUR PERSONAL IDENTIFICATION NUMBER HERE: _____
 (you must complete the above or you will lose your chance of obtaining this object)

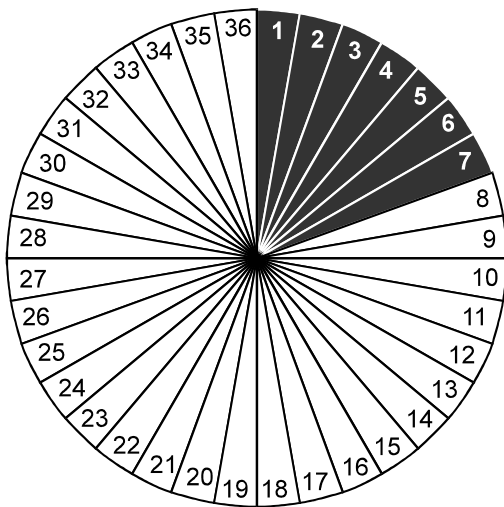
Rating task for Object 1

Object 1 is a bet which you would play for real money.

We would like you to rate how attractive the prospect of playing the following bet is to you

7/36 to win **£9.00**

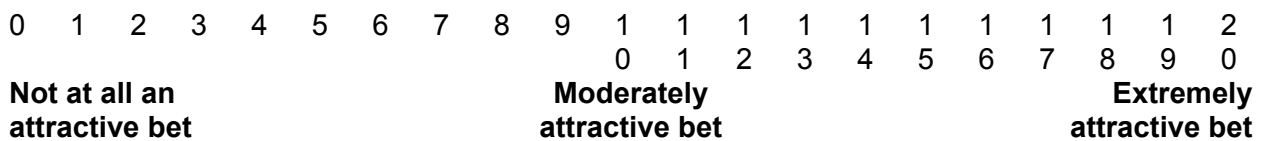
This means that there are 7 chances out of 36 that you will win the bet and receive **£9.00** and 29 chances out of 36 that you will win nothing



The bet will be played using a roulette wheel like the one shown here. If a ball lands on any of the 7 numbers between 1 and 7 inclusive, you win £9.00. If it lands on numbers 8-36, you win nothing

Indicate your opinion of this bet's attractiveness by **circling one** number on the rating scale below.

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of playing this bet.



< THE FACILITATOR WILL COME AND COLLECT THIS ONCE YOU HAVE COMPLETED THE RATING TASK. YOU WILL THEN BE GIVEN THE NEXT RATING TASK >

WRITE YOUR PERSONAL IDENTIFICATION NUMBER HERE: _____
(you must complete the above or you will lose your chance of obtaining this object)

Rating task for Object 2

Object 2 is that you receive a free Mars bar.

Indicate your opinion of how attractive this object is by **circling one** number on the rating scale below.

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of this object.

0	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2
										0	1	2	3	4	5	6	7	8	9	0
Not at all									Moderately									Extremely		
Attractive									attractive									attractive		

< THE FACILITATOR WILL COME AND COLLECT THIS ONCE YOU HAVE COMPLETED THE RATING TASK. YOU WILL THEN BE GIVEN THE NEXT RATING TASK >

WRITE YOUR PERSONAL IDENTIFICATION NUMBER HERE: _____
(you must complete the above or you will lose your chance of obtaining this object)

Rating task for Object 3

Object 3 is the opportunity for you to purchase a new toothbrush, for 5 pence, if you want to (or you can keep your money and not receive the toothbrush)

Indicate your opinion of how attractive this object is by **circling one** number on the rating scale below.

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of this object.

0	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2	
										0	1	2	3	4	5	6	7	8	9	0	
Not at all attractive										Moderately Attractive										Extremely attractive	

< THE FACILITATOR WILL COME AND COLLECT THIS ONCE YOU HAVE COMPLETED THE RATING TASK. YOU WILL THEN BE GIVEN THE NEXT RATING TASK >

WRITE YOUR PERSONAL IDENTIFICATION NUMBER HERE: _____
(you must complete the above or you will lose your chance of obtaining this object)

Rating task for Object 4

Object 4 is that you receive a free, unused, single tea bag.

Indicate your opinion of how attractive this object is by **circling one** number on the rating scale below.

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of this object.

0	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2
										0	1	2	3	4	5	6	7	8	9	0
Not at all									Moderately									Extremely		
attractive									attractive									attractive		

< THE FACILITATOR WILL COME AND COLLECT THIS ONCE YOU HAVE COMPLETED THE RATING TASK. YOU WILL THEN BE GIVEN THE NEXT RATING TASK >

WRITE YOUR PERSONAL IDENTIFICATION NUMBER HERE: _____
(you must complete the above or you will lose your chance of obtaining this object)

Rating task for Object 5

Object 5 is that you receive an envelope containing £5

Indicate your opinion of how attractive this object is by **circling one** number on the rating scale below.

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of this object.

0	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2									
										0	1	2	3	4	5	6	7	8	9	0									
Not at all attractive										Moderately Attractive										Extremely attractive									

< THE FACILITATOR WILL COME AND COLLECT THIS ONCE YOU HAVE COMPLETED THE RATING TASK. YOU WILL THEN BE GIVEN THE NEXT RATING TASK >

WRITE YOUR PERSONAL IDENTIFICATION NUMBER HERE: _____
(you must complete the above or you will lose your chance of obtaining this object)

Rating task for Object 6

Object 6 is that you receive a standard sized (415g) tin of Heinz baked beans for free.

Indicate your opinion of how attractive this object is by **circling one** number on the rating scale below.

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of this object.

0	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2									
										0	1	2	3	4	5	6	7	8	9	0									
Not at all attractive										Moderately Attractive										Extremely attractive									

< THE FACILITATOR WILL COME AND COLLECT THIS ONCE YOU HAVE COMPLETED THE RATING TASK. YOU WILL THEN BE GIVEN THE NEXT RATING TASK >

BREAK

WRITE YOUR PERSONAL IDENTIFICATION NUMBER HERE: _____

(you must complete the above or you will lose your chance of obtaining this object)

Rating task for Object 7

Object 7 is that you receive a box of handmade Belgian chocolates from Digby's of Holt. Digby's usually make boxes of twelve chocolates but currently have a range with just eleven chocolates in, which is what we would give you.

Indicate your opinion of how attractive this object is by **circling one** number on the rating scale below.

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of this object.

0	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2
										0	1	2	3	4	5	6	7	8	9	0
Not at all										Moderately										Extremely
attractive										Attractive										attractive

< THE FACILITATOR WILL COME AND COLLECT THIS ONCE YOU HAVE COMPLETED THE RATING TASK. YOU WILL THEN BE GIVEN THE NEXT RATING TASK >

WRITE YOUR PERSONAL IDENTIFICATION NUMBER HERE: _____
(you must complete the above or you will lose your chance of obtaining this object)

Rating task for Object 8

Object 8 is that we give you two 100g jars of Marmite for free.

Indicate your opinion of how attractive this object is by **circling one** number on the rating scale below.

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of this object.

0	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2									
										0	1	2	3	4	5	6	7	8	9	0									
Not at all attractive										Moderately Attractive										Extremely attractive									

< THE FACILITATOR WILL COME AND COLLECT THIS ONCE YOU HAVE COMPLETED THE RATING TASK. YOU WILL THEN BE GIVEN THE NEXT RATING TASK >

WRITE YOUR PERSONAL IDENTIFICATION NUMBER HERE: _____
 (you must complete the above or you will lose your chance of obtaining this object)

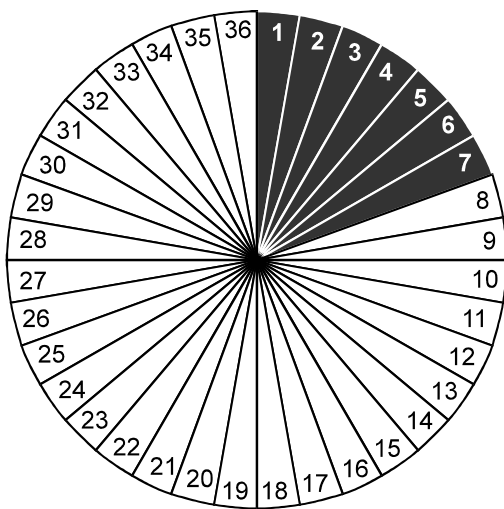
Rating task for Object 9

Object 9 is a bet which you would play for real money.

We would like you to rate how attractive the prospect of playing the following bet is to you

7/36 to win **£9.00**
 29/36 to lose **£0.05**

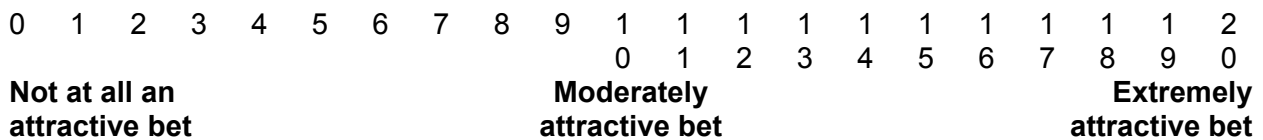
This means that there are 7 chances out of 36 that you will win the bet and receive **£9.00** and 29 chances out of 36 that you will lose **£0.05**



The bet will be played using a roulette wheel like the one shown here. If a ball lands on any of the 7 numbers between 1 and 7 inclusive, you win £9.00. If it lands on numbers 8-36, you lose £0.05

Indicate your opinion of this bet's attractiveness by **circling one** number on the rating scale below.

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of playing this bet.



< THE FACILITATOR WILL COME AND COLLECT THIS ONCE YOU HAVE COMPLETED THE RATING TASK. YOU WILL THEN BE GIVEN THE NEXT RATING TASK >

WRITE YOUR PERSONAL IDENTIFICATION NUMBER HERE: _____
(you must complete the above or you will lose your chance of obtaining this object)

Rating task for Object 10

Object 10 allows you to pick an envelope from a bag of envelopes of which equal numbers contain either nothing or £10

Indicate your opinion of how attractive this object is by **circling one** number on the rating scale below.

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of this object.

0	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2
										0	1	2	3	4	5	6	7	8	9	0
Not at all										Moderately										Extremely
attractive										Attractive										attractive

< THE FACILITATOR WILL COME AND COLLECT THIS ONCE YOU HAVE COMPLETED THE RATING TASK. YOU WILL THEN BE GIVEN THE NEXT RATING TASK >

WRITE YOUR PERSONAL IDENTIFICATION NUMBER HERE: _____
(you must complete the above or you will lose your chance of obtaining this object)

Rating task for Object 11

Object 11 is a free copy of next Friday's Independent newspaper given to you in next Friday's lecture

Indicate your opinion of how attractive this object is by **circling one** number on the rating scale below.

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of this object.

0	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2
										0	1	2	3	4	5	6	7	8	9	0
Not at all										Moderately										Extremely
attractive										Attractive										attractive

< THE FACILITATOR WILL COME AND COLLECT THIS ONCE YOU HAVE COMPLETED THE RATING TASK. YOU WILL THEN BE GIVEN THE NEXT RATING TASK >

WRITE YOUR PERSONAL IDENTIFICATION NUMBER HERE: _____

(you must complete the above or you will lose your chance of obtaining this object)

Rating task for Object 12

Object 12 is the opportunity to purchase a medium sized (750g) box of Cornflakes for 1 penny, if you want to (or you can keep your money and not receive the Cornflakes)

Indicate your opinion of how attractive this object is by **circling one** number on the rating scale below.

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of this object.

0	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2									
										0	1	2	3	4	5	6	7	8	9	0									
Not at all										Moderately										Extremely									
Attractive										Attractive										attractive									

< THE FACILITATOR WILL COME AND COLLECT THIS ONCE YOU HAVE COMPLETED THE RATING TASK. YOU WILL THEN BE GIVEN THE NEXT RATING TASK >

WRITE YOUR PERSONAL IDENTIFICATION NUMBER HERE: _____
(you must complete the above or you will lose your chance of obtaining this object)

Rating task for Object 13

Object 13 is a free medium sized (750g) box of Cornflakes.

Indicate your opinion of how attractive this object is by **circling one** number on the rating scale below.

There is no right or wrong answer, we are interested only in your opinion about the **attractiveness** of this object.

0	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2
										0	1	2	3	4	5	6	7	8	9	0
Not at all										Moderately										Extremely
attractive										Attractive										attractive

< THE FACILITATOR WILL COME AND COLLECT THIS ONCE YOU HAVE COMPLETED THE RATING TASK. YOU WILL THEN BE GIVEN THE NEXT RATING TASK >

WRITE YOUR IDENTIFICATION NUMBER HERE _____

Background information

These details will help us examine whether different people give different answers. Please answer the following questions.

- **Gender** (Circle the response that applies to you):

I am : MALE FEMALE

- **Age** (Please tell us your age in years)

I am _____ years old

- **Have you studied economics before?** (Circle the response that applies to you):

YES NO

If "YES", to what level? (Tick highest level to which studied)

GCSE	<input type="checkbox"/>
A level	<input type="checkbox"/>
Bachelor's degree	<input type="checkbox"/>
Master's degree	<input type="checkbox"/>
Ph.D.	<input type="checkbox"/>

- **Have you studied psychology before?** (Circle the response that applies to you):

YES NO

If "YES", to what level? (Tick highest level to which studied)

GCSE	<input type="checkbox"/>
A level	<input type="checkbox"/>
Bachelor's degree	<input type="checkbox"/>
Master's degree	<input type="checkbox"/>
Ph.D.	<input type="checkbox"/>

MANY THANKS FOR COMPLETING THIS QUESTIONNAIRE

Appendix 2: Procedure for the real-play Dutch auction

Two samples of subjects were taken at random from a class of environmental science students at the University of East Anglia. All subjects received a two page booklet the first page of which was that entitled (cover sheet) as shown subsequently³. For those subjects in Sample 1 this was attached to the page headed (treatment 1) on the following page (note that the heading was omitted from the sheet so that subjects were not alerted to the split sample nature of this experiment). For those in Sample 2 this was replaced by the page headed (treatment 2) also reproduced subsequently. Subjects initially filled in the cover sheet. The facilitator read out the appropriate second page (treatment 1 or 2) and asked if there were any questions. It was made very clear that this Dutch auction was for real and that payment would have to be made when the box of chocolates was delivered to the appropriate student at a class later that week. An identical box of chocolates was shown to all subjects who then completed their bid forms in secret. All subjects then placed their cover sheet and treatment 1 or 2 response sheets into individual envelopes which they sealed and passed to the facilitator on exit.

³ Note that these sheets have been reduced slightly for reproduction purposes.

(cover sheet)

Please answer the following questions:

Your name:

The School you are in

What year are you in?

The degree you are taking.....

Today's date: / /

Gender (please circle) Male Female

Have you studied economics before?

(please circle the one that applies to you)

YES

NO

If "yes", to what level? (Tick highest level to which studied)

GCSE

A level

Bachelor's degree

Master's degree

Ph.D.

(treatment 1)

Note: This task is for real! If it proves that you are the person buying the chocolates described below then you will have to pay me the relevant amount of money detailed below! You will have to bring the amount to the next lecture - but in return you will get the chocolates!

At first you may not like the thought of this – but remember that you can adjust your bid to any level (even zero) such that you would be happy to play this real money game.

In the centre of Norwich is a wonderful Belgian chocolate shop called Digby's of Holt. Here they make handmade chocolates which are bought in boxes of various sizes. You get to select the contents of a box from more than thirty different types of chocolate and you are free to make any combination from each one being different to them all being the same.

Digby's usually sell boxes of twelve chocolates but currently have a range with just eleven chocolates in. These taste great and make wonderful presents. What is the maximum that you would be willing to pay for such a box?

1. In the space provided below write in the most that you would be prepared to pay for this box of chocolates. It is in your own best interest to answer truthfully. If, for example, you state less than you really would be willing to pay then you might miss out on the chance to buy these chocolates at a price you would actually be prepared to pay.
2. I will take in all the answer sheets. The person who bids the highest amount will get to buy the chocolates, but I will charge a price equal to the next highest bid.

What is the maximum that you would be willing to pay for such a box?

The most I would pay for a box of eleven chocolates (rather than the usual twelve chocolates) is:

£.....

(please write in the amount above)

(treatment 2)

Note: This task is for real! If it proves that you are the person buying the chocolates described below then you will have to pay me the relevant amount of money detailed below! You will have to bring the amount to the next lecture - but in return you will get the chocolates!

At first you may not like the thought of this – but remember that you can adjust your bid to any level (even zero) such that you would be happy to play this real money game.

In the centre of Norwich is a wonderful Belgian chocolate shop called Digby's of Holt. Here they make handmade chocolates which are bought in boxes of various sizes. You get to select the contents of a box from more than thirty different types of chocolate and you are free to make any combination from each one being different to them all being the same.

Digby's are currently selling boxes with 10% free, i.e. if you bought ten chocolates you would get an additional one free. These taste great and make wonderful presents. What is the maximum that you would be willing to pay for such a box?

1. In the space provided below write in the most that you would be prepared to pay for this box of chocolates. It is in your own best interest to answer truthfully. If, for example, you state less than you really would be willing to pay then you might miss out on the chance to buy these chocolates at a price you would actually be prepared to pay.
2. I will take in all the answer sheets. The person who bids the highest amount will get to buy the chocolates, but I will charge a price equal to the next highest bid.

What is the maximum that you would be willing to pay for such a box?

**The most I would pay for a box of ten plus 10% free (i.e. eleven) chocolates is:
£.....**

(please write in the amount above)