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Consumer Decision-Making Under Complexity

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Disclaimer

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Executive Summary

This report outlines the methods and results of an investigation into how complexity affects consumers' decision making, commissioned by the Commerce Commission and undertaken by researchers from the University of Waikato. The results were based on laboratory experiments conducted in the Waikato Experimental Economics Laboratory. Specifically we investigated three research questions:

1. How are consumer purchasing decisions (or outcomes) in a retail grocery context (i.e., supermarkets) influenced by the existence of multiple discounting schemes, and does the existence of different schemes lead to a reduction in consumer welfare compared to pricing with fewer, or no schemes?;

2. When consumers compare the same product across pack sizes, is their ability to compare affected by whether one is on promotion or not (and the other option is not)?; and

3. Could displaying unit prices mitigate some of the effects of the above? (if there are any effects).

Using lab experiment data from 180 research participants, we find that multiple discounting schemes do induce suboptimal decision making on the part of consumers. They are less likely to choose the optimal consumption bundle when faced with multiple pricing schemes, and the average welfare loss (loss of consumer surplus) is higher than when faced with no discounting and a single simple pricing scheme. Comparing three-packs with single units, we find that package size likely makes no difference to the extent of suboptimal decision-making; however, further research into this research question may be required. Finally, we find weak statistical evidence that displaying unit prices mitigates the effects of multiple discounting schemes on the optimality of consumer decision-making.

1. Introduction

The Commerce Commission commissioned the Institute for Business Research at the University of Waikato in early 2021 to conduct research into how complexity affects consumers' decision making. In particular, the Commission asked for research where the contexts would mimic as much as possible the decision making that consumers face when considering supermarket promotional schemes. The research was conducted using laboratory experiments conducted in the Waikato Experimental Economics Laboratory (WEEL) at the University of Waikato.

Specifically, the research addressed the following research questions:

1. How are consumer purchasing decisions (or outcomes) in a retail grocery context (i.e., supermarkets) influenced by the existence of multiple discounting schemes, and does the existence of different schemes lead to a reduction in consumer welfare compared to pricing with fewer, or no schemes?;
2. When consumers compare the same product across pack sizes, is their ability to compare affected by whether one is on promotion or not (and the other option is not)?; and
3. Could displaying unit prices mitigate some of the effects of the above? (if there are any effects).

The remainder of this report is structured as follows:

- Section 2 outlines the experimental data collection and analysis methods;
- Section 3 presents and briefly discusses the results; and
- Section 4 concludes.

2. Data and Methods

2.1 Experimental Methods and Data Collection

The researchers tested the impact of promotional schemes of varying complexity on the extent of consumer bounded rationality via the experimental economic method (Binmore, 1987; 1999; Plott, 1982; 1991a; 1991b; 1994; Roth, 1986; 1991; 1994; Smith, 1976; 1989; 1994). Experimental economics is a field within economics that studies human behaviour via the

scientific method. To do so, experimental designs are created specifically to address research questions to allow for the collection of data in controlled laboratory and/or field settings. The data consist of decisions made by real people facing real financial consequences. Some of the benefits of using the experimental economic method are credibility (salient decision processes), control (ability to change only a single treatment variable at a time), observability (environment and institutional factors are not only able to be controlled, but also viewed, which in many instances is not possible with traditional field data collection techniques) and replicability (the experiment can be conducted any number times by anyone to allow for proper statistical analysis, robustness tests, and so on).

The root of the three research questions provided by the Commerce Commission is whether consumers are boundedly rational. Bounded rationality exists where a consumer does not exert sufficient cognitive effort to choose a consumption bundle that maximises their welfare. Simply stated, every decision made by human beings requires reasoning (cognitive effort) to assess the appropriate action to be taken (Kurzban et al., 2013; Westbrook and Braver, 2015). Just as for all forms of effort, cognitive effort, i.e. thinking about making the "right" decision, has an associated effort-cost (Kool et al., 2010). Therefore, people must make a cost-benefit analysis upon their actions/decisions considering the extent of this cognitive effort-cost. More specifically, if the costs (including the cost of cognitive effort) outweigh the benefits of the action, then people do not take that action. Relating specifically to this study, some of the offered promotional schemes require a significant amount of cognitive effort in order to extract the maximum amount of gain from the purchase. For participants who optimise for simpler promotions but do not optimise for more difficult options, we infer that this behaviour is due to their unwillingness to exert a sufficient amount of cognitive effort to solve the problem.

Note, for the inference above, we assume that consumers are not cognitively limited, i.e. if enough effort is exerted and sufficient incentive provided, then the consumer can choose the optimal bundle. We believe this assumption to be perfectly reasonable due to the participants receiving extensive instructions, receiving a thorough oral presentation of the environment and associated decision processes after reading through the instructions independently, and being required to complete/pass a quiz focused on the process of achieving highest possible earnings for a given price (irrespective of the promotion scheme). Additionally, participants were encouraged to ask clarification questions at any time.

Given the importance of cognitive effort to the analysis, each participant completed a Cognitive Reflection Test (CRT) at the start of the experimental session. In short, this test can be used to estimate the willingness of participants to think deeply, i.e., exert cognitive effort (Frederick, 2005). Cognitive processes can be split into System 1 and System 2 processes (Stanovich and West, 2000; Kahneman, 2002). Cognitive processes that employ minimal mental reflection using spontaneous and intuitive reasoning, such as recognising a person's face, belong to the System 1 category. Problems that require depth of thought and mental concentration, such as calculating $\sqrt{19163}$, require the use of System 2 processes to solve. To achieve correct answers to the CRT questions, System 2 processes are required. However, the questions also offer an intuitive, incorrect solution if the participant employs only a System 1 process. Therefore, the CRT can differentiate between those participants who employ a System 1 process and those who employ a System 2 process.

The three CRT questions that were used were:

1. A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? .... cents
2. If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? .... minutes
3. In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? .... days.

The intuitive, incorrect answers to these questions are 10, 100, and 24, but the correct answers are 5, 5, and 47. Participants were paid $1 for each correct answer ($3 maximum).

Interestingly, time preferences correlate with subject's CRT scores (Frederick, 2005); a person who rejects the impulsive response and gives the answer that requires depth of thinking often also has time preferences that are reflective of a more patient nature. High CRT scoring subjects are also more likely to take risks when pursuing gains, but more likely to take a sure loss to avoid a larger potential loss. CRT as a test measures cognitive reflection, a measure of the propensity to resist giving an intuitive answer and reflect upon the problem. It is a tested, rather than self-reported, form of the need for cognition (NFC), an individual's "tendency to engage in and enjoy thinking" as put forward by Cacioppo and Petty (1982). Theoretically, whilst the NFC is distinguishable from intelligence, those with higher scores tended to exhibit behaviours

associated with higher scores in any test of cognitive function. These include better scores on arithmetic problems, university homework, and trivia.

Specifically related to each research question, we tested whether the consumer is willing to optimise across the presented pricing scheme(s), and thus choose the welfare maximising consumption bundle. That is, given the complexity of the promotion scheme(s) available, are subjects willing to exert the required cognitive effort to calculate which promotion scheme(s) to purchase from and how many units within the chosen promotion scheme(s) to purchase, such that they maximise their welfare, i.e. the difference between how much the participant is willing to pay for each of those units and how much the chosen promotion scheme(s) require them to pay.

The experiment consisted of a series of consumption decision rounds, including several treatment conditions (described below). In each decision round, participants were asked to indicate the number of units of a fictitious good that they would be willing to purchase. The use of a fictitious good, as opposed to any actual good, is necessary in order to avoid unobservable preferences for the good and thus allow for the explicit control and measurement of welfare gains/losses from transactions (Kagel and Roth, 1995). Figure 1 presents the visual illustration of the fictitious good used in the experiment. The description provided to the participants in the experiment instructions (see Appendix B for full instructions) is as follows, "In each round, you will decide how many (if any) of the fictitious goods on offer you would like to purchase. In any given round, you will be presented a single item (1L volume of "stuff") and/or a 3-pack of the item." Using a single fictitious good (in both single and three-pack forms) eliminated any concerns about substitution effects between the two goods, as well as mimicking a key source of variation in unit prices observed in field settings.

Figure 1: Visual representation of the fictitious good

In order to explicitly calculate the welfare implications of the consumption decisions, we imposed preferences (willingness to pay) for the fictitious good via induced value theory (Smith, 1976). Since any pre-existing preferences were removed via the use of a fictitious good, we need to impose new preferences (willingness to pay) upon the participants for the fictitious good. To do so, we provided each participant with a schedule of "Buy Back Values" corresponding to each unit they purchase, presented in Table 1. For each unit of the fictitious good that a participant chose to purchase in each decision round, the experimenter paid the participant the amount listed in Table 1 that corresponds to that unit. A participant's earnings from each experimental round were determined by the difference between the price they paid for the unit and the 'Buy Back Value' for that unit. For example, if the participant decides to purchase four units in a round, then the experimenter would pay 400 ECU for the first unit, 380 ECU for the second unit, 360 ECU for the third unit, and 340 for the fourth unit. Therefore, for all 4 units combined, the experimenter would pay 400+380+360+340 = 1480 ECU. The currency used in the experiment was ECU (Experimental Currency Units), which was converted to New Zealand dollars at the known exchange rate of 108 ECU to $1.

Table 1: Buy Back Values

Unit Purchased	Buy Back Value (ECU)		Unit Purchased	Buy Back Value (ECU)
1	400		12	180
2	380		13	160
3	360		14	140
4	340		15	120
5	320		16	100
6	300		17	80
7	280		18	60
8	260		19	40
9	240		20	20
10	220		21	0
11	200			

A participant's earnings were determined by the difference between the price they paid for the unit and the 'Buy Back Value' for that unit. In other words, the participant's earnings in the experiment were equivalent to their consumer surplus. To continue the example above, suppose that a participant decides to purchase four units at a price of 300 ECU each. As calculated above, the participant receives a payment of 1480 ECU from the experimenter for those four

units. However, recall that the participant must pay the price required by the chosen promotion scheme(s) for those four units, 300 ECU each in this example. Therefore, the earnings (consumer surplus) are calculated as (400-300)+(380-300)+(360-300)+(340-300) = 280 ECU.

At the conclusion of the experimental session, two of the decision rounds were selected at random to determine each participant's overall earnings. This is a technique used to ensure that earnings earned in earlier rounds do not impact consumption decisions in later rounds due to accumulated wealth over time.

The experiment was computerised using the z-Tree software (Fischbacher, 2007) and all decision-making was anonymous in order to avoid social biases/pressures. Within this environment, subjects played a series of consumption decision rounds. The experimental design did not randomise the order of schemes faced by participants across rounds, as we believe that there is very little to no learning or ordering effects for the following reasons. First, we are simply replicating decision processes that subjects are well accustomed to making in retail environments. Second, the framing and parameterisation of promotions were provided by the Commission to closely represent an actual consumption decision within grocery stores. Therefore, the "experience" and decisions processes in the lab are virtually the same as those the participants face regularly in the field, except for the induced preferences (in the form of Buy Back Values). Third, four different price levels were randomised across schemes such that a participant was guaranteed not to see the same price level for two consecutive rounds and then randomised in the following rounds. Therefore, even if a participant faced a given pricing scheme in two consecutive rounds, the prices were guaranteed to be different, and thus calculations must be conducted once again. Fourth, participants did not receive feedback between decision rounds as to whether their choice was optimal or not.

The number of pricing schemes available at any given time was varied in order to induce different levels of complexity. The specific pricing schemes that were used are outlined in Table 2. The names of each pricing scheme and the parameters of each scheme were provided by the Commerce Commission. The Commerce Commission emphasised the importance of this framing and parameterisation to ensure 'reality' and familiarity of the decision process. The names are generic as to try to avoid confusion via association with actual promotion schemes used at local grocery stores. Participants were presented with one or more pricing schemes, from five different pricing schemes for single units, and three different pricing schemes for three-unit packs. For each pricing scheme, participants were presented with one

of four different prices. All prices were presented in Experimental Currency Units (ECU), as noted above.

Table 2: Pricing schemes

Scheme Number	Pricing Scheme	Description	Prices (ECU)
	Single Units:		
1	"*Good Value*" or no label	Anchor price (full value)	245; 230; 210; 190
2	"*Special* xxx ECU" With either "save xxx ECU" in small or "save 20%" in small writing below per unit price. Note, there was no specific reference to the anchor price directly.	A discount from the Anchored price	196; 184; 168; 152
3	"*Extra Saver*" presented as "5 units for xxx ECU"	5 unit block pricing with 25% discount offer set against the Anchored price	919; 863; 788; 713
4	"*Great Prices*"	Buy three, get one free	245; 230; 210; 190
6	"*Club Discount*"	pay 50 to join the club, then 15% discount	208; 196; 179; 162
	Three-unit packs:		
7	"Good Value" or no label	Anchor price (full value)	650; 620; 580; 540
8	"Special xxx ECU" with "save xxECU" in small writing or "Special xxx ECU with "save 20%" in small writing	A discount from the Anchored price	520; 496; 464; 432
12	"Club Discount"	pay 50 to join the club, then 15% discount.[1]	553; 527; 493; 459

N.B. Schemes are not consecutively numbered, as some pricing schemes from the original design proposal were not used in the final experimental design.

A 2x2 design was created for the framing of Schemes 1 and 7 (label or no label) and Schemes 2 and 8 (whether discount is present in ECU value or percentage). Each participant had a 25% chance to be assigned to a treatment cell and this assignment was consistent through Stages 1

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[1] The rationale for the Club Discount was to mimic the cost of joining loyalty/card schemes. We acknowledge that this design somewhat diverges from actual implementation in the field. However, it is an open empirical question as to whether these framing differences would have any impact on behaviour.

to 3 of the experimental session (as discussed below). In Stage 4 of the experimental session, all participants faced a treatment cell consisting of Scheme 1 and 7 label (Good Value) and Scheme 2 and 8 (stated ECU discount).

Recall that all rounds are independent. Decisions and earnings in any given round do not impact decisions in any other round. That is, the experiment is designed as repeated play of a "one-shot" game. This was described to participants as imagining each round as their first visit to a retail store. The implications for Schemes 4 and 12 (Club Discount) are that the participant must pay the joining fee in each round in which they choose to purchase via the Club Discount. Once they pay the joining fee in that round, then they could purchase as many units as they wanted to at the Club Discount price.

The laboratory experiments were conducted in four stages, as outlined in Table 3. Each stage included several decision rounds, in which participants were presented with different sets of pricing schemes from which to select. In Stage 1, each decision round included only a single pricing scheme (as shown in Figure 2). The first round of Stage 1 represents the simplest decision for the participants, where they were presented with a price per unit for single units of the fictitious good. In Stage 2, participants were presented with several pricing schemes at once (as shown in Figure 3). Participants were restricted to purchase from only a single pricing scheme. They first chose the scheme they wanted to purchase from and then the quantity to purchase within that scheme. In Stage 3, participants were again presented with several pricing schemes, but could purchase any number of units from any of the pricing schemes (as shown in Figure 4). That is, if they wanted, they could purchase units from more than one pricing scheme at the same time. Finally, the setup for Stage 4 was the same as Stage 3 but participants were provided with unit prices for each of the pricing schemes (as shown in Figure 5). The unit prices were presented in ECU per mL or ECU per L, and participants were randomised as to whether the unit prices were expressed in ECU per mL or ECU per L (although once randomised into a treatment, participants saw unit prices presented in the same way for all decision rounds in Stage 4). Prior to Stage 4, participants were not aware that they would be given unit prices with any of the promotion schemes.

The research received ethics approval from the Waikato Management School Human Research Ethics Committee. Data were collected from 180 participants, across 13 lab experiment sessions (each participant participated in only one session). Data collected from the experiment

sessions included the participants' choices for each decision round, as well as the prices that they were faced with as well as CRT scores.

Table 3: Decision rounds

Stage	Notes	Decision Round	Pricing Schemes
1	One pricing scheme at a time	1	1
		2	2
		3	3
		4	4
		5	6
		6	7
2	Multiple pricing schemes, participants may purchase from only one scheme	1	2,6,7,12
		2	2,6,8,12
3	Multiple pricing schemes, participants may purchase from any number of schemes	1	3,6,7,12
		2	4,6,7,12
		3	2,3,6,7,12
		4	2,4,6,7,12
		5	3,6,8,12
		6	4,6,8,12
		7	2,3,6,8,12
		8	2,4,6,8,12
4	Multiple pricing schemes shown with unit prices, participants may purchase from any number of schemes	1	3,6,7,12
		2	2,3,6,7,12
		3	3,6,8,12
		4	2,3,6,8,12

Figure 2: Screen Shot of Stage 1 Decision

Figure 3: Screen Shot of Stage 2 Decision

Figure 4: Screen Shot of Stage 3 Decision

Figure 5: Screen Shot of Stage 4 Decision

2.2 Analysis method

To analyse the data, we first specify two outcome variables: (1) whether a participant purchased the optimal (highest consumer surplus) option (i.e., in order to purchase the optimal option, they must select both the correct pricing scheme or schemes, and the correct quantities); and (2) how far their choice deviated from the optimal option, in relative terms. The first outcome variable takes on values of one (if the participant selected the optimal option) or zero (if they did not).[2] The second outcome is measured as the loss in the consumer surplus (or welfare) generated by the selected option, as a percentage of the optimal consumer surplus (or welfare). For example, if the optimal consumer surplus was 1000, and the participant's choice led to a consumer surplus of 900, the loss in welfare is 10 percent ([1000-900]/[1000]).

In the analyses, we first summarise the outcome variables for each round. We then test for significant deviations from optimality that exceed the deviations observed for the simplest choice task (from Stage 1, Round 1, where the participants faced Scheme 1). To do this, we re-specify each outcome variable as the difference between its value in the current choice task, and its value in the simplest choice task. This provides an explicit within-subject comparison for each choice task, effectively holding constant all unobserved characteristics about the participants. We then estimate linear regression models separately for each experimental round, controlling for participants' performance in the cognitive reflection test, and for the observed prices in that round and in the comparator round (in most instances this is Stage 1, Round 1). Specifically, the regression models are of the form:

$$\left(Y_{ij} - Y_{ik}\right) = \alpha + \beta X_i + \gamma_n Z_{in} + \varepsilon_{ijk} \tag{1}$$

where Y_{ij} and Y_{ik} are the outcome variables (either a binary variable indicating whether the choice was optimal or not; or the welfare loss) for participant i for choice tasks j and k respectively, X_i is the participant i's performance in the cognitive reflection test (measured out of three), Z_{in} is a vector of two fixed effects ($n \in \{j.k\}$), reflecting the observed prices that the participant was presented with in the round being analysed, and in the round it is being compared with (initially Stage 1, Round 1), and ε_{ijk} is an idiosyncratic error. The variable of interest is α, the intercept term, which captures the conditional mean difference in optimality after controlling for CRT score and prices. This econometric specification has the advantage

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[2] However, for each of interpretation in the analyses, we actually reverse-code this variable so that it takes on values of zero or negative one.

that the within-subject specification (*Yij-Yik*) eliminates any observed or unobserved characteristics of the participants that do not differentially affect their performance in different choice tasks.[3] CRT score remains in the specification because we assume that participant effort differs between choice tasks, depending on the complexity of those tasks. That means that the correct interpretation of the intercept term α is that it is the conditional mean difference for participants with a CRT score of zero, those who are most likely to exert the least effort on complex choice tasks.[4] The comparison between the rounds in Stages 2 and 3 of the experiment and the simplest choice task (from Stage 1, Round 1) provides an answer to the first research question.

To test for the effect of discounting of the three-unit packs of the fictitious good, we compare the outcome variables from the first four rounds of Stage 3 with the same variables from the last four rounds of Stage 3. The difference between those two sets of rounds is that, in the last four rounds, the three-unit packs are discounted relative to the anchor price. In this case, the outcome variables are re-specified as the difference between the value in the first four rounds of Stage 3 and the value in the last four rounds of Stage 3. This comparison provides an answer to the second research question.

We then test for whether the statistical significance of the framing of unit prices (mL or L) creates a statistically significantly different effect on the optimality of decision making, by comparing the outcome variables between participants who received each framing. In contrast with the other analyses, the analysis of the framing of unit prices is *between-subjects* rather than *within-subjects*,[5] as each participant only saw one treatment (mL or L). Finally, we test

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[3] To see why, consider separate regression equations for choice task *j* and choice task *k*:

$$Y_{ij} = \alpha_j + \beta_j X_i + \gamma_j Z_{ij} + \delta K_i + \varepsilon_{ij} \tag{2}$$

$$Y_{ik} = \alpha_k + \beta_k X_i + \gamma_k Z_{ik} + \delta K_i + \varepsilon_{ik} \tag{3}$$

where K_i is a vector of observed and unobserved characteristics of participant *i*, that are correlated with their ability to optimise on any choice task. Subtracting Equation (3) from Equation (2) gives:

$$(Y_{ij} - Y_{ik}) = (\alpha_j - \alpha_k) + (\beta_j - \beta_k)X_i + \gamma_j Z_{ij} + \gamma_k Z_{ik} + (\varepsilon_{ij} - \varepsilon_{ik}) \tag{4}$$

The characteristics vector K_i is eliminated by this subtraction. It is then straightforward to show that Equation (4) simplifies to Equation (1), under the assumption that ε_{ij} and ε_{ik} are both idiosyncratic errors.

[4] We omit reporting the coefficients on CRT score for simplicity. However, we note that the coefficient on CRT score is statistically significant and of the expected sign in all analyses.

[5] 'Between subjects' means that the comparison is made between participants who saw one treatment, and participants who saw a different treatment. This distinguished the analysis from 'within subjects', where participants see both treatments.

for the effect of the presentation of unit prices alongside the pricing schemes, by comparing performance in Stage 4 with performance in Stage 3 on otherwise identical choice tasks. In this case, the outcome variables are re-specified as the difference between the value in Stage 4 and the value in Stage 3 for the identical task. This provides an answer to the third research question.

In Stages 3 and 4, where participants could choose from as many of the pricing schemes as they wished, some participants clearly misunderstood one or more of the choice tasks. Those participants appear to have selected options as if each of the pricing schemes were independent. That is, they may have mistakenly *optimised independently for each pricing scheme* they were presented with in a single choice task, instead of *optimising across all of the available pricing schemes*. This mistaken approach leads to substantial negative welfare. Therefore, in the analysis of each decision round, we exclude the small number of participants (between 15 and 23, depending on the task) who had substantial negative welfare in that round.[6]

As the Stage 1 results (described in the following section) demonstrate, not all participants can successfully optimise in even the simplest choice task. As a robustness check, we re-run all analyses, limiting the sample to participants who successfully optimised in the first round of Stage 1. Our results are mostly not sensitive to this change, so we report the results in the following section for the larger sample, with most of the results based on the smaller sample included in Appendix A.

3. Results and Discussion

Prior to presenting the detailed results, we note that in Stages 1 to 3, we tested the significance of the framing of discounts for Schemes 2, 7 and 8. Specifically, we tested for a difference between discounts that were labelled "Good value" and those that were unlabelled, and for a difference between discounts that were presented in absolute ECU terms (save X ECUs) and discounts that were presented in relative terms (save X%). In only three of the 30 comparisons[7] was the difference weakly statistically significant ($p<0.1$), but there was no discernible pattern, and none of the levels of statistical significance achieved a p-value of 0.05 or less. We conclude

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[6] In practice, this involved excluding participants who purchased more than 20 units of the fictitious good in total, since the 21st unit had a zero 'Buy Back Value', and the 22nd and subsequent units had negative 'Buy Back Values'.

[7] Each comparison involved one of the regression models from Tables 4 to 6, but with the inclusion of two additional treatment variables, for labelling and relative discounting respectively.

that there is no evidence for differences in results based on the framing of discounts, and we therefore combine all framings together in the analysis.

The results from Stage 1 are summarised in Table 4. The first column shows the proportion of participants who chose optimally. For the simplest pricing scheme (Scheme 1), where participants were presented with a single price per unit and asked to optimise, 81.7 percent of participants selected the optimal purchase quantity (as shown in the first column). The second column shows the average welfare loss, for all participants (including those who optimised, for whom the welfare loss is zero). On average, participants suffered a 6.5 percent welfare loss with Scheme 1, relative to the welfare they would have received by choosing the optimal quantity. Interestingly, when the price was discounted from the full price (Scheme 2), fewer participants (76.7 percent) selected the optimal quantity, although the average welfare loss (6.5 percent) was essentially the same.

The third column compares the optimality of decision making between each pricing scheme and Scheme 1. As noted earlier, this is the constant term in a regression of the difference in optimality between the two pricing schemes, controlling for the participants' cognitive reflection test results and the prices that participants observed in Scheme 1 and the other pricing scheme. The constant term represents how much more likely (in absolute probability terms) participants were to choose optimally in the other pricing scheme than in Scheme 1, on average. Thus, negative numbers indicate that the participants were less able to choose optimally in the other pricing scheme than in Scheme 1. The fourth column shows analogous results for the average welfare loss, where the constant term represents how much greater the welfare loss was in Scheme 1 than in the other pricing scheme (and where a negative number represents a greater welfare loss for the other pricing scheme than for Scheme 1).

Table 4: Stage 1 Experimental Results

Pricing Scheme	Proportion of Optimal Choices	Average Welfare Loss	Comparison with Most Optimal	
			Optimal Choice	Welfare Loss
Scheme 1: "Good Value" (*Anchor, full price*)	81.7%	6.5%	N/A	N/A
Scheme 2: "Special" (*20% discount from anchor price*)	76.7%	6.5%	0.003	2.556
Scheme 3: "Extra Saver" (*5-unit block pricing with 25% discount*)	26.7%	21.9%	-0.852***	-16.43***
Scheme 4: "Great Prices" (*Buy 3 get 1 free*)	26.1%	18.5%	-0.592***	-13.72***
Scheme 6: "Club Discount" (*Two-part pricing with 15% discount*)	32.8%	11.6%	-0.456***	-17.89***
Scheme 7: "Good Value" for 3-packs (*Anchor, full price for 3-packs*)	50.6%	18.6%	-0.614***	-13.68***

N.B. The first column shows the proportion of participants who selected the optimal quantity. The second column shows the average loss of welfare (in relative terms), in comparison with the welfare that could be obtained from choosing the optimal pricing scheme and quantity. The third and fourth columns show the constant terms from regressions on the difference between the results of that round and the most optimal round (Stage 1, Round 1) for optimal choice (Column 3) and the extent of welfare loss (Column 4), controlling for the cognitive reflection test results and the prices the participants were presented with; * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

For Scheme 2, these differences proved to be small and statistically insignificant, as shown in the final two columns of Table 4. For every other pricing scheme in Stage 1, there are statistically significant deviations from optimal behaviour. For Schemes 3 to 6, less than one-third of participants chose the optimal quantity, and the average welfare loss relative to the simplest choice task (Scheme 1) ranged from 11.6 percent to 21.9 percent. The differences in optimality when compared with Scheme 1 were highly statistically significant, implying a lower probability of choosing optimally of between 45.6 and 85.2 percentage points, and average welfare losses between 13.7 and 17.9 percent, after controlling for prices and the cognitive reflection test. For example, for Scheme 3, after controlling for prices and performance in the cognitive reflection test, participants were on average 85.2 percentage points less likely to choose optimally than they were for Scheme 1, and the average welfare loss was 16.43 percentage points greater than for Scheme 1.

The results for Scheme 7, which was simple pricing of three-unit packs, were slightly better, with 50.6 percent of participants selecting the optimal quantity. However, the average welfare loss was similar to the other pricing schemes, suggesting that participants who did not chose optimally in Scheme 7 performed worse on average in Scheme 7 than for the other pricing schemes. These results are highly statistically significant.

The equivalent results, limited to participants who successfully optimised for Scheme 1 (which we refer to as Stage 1 Round 1 Optimisers), are included in Appendix A, Table A1. When the sample is limited to those optimisers only, the proportion selecting optimally is much higher, and the average welfare loss is lower. However, controlling for prices and the cognitive reflection test, the difference in optimality between each scheme and Scheme 1 is uniformly larger than for the full sample. This reflects that participants who scored higher on the CRT are also more likely to optimise in the simplest decision than those who scored lower on the CRT.

The results from Stage 2 are summarised in Table 5. In Stage 2, participants were presented with multiple pricing schemes, but could purchase from only one scheme. In both cases, less than half of participants chose the optimal quantity, and the average welfare loss relative to the simplest decision task (Stage 1 Round 1) was between 12 and 15 percent. This suggests decision behaviour is closer to optimal than when the more complex pricing schemes were offered alone (see Table 4). This may be because some participants were put off by the inclusion of more complex pricing strategies, and chose to purchase from the simplest of the available pricing schemes (particularly Scheme 2) – of the 180 participants, 114 selected only from Scheme 2 in Round 1 of Stage 2, and 40 selected only from Scheme 2 in Round 2 of Stage 2. The equivalent results to Table 5, limited to Stage 1 Round 1 Optimisers, are included in Appendix A, Table A2.

Table 5: Stage 2 Experimental Results

Pricing Schemes	Proportion of Optimal Choices	Average Welfare Loss	Comparison with Most Optimal	
			Optimal Choice	Welfare Loss
Schemes 2,6,7,12	31.7%	14.9%	-0.316***	-13.93***
Schemes 2,6,8,12	47.8%	12.8%	-0.392***	-14.18***

N.B. The first column shows the proportion of participants who selected the optimal pricing scheme and quantity. The second column shows the average loss of welfare (in relative terms), in comparison with the welfare that could be obtained from choosing the optimal pricing scheme and quantity. The third and fourth columns show the constant terms from regressions on the difference between the results of that round and the most optimal round (Stage 1, Round 1) for optimal choice (Column 3) and the extent of welfare loss (Column 4), controlling for the cognitive reflection test results and the prices the participants were presented with; * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

The results from Stage 3 are summarised in Table 6. In this stage, participants choose quantities to purchase from multiple pricing schemes simultaneously, making the choice task substantially more complex than in Stage 2. The proportions of participants selecting the optimal quantities across all pricing schemes varied from 10.0 percent to 36.4 percent. These were statistically significantly lower than in the simplest decision task (Round 1 of Stage 1). The average welfare loss ranged from 14.1 to 21.1 percentage points. The welfare loss was mostly statistically significant, but not in every round of this stage. However, when the sample is limited to Stage 1 Round 1 Optimisers (as shown in Appendix, Table A3), the differences in welfare loss attained a much higher degree of statistical significance, with six out of eight differences significant at $p<0.01$, and all eight differences significant at $p<0.1$.

Table 6: Stage 3 Experimental Results

Pricing Schemes	Proportion of Optimal Choices	Average Welfare Loss	Comparison with Most Optimal	
			Optimal Choice	Welfare Loss
Schemes 3,6,7,12	20.0%	17.5%	-0.652***	-8.000
Schemes 4,6,7,12	21.6%	21.1%	-0.510***	-12.02**
Schemes 2,3,6,7,12	10.0%	16.7%	-0.745***	-9.968**
Schemes 2,4,6,7,12	17.8%	17.1%	-0.597***	-10.68*
Schemes 3,6,8,12	23.0%	17.1%	-0.900***	-15.50***
Schemes 4,6,8,12	36.4%	16.8%	-0.887***	-25.13***
Schemes 2,3,6,8,12	28.0%	14.6%	-0.870***	-7.224
Schemes 2,4,6,8,12	31.2%	14.1%	-0.755***	-4.898

N.B. The first column shows the proportion of participants who selected the optimal pricing scheme(s) and quantity. The second column shows the average loss of welfare (in relative terms), in comparison with the welfare that could be obtained from choosing the optimal pricing scheme and quantity. The third and fourth columns show the constant terms from regressions on the difference between the results of that round and the most optimal round (Stage 1, Round 1) for optimal choice (Column 3) and the extent of welfare loss (Column 4), controlling for the cognitive reflection test results and the prices the participants were presented with; * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table 7 compares the results from Rounds 1 to 4 of Stage 3 with the results from Rounds 5 to 8 of that stage. The differences test the effect of discounting the three-unit pack of the fictitious good on the optimising behaviour of participants. Few of the differences are statistically significant, and there is weak evidence that the welfare loss is larger when the three-unit packs are not discounted, while there is no consistent pattern in the statistical significance of the results in terms of the probability that a participant chooses the optimal consumption bundle. This suggests that discounting of the three-unit pack in itself likely has no significant effect on the optimality of the participants' choices. The results were similar when restricted to Stage 1 Round 1 Optimisers (data not shown).

Table 7: Test of Discounting of Three-unit Packs on Optimality of Choices

Pricing Schemes (with Scheme 7)	Comparison with Pricing Schemes (with Scheme 8)		Comparison with Pricing Schemes (with Scheme 8) (for Stage 1 Round 1 Optimisers)	
	Optimal Choice	Welfare Loss	Optimal Choice	Welfare Loss
Schemes 3,6,12	0.372***	3.474	-0.355**	6.478
Schemes 4,6,12	-0.004	7.070	0.012	12.837**
Schemes 2,3,6,12	0.086	0.668	-0.056	6.844
Schemes 2,4,6,12	0.165	3.930	-0.170	6.025

N.B. The first and second columns show the constant terms from regressions on the difference between the results of that round in Stage 3 and the equivalent round later in Stage 3 that replaces Pricing Scheme 7 with Pricing Scheme 8 for optimal choice (Column 1) and the extent of welfare loss (Column 2), controlling for the cognitive reflection test results and the prices the participants were presented with; the third and fourth columns show the equivalent coefficients, with the sample limited to participants who chose the optimal allocation in Stage 1 Round 1; * $p<0.1$; ** $p<0.05$; *** $p<0.01$. N.B.

In Stage 4, we tested the significance of the framing of unit prices. Specifically, we tested for a difference in results between a unit price based on mL and a unit price based on L. In none of the comparisons was the difference statistically significant ($p>0.1$ in all comparisons). We conclude that there is no evidence for differences in results based on the framing of unit prices, and we therefore combine both framings together in the analysis of Stage 4.

The results from Stage 4 are summarised in Table 8, with comparisons with Round 1 of Stage 1. This stage had the same setup as Stage 3, but participants were additionally presented with unit prices for each pricing scheme. The proportions of participants selecting the optimal quantities across all pricing schemes varied from 16.9 percent to 40.5 percent, and were statistically significantly lower than in the simplest choice task (Round 1 of Stage 1). The average welfare loss ranged from 13.8 to 19.0 percentage points, and were statistically significantly higher than in the simplest choice task (Round 1 of Stage 1). The equivalent results to Table 8, limited to Stage 1 Round 1 Optimisers, are included in Appendix A, Table A4.

Table 8: Stage 4 Experimental Results

Pricing Schemes	Proportion of Optimal Choices	Average Welfare Loss	Comparison with Most Optimal	
			Optimal Choice	Welfare Loss
Schemes 3,6,7,12	25.2%	19.0%	-0.679[***]	-16.13[***]
Schemes 2,3,6,7,12	16.9%	15.3%	-0.742[***]	-18.18[***]
Schemes 3,6,8,12	36.5%	14.4%	-0.757[***]	-13.34[***]
Schemes 2,3,6,8,12	40.5%	13.8%	-0.938[***]	-12.52[**]

N.B. The first column shows the proportion of participants who chose the optimal pricing scheme(s) and quantity. The second column shows the average loss of welfare (in relative terms), in comparison with the welfare that could be obtained from choosing the optimal pricing scheme and quantity. The third and fourth columns show the constant terms from regressions on the difference between the results of that round and the most optimal round (Stage 1, Round 1) for optimal choice (Column 3) and the extent of welfare loss (Column 4), controlling for the cognitive reflection test results and the prices the participants were presented with; [*] $p<0.1$; [**] $p<0.05$; [***] $p<0.01$.

Table 9 compares the results from Stage 4 with the results from the same sets of pricing schemes from Stage 3. This demonstrates the impact of including unit prices on the optimality of participants choices. Only one of the differences is statistically significant, suggesting that presenting participants with unit prices makes little difference to the optimality of the participants' choices, in the context of multiple pricing schemes. The results were similar when restricted to Stage 1 Round 1 Optimisers (data not shown).

Table 9: Test of Unit Prices on Optimality of Choices

Pricing Schemes	Comparison with Stage 3		Comparison with Stage 3 (Stage 1 Round 1 Optimisers)	
	Optimal Choice	Welfare Loss	Optimal Choice	Welfare Loss
Schemes 3,6,7,12	0.042	-2.898	-0.042	2.847
Schemes 2,3,6,7,12	-0.095	2.850	0.147	5.723
Schemes 3,6,8,12	-0.033	-2.012	-0.024	-2.182
Schemes 2,3,6,8,12	-0.117	-1.768	-0.359	-12.52[**]

N.B. The first and second columns show the constant terms from regressions on the difference between the results of that round in Stage 4 and the equivalent round in Stage 3 for optimal choice (Column 1) and the extent of welfare loss (Column 2), controlling for the cognitive reflection test results and the prices the participants were presented with; the third and fourth columns show the equivalent coefficients, with the sample limited to participants who chose the optimal allocation in Stage 1 Round 1; [*] $p<0.1$; [**] $p<0.05$; [***] $p<0.01$.

An alternative (and less conservative) approach to investigating the effect of unit prices on optimality is to look at the proportion of participants who chose the optimal pricing scheme,[8] whether or not they chose the optimal quantity as well. Table 10 compares the results from Stage 4 with the results from the same sets of pricing schemes from Stage 3, but in terms of whether participants chose the optimal scheme. In this case, the results are suggestive that unit prices improve the optimality of decision-making, with more optimal decision making in Stage 4 than in Stage 3, with two of the four comparisons being statistically significant (at $p<0.1$). The results were similar when restricted to Stage 1 Round 1 Optimisers (data not shown).

Table 10: Alternative Test of Unit Prices on Optimality of Choices

Pricing Schemes	Proportion of Optimal Choices		Comparison between Stages
	Stage 3	Stage 4	
Schemes 3,6,7,12	64.5%	69.9%	0.255[*]
Schemes 2,3,6,7,12	46.9%	46.3%	0.163
Schemes 3,6,8,12	54.1%	69.8%	0.321[**]
Schemes 2,3,6,8,12	51.3%	62.0%	0.171

N.B. The first two columns show the proportion of participants who chose the optimal pricing scheme in Stages 3 and 4 respectively. The third column shows the constant term from a regression on the difference between the results of that round in Stage 4 and the equivalent round in Stage 3 for the alternative measure of optimal choice, controlling for the cognitive reflection test results and the prices the participants were presented with; [*] $p<0.1$; [**] $p<0.05$; [***] $p<0.01$.

4. Conclusion

This report outlined the methods and results of an investigation into how complexity affects consumers' decision making. The results were based on laboratory experiments conducted in the Waikato Experimental Economics Laboratory. Specifically we investigated three research questions:

1. How are consumer purchasing decisions (or outcomes) in a retail grocery context (i.e., supermarkets) influenced by the existence of multiple discounting schemes, and does the existence of different schemes lead to a reduction in consumer welfare compared to pricing with fewer, or no schemes?;

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[8] That is, whether the participant chose to purchase one or more units from the scheme offering the lowest unit price.

2. When consumers compare the same product across pack sizes, is their ability to compare affected by whether one is on promotion or not (and the other option is not)?; and

3. Could displaying unit prices mitigate some of the effects of the above? (if there are any effects).

In relation to the first research question, it is clear that the existence of multiple discounting schemes does induce suboptimal decision making on the part of consumers, and this sub-optimality does not depend on the way that discounts are framed. In Stages 2 and 3 of the experiment, participants were statistically significantly less likely to choose the optimal consumption bundle, and the resulting consumer surplus was statistically significantly lower on average. However, it may be that more complicated pricing schemes (such as buy three, get one free) are driving this result rather than the multiplicity of pricing schemes *per se*. The results of Stage 2 and Stage 3 are similar to those in Stage 1 when the more complicated pricing schemes were the only scheme available to the participants. Further research may be required to explore this mechanism in more detail.

In relation to the second research question, it does not appear that the package size makes a difference. Research participants' decisions were significantly less optimal when they were faced with a purchase decision based on three-unit packs in Stage 1 of the experiment. There was weak evidence that discounting of three-unit packs *decreased* the average welfare loss, but made no statistically significant difference to the probability of participants choosing the optimal consumption bundle in Stage 3 of the experiment. Further research may be required in order to more definitively answer this research question.

In relation to the third research question, there is weak evidence that displaying unit prices mitigates the effects of multiple discounting schemes on the optimality of consumer decision-making. The difference in results between Stages 3 and 4 of the experiment were not statistically significant, except in some cases in terms of whether participants chose the optimal scheme (but not necessarily the optimal quantity within the scheme). Our results demonstrate that under the most complex decision-making conditions, where there are multiple pricing schemes and the most complex pricing schemes are included, unit prices do not universally improve the optimality of decision-making. We are unable to determine whether unit prices might mitigate one or other of the complexity or multiple schemes alone. However, if they did mitigate either complexity or multiple schemes alone, we would expect them to also mitigate

somewhat the combination of the two, which we did not observe. Also, other ways of displaying unit prices (other than those tested in these experiments) might have different effects.

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Appendix A

Table A1: Stage 1 Experimental Results, for Stage 1 Round 1 Optimisers

Pricing Scheme	Proportion of Optimal Choices	Average Welfare Loss	Comparison with Most Optimal	
			Optimal Choice	Welfare Loss
Scheme 1: "Good Value" (*Anchor, full price*)	100.0%	0.0%	N/A	N/A
Scheme 2: "Special" (*20% discount from anchor price*)	87.8%	1.0%	0.053	-2.285
Scheme 3: "Extra Saver" (*5-unit block pricing with 25% discount*)	29.9%	17.5%	1.186***	-22.73***
Scheme 4: "Great Prices" (*Buy 3 get 1 free*)	31.3%	11.3%	0.828***	-16.66***
Scheme 6: "Club Discount" (*Two-part pricing with 15% discount*)	38.8%	4.6%	0.607***	-21.18***
Scheme 7: "Good Value" for 3-packs (*Anchor, full price for 3-packs*)	57.8%	14.9%	0.890***	-18.16***

N.B. The first column shows the proportion of participants who selected the optimal quantity. The second column shows the average loss of welfare (in relative terms), in comparison with the welfare that could be obtained from choosing the optimal pricing scheme and quantity. The third and fourth columns show the constant terms from regressions on the difference between the results of that round and the most optimal round (Stage 1, Round 1) for optimal choice (Column 3) and the extent of welfare loss (Column 4), controlling for the cognitive reflection test results and the prices the participants were presented with; * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table A2: Stage 2 Experimental Results, for Stage 1 Round 1 Optimisers

Pricing Schemes	Proportion of Optimal Choices	Average Welfare Loss	Comparison with Most Optimal	
			Optimal Choice	Welfare Loss
Schemes 2,6,7,12	36.7%	9.5%	0.557***	-19.61***
Schemes 2,6,8,12	53.1%	9.7%	0.698***	-20.39***

N.B. The first column shows the proportion of participants who selected the optimal pricing scheme and quantity. The second column shows the average loss of welfare (in relative terms), in comparison with the welfare that could be obtained from choosing the optimal pricing scheme and quantity. The third and fourth columns show the constant terms from regressions on the difference between the results of that round and the most optimal round (Stage 1, Round 1) for optimal choice (Column 3) and the extent of welfare loss (Column 4), controlling for the cognitive reflection test results and the prices the participants were presented with; * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table A3: Stage 3 Experimental Results, for Stage 1 Round 1 Optimisers

Pricing Schemes	Proportion of Optimal Choices	Average Welfare Loss	Comparison with Most Optimal	
			Optimal Choice	Welfare Loss
Schemes 3,6,7,12	24.0%	13.6%	0.962***	-21.92***
Schemes 4,6,7,12	26.0%	16.9%	0.736***	-20.42***
Schemes 2,3,6,7,12	12.3%	11.5%	1.034***	-14.64***
Schemes 2,4,6,7,12	21.7%	13.1%	0.923***	-21.41***
Schemes 3,6,8,12	25.7%	13.3%	1.102***	-18.54***
Schemes 4,6,8,12	41.5%	12.1%	1.198***	-26.86***
Schemes 2,3,6,8,12	30.5%	10.0%	1.031***	-8.475**
Schemes 2,4,6,8,12	34.9%	8.9%	0.957***	-7.609*

N.B. The first column shows the proportion of participants who selected the optimal pricing scheme(s) and quantity. The second column shows the average loss of welfare (in relative terms), in comparison with the welfare that could be obtained from choosing the optimal pricing scheme and quantity. The third and fourth columns show the constant terms from regressions on the difference between the results of that round and the most optimal round (Stage 1, Round 1) for optimal choice (Column 3) and the extent of welfare loss (Column 4), controlling for the cognitive reflection test results and the prices the participants were presented with; * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Table A4: Stage 4 Experimental Results, for Stage 1 Round 1 Optimisers

Pricing Schemes	Proportion of Optimal Choices	Average Welfare Loss	Comparison with Most Optimal	
			Optimal Choice	Welfare Loss
Schemes 3,6,7,12	28.6%	13.9%	0.998***	-20.38***
Schemes 2,3,6,7,12	16.2%	11.1%	1.038***	-22.32***
Schemes 3,6,8,12	40.0%	9.7%	1.041***	-15.24***
Schemes 2,3,6,8,12	44.2%	9.2%	1.171***	-11.76**

N.B. The first column shows the proportion of participants who chose the optimal pricing scheme(s) and quantity. The second column shows the average loss of welfare (in relative terms), in comparison with the welfare that could be obtained from choosing the optimal pricing scheme and quantity. The third and fourth columns show the constant terms from regressions on the difference between the results of that round and the most optimal round (Stage 1, Round 1) for optimal choice (Column 3) and the extent of welfare loss (Column 4), controlling for the cognitive reflection test results and the prices the participants were presented with; * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

Appendix B

Welcome to the Individual Consumption Decision Experiment. This is an experiment to gain an understanding of individual consumption decisions when facing a variety of promotional offerings.

If you read the following instructions carefully, you can, depending on your decisions and a random variable, earn a considerable amount of money. It is therefore very important that you read these instructions with care.

The instructions we have distributed to you are solely for your private information. **It is prohibited to communicate with the other participants during the experiment.** Should you have any questions please ask us. If you violate this rule, we shall have to exclude you from the experiment and from all payments.

During the experiment your entire earnings will be calculated in ECU (Experimental Currency Units). At the end of the experiment the total amount of ECU you have earned will be converted to dollars at the following rate: 108 ECU=$1

At the end of the experiment your entire earnings from the experiment will be immediately paid to you in cash.

In the experiment today, you will participate in 20 decision rounds. In each round, you will decide how many (if any) of the fictitious goods on offer you would like to purchase. In any given round, you will be presented a single item (1L volume of "stuff") and/or a 3-pack of the item. For each case, you will be presented one or more promotional offerings for the item(s). You must decide how many of the item(s) you want to purchase given the various promotional offerings. In some decision rounds, you may purchase via multiple promotional offerings, and in other rounds, you may only purchase via a single promotional offering. This information will be given to you on each decision screen.

The promotions on offer will be similar to the following (note, all prices throughout the experiment are expressed in ECU):

XXX per unit	Each unit you decide to purchase costs XXX ECU
Special: XXX per unit	Each unit you decide to purchase costs XXX ECU
Extra saver: 5 units for XXX single unit price ZZZ	Every bundle of 5 units purchased costs XXX ECU for those 5 units. Any additional units beyond increments of 5 costs ZZZ ECU.
Great Prices: XXX per unit Buy three, get one free	1 unit free for every 3 units purchased. The individual unit price is XXX ECU
Club Discount: 50 ECU initial fee After paying 50 ECU, each unit costs XXX ECU	Must pay 50 ECU for the right to purchase as many units as you like at the per unit price of XXX ECU

Earnings

In each round of the experiment, you must decide how many units of the item you want to purchase at a specified promotional offering. The experimenter will BUY BACK the units you purchase according to the following schedule.

Single Units	
Unit Purchased	**Buy Back Value**
1	400
2	380
3	360
4	340
5	320
6	300
7	280
8	260
9	240
10	220
11	200
12	180
13	160
14	140
15	120
16	100
17	80
18	60
19	40
20	20
21	0

The left column, labelled Unit Purchased, corresponds to the unit purchased in a given round. The right column, labelled Buy Back Value, presents the amount of ECU the experimenter will pay you for purchasing that unit.

For example, if you decide to purchase 4 units in a round, then the experimenter will pay you 400ECU for the 1st unit, 380ECU for the 2nd unit, 360ECU for the 3rd unit and 340 for the 4th unit. Therefore, for all 4 units, the experimenter will pay you 400+380+360+340=1480ECU.

Your earnings in a period are calculated as the difference you paid to purchase the unit(s) and the BUY BACK VALUE for the unit(s). To continue with the example above, suppose you bought 4 units for 300ECU each. Your earnings for this round are calculated as:

(400-300)+(380-300)+(360-300)+(340-300)=280ECU.

NOTE: Each round is independent. That means that whatever you decided to do in one round has no impact on any other round. More specifically, you start each round with zero units purchased, i.e. purchases from previous round(s) are ignored. For example, the first unit you purchase in any round will have a BUY BACK VALUE of 400ECU.

Even though you will participate in 20 decision rounds today, only 2 of those rounds will count towards your earnings. The computer will randomly select 2 of the 20 rounds. The sum of those two randomly selected rounds will be used to calculate your earnings for the experiment today.

The experiment will end when everyone has completed all 20 decision rounds. If you finish early, please wait quietly for others to finish. Subjects will be called one at a time to receive their experiment earnings privately.

Decision Example

Some framing may help in understanding the consumption decisions. When you state on a given decision screen that you want to consumer some quantity of units (for XXX price), this is analogous to putting these units in a shopping cart to be paid for at the register.

For example, the Great Prices offer is "buy three, get one free." If you want to get the free fourth unit, then you must enter four units on the decision screen. Representing this example in a shopping experience, you would put all four units in your cart and the cash register person would then allocate the appropriate prices, i.e. charge you the price for three units and zero price for the fourth.

Examples of decision screens are provided below (prices have been covered):

Unit purchased	Buy back value
1	400
2	380
3	360
4	340
5	320
6	300
7	280
8	260
9	240
10	220
11	200
12	180
13	160
14	140
15	120
16	100
17	80
18	60
19	40
20	20
21	0

Single units

3-packs

No. of single units

No. of 3-packs

Extra saver
5 units for

Single unit price 210 | 0 |

Good Value

per 3-pack | 0 |

Club discount

If you want to purchase any at this price, you
must first pay 50 for your club membership

9 per unit | 0 |

Club discount

If you want to purchase any at this price, you
must first pay 50 for your club membership

per 3-pack | 0 |

Instructions: In this round, you may choose to purchase unit(s) from any/all/none of the promotional offerings.

To finalize your decision and move to the next
round, please click the CONFIRM button. You
cannot change anything once it is confirmed.

Confirm

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