to have a lasting impact on most of the subjects and thus one would not expect a dramatic wealth effect.[24] However, Eeckhoudt and Schlesinger (2006) require that prudent and temperate people hold the specified preference relation no matter how trivial the stakes.

We have no other benchmark results to which we can compare our data for temperance. For prudence, our numbers seem to support the findings of Tarazona-Gomez, who measures the strength of the prudence effect within an EU-based setting and finds that her subjects were mostly prudent, but not very much so. Our results also support the empirical conclusions of Dynan (1993), who finds evidence of very weak prudence, using an EU-based methodology.

We think our results have implications that are much broader than many people initially realize. For example, in an EU framework, both CARA utility and CRRA utility are used with great frequency. Each of these utility forms always displays both prudence and temperance. But, to the extent that our results are not due to other behavioural effects, they would reject these classes of utility, since we find preferences to be somewhat intemperate. Likewise, the sometimes-used quadratic form of utility has both zero prudence and zero temperance, neither of which is supported by our experiment.

Similarly, non-EU theories should be cognizant of these higher order risk effects. The literature has developed alternative concepts for risk aversion, such as ambiguity aversion (see Schmeidler, 1989) and loss aversion (see Kahneman and Tversky, 1979). However, we are not aware of any efforts to extend these higher order risk effects.

Although we showed that our ten tasks would lead to the prudent choices or intemperate choices under CPT with parameters similar to Tversky and Kahneman (1992), not all individuals would be expected to have exactly the same preferences. Indeed, these parameters for CPT are calibrated to fit the average data in Tversky and Kahneman (1992). In addition to varying the CPT parameters, there also are many variations in the functional forms used for both the value function and the weighting function. Most of these are analysed in Stott (2006). Moreover, Köszegi and Rabin (2006) have recently come up with alternative ways to incorporate the reference point into these types of models.[25]

Given the importance of higher order risk effects for predicting certain types of behaviour, there is a need for future behavioural research. What would happen with different subjects in the laboratory; or what would happen if our lotteries were embedded into field experiments? Perhaps more temperate behaviour would be observed in a different type of experiment or if the stakes were much higher. To the extent that future endeavours have findings similar to ours, it would call for newer theoretical work to help explain the resulting behaviour and generate new testable hypotheses.

APPENDIX: SUBJECT DIRECTIONS, COMPREHENSION HANDOUT, AND VERSION 1

Experiment on decision making under uncertainty: higher order effects

Instructions: You are participating in a research study on decision making under uncertainty. At the end of the study you will be paid your earnings in cash and it is important that you understand how your decisions affect

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24. This is generally true for laboratory experiments studying risk aversion. See, for example, Deck, Lee, and Reyes (2008) and Post *et al.* (2008). As an extreme stakes effect, one can note the Mega Millions lottery jackpot of 6 March 2007, which was $390 million, was split equally between two winners. Given that the net payout on a lottery ticket is usually around 50 cents on the dollar, we might conclude these two winners were risk lovers. Yet, we doubt that either one of these two winners would have tossed a coin on the fair bet: "winner takes all".

25. Since using expected wealth as the reference point is also one possibility in Köszegi and Rabin (2006), our CPT results could also be interpreted as applying in at least one version of their setting.

your payoff. If you have questions at any point, please let a researcher know and someone will assist you. Otherwise, please do not talk during this study and please turn off all cell phones.

On the following sheets there is a series of 10 tasks. Once you have completed these sheets, one of the ten tasks will be randomly selected by rolling a ten-sided die to determine your payoff. Each task starts with a fixed amount of cash that includes the $5.00 participation payment that you are receiving and two additional items. The additional items will be cash or lotteries, and a coin toss will determine if you receive these items. A lottery has a 50% chance of having an amount of money added to your payoff and a 50% chance of that amount of money being subtracted from your payoff.

(5 | −5) represents the lottery in which you could have US$5.00 added to or subtracted from your payoff. How much money you would receive from the lottery will be determined by a spinner that is half green and half red. If the spinner stops on green, the amount will be added to your payoff, but if it lands on red, the amount will be subtracted from your payoff. You are welcome to inspect the coin, die, and spinner at any time.

In each task, you determine whether you prefer to receive the first additional item when the coin toss lands on *Heads* or *Tails*. You will also determine whether you prefer to receive the second item on the *Same* or *Different* outcome of the coin toss as the first item. There is only one coin toss, and you are deciding whether you want the two items combined (so that you receive both or neither) or the two items separated (so that you receive one or the other). If you receive two lotteries, there will be independent spins for each.

Your choice will not affect the expected value of the task, which is the average amount that you would be paid from going through the task many, many times. Please note that you cannot lose your own money or the $5.00 participation payment that you are receiving for completing this study.

PLEASE DO NOT CONTINUE UNTIL INSTRUCTED TO DO SO!

This page contains practice problems that will not impact your payoff in any way.

Practice #1) You will receive $20 +

(10 | −10) if the coin lands on *Heads* or (Tails) and $5.00 if the coin lands on the (Same) or *Different* outcome.

Suppose you made the indicated responses.

If your coin toss landed on Heads, your payoff would be _____.
If your coin toss landed on Tails and the spinner landed on Green, your payoff would be _____.
If your coin toss landed on Tails and the spinner landed on Red, your payoff would be _____.

Practice #2) You will receive $20 +

(10 | −10) if the coin lands on *Heads* or (Tails) and $5.00 if the coin lands on the *Same* or (Different) outcome.

Suppose you made the indicated responses.

If your coin toss landed on Heads, your payoff would be _____.
If your coin toss landed on Tails and the spinner landed on Green, your payoff would be _____.
If your coin toss landed on Tails and the spinner landed on Red, your payoff would be _____.

Practice #3) You will receive $15 +

(5 | −5) if the coin lands on (Heads) or *Tails* and $5.00 if the coin lands on the (Same or) *Different* outcome.

Suppose you made the indicated responses.

If your coin toss landed on Heads and the spinner landed on Green, your payoff would be _____.
If your coin toss landed on Heads and the spinner landed on Red, your payoff would be _____.
If your coin toss landed on Tails, your payoff would be _____.

Practice #4) You will receive $15 +

(5 | −5) if the coin lands on (Heads) or *Tails* and (10 | −10) if the coin lands on the *Same* or (Different) outcome.

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Suppose you made the indicated responses.

If your coin toss landed on Heads and the spinner landed on Green, your payoff would be _____.
If your coin toss landed on Heads and the spinner landed on Red, your payoff would be _____.
If your coin toss landed on Tails and the spinner landed on Green, your payoff would be _____.
If your coin toss landed on Tails and the spinner landed on Red, your payoff would be _____.

Once you have completed this sheet, please raise your hand so that an experimenter can check your responses and answer any questions you might have.

PLEASE DO NOT CONTINUE UNTIL INSTRUCTED TO DO SO!

These pages contain the ten decision tasks. One task will be randomly selected to determine your payoff.

Task #1) You will receive $30.00 +

(25 | −25) if the coin lands on *Heads* or *Tails* and $25.00 if the coin lands on the *Same* or *Different* outcome.

Task #2) You will receive $15 +

(5 | −5) if the coin lands on *Heads* or *Tails* and (5 | −5) if the coin lands on the *Same* or *Different* outcome.

Task #3) You will receive $12.50 +

$9.00 if the coin lands on *Heads* or *Tails* and (5 | −5) if the coin lands on the *Same* or *Different* outcome.

Task #4) You will receive $15 +

(9 | −9) if the coin lands on *Heads* or *Tails* and (1 | −1) if the coin lands on the *Same* or *Different* outcome.

Task #5) You will receive $12.50 +

(5 | −5) if the coin lands on *Heads* or *Tails* and $1.00 if the coin lands on the *Same* or *Different* outcome.

Task #6) You will receive $55.00 +

(25 | −25) if the coin lands on *Heads* or *Tails* and (25 | −25) if the coin lands on the *Same* or *Different* outcome.

Task #7) You will receive $10.50 +

$9.00 if the coin lands on *Heads* or *Tails* and (1 | −1) if the coin lands on the *Same* or *Different* outcome.

Task #8) You will receive $55.00 +

(5 | −5) if the coin lands on *Heads* or *Tails* and (45 | −45) if the coin lands on the *Same* or *Different* outcome.

Task #9) You will receive $12.50 +

$5.00 if the coin lands on *Heads* or *Tails* and (5 | −5) if the coin lands on the *Same* or *Different* outcome.

Task #10) You will receive $14.50 +

(9 | −9) if the coin lands on *Heads* or *Tails* and $1.00 if the coin lands on the *Same* or *Different* outcome.

Please review your answers to verify that everything is marked the way you want it to be. Please raise your hand when you are done, and an experimenter will approach you so that your payoff may be determined. Once you have rolled the die to determine which round will be used in calculating your payoff, you may not change your responses.

The remainder of this sheet is to be completed by an experimenter.

Number rolled _____.
Result of coin toss _____
Result of spinner (as necessary) _____.
Payoff _____.

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Experiment Related Materials

The directions were computerized and self-paced as was the comprehension quiz. Italicized headings were not observed by the participants.

Page 1 of the Directions:

You are participating in a research study on decision making under uncertainty. At the end of the study you will be paid your earnings in cash and it is important that you understand how your decisions affect your payoff. If you have questions at any point, please let a researcher know and someone will assist you. Otherwise, please do not talk during this study and please turn off all cell phones.

Page 2 of the Directions:

In this study there is a series of 38 tasks. Each task involves choosing between Option A and Option B. Once you have completed these tasks, <u>one</u> of the thirty-eight tasks will be randomly selected to determine your payoff.

Page 3 of the Directions:

Each option will involve amounts of money and possibly one or more 50-50 lotteries represented as a circle with a line through the middle. A 50-50 lottery means there is a 50% chance of receiving the item to left of the line and a 50% chance of receiving the item to the right of the line. For example, is a 50-50 lottery in which you would receive either $8 or $12, each with an equal chance. To determine the outcome of any 50-50 lottery, we will use a spinner. You are welcome to inspect the spinner at any point.

Page 4 of the Directions:

In some cases, one of the items in a 50-50 lottery may be another lottery. For example,
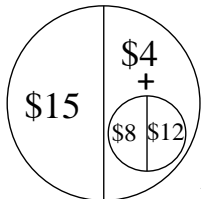
 is a 50-50 lottery where you receive either $15 or you receive $4 plus the 50-50 lottery .

Page 5 of the Directions:
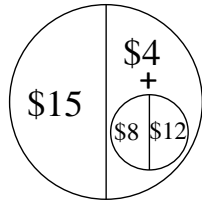
Continuing with the example, , there is a 50% chance that you would receive $15 in the big 50-50 lottery and that would be it. There is also a 50% chance that you would receive
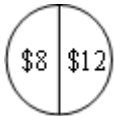
$4 + in the big 50-50 lottery. Conditional on this outcome for the big 50-50 lottery, you would then have a 50% chance of receiving an extra $8 and a 50% chance of receiving an extra $12 in addition to the $4. Therefore, the chance that you would end up with $4+$8 = $12 is $0.5 \times 0.5 = 0.25 = 25\%$. The chance that you would end up with $4+$12 = $16 is $0.5 \times 0.5 = 0.25 = 25\%$.

Page 6 of the Directions:
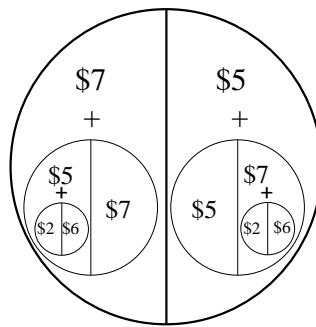
Let's look at a more complicated example. is 50-50 lottery where you
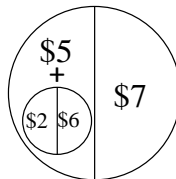
receive either $7 plus the 50-50 lottery or you receive $5 plus the 50-50 lottery
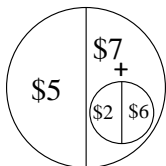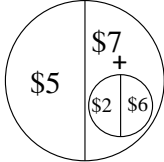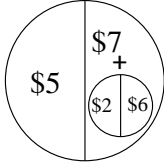
, both of which include an additional 50-50 lottery.
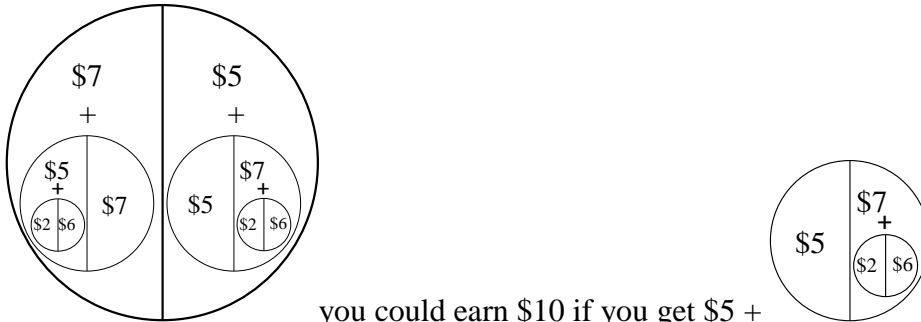
In [diagram] you could earn $10 if you get $5 + [diagram] in the big lottery and then earn $5 in the second lottery. This occurs with a 0.5 x 0.5 = 25% chance. Alternatively, you could earn $14 with a 37.5% chance. Notice that you could earn $14 by 1) earning $7 (in the big lottery) + $5 (in the middle lottery) +$2 (little lottery) which happens with a 0.5 x 0.5 x 0.5 = 12.5% chance or 2) earning $7 (in the big lottery) + $7 (in the middle lottery) which happens with a 0.5 x 0.5 = 25% chance, or 3) earning $5 (in the big lottery) + $7 (in the middle lottery) +$2 (little lottery) which happens with a 0.5 x 0.5 x 0.5 = 12.5% chance. Finally there are two ways that you could earn $18 which occurs with a 0.5 x 0.5 x 0.5 + 0.5 x 0.5 x 0.5 = 25% chance.

Comprehension Quiz Screen 1 (with correct answers added):

Comprehension Quiz Screen 2 (with correct answers added):

Standardized Consent Form

Consent to Participate in Paid BBRL Research Study

This study is being conducted for research purposes by Dr. Cary Deck at the University of Arkansas. Your participation in this study is voluntary and you are free to withdraw from the study at any point with no negative repercussions.

Description and Procedures: This is a research study about how people make decisions related to business. Specific directions regarding the decision tasks will be given to you once the study begins. The entire process is expected to last 90 minutes.

Payment: You may be paid for participating in this study. How much you will be paid will be explained in the directions you will be given once the study begins. You cannot lose any of the money you currently have. In order to be paid, you must sign the accompanying "Record of Participation Payment." That form will be given to the University of Arkansas accounting office as any money you are paid is considered taxable income. A copy may be kept by the researcher or the Behavioral Business Research Laboratory (BBRL).

Risks and Benefits: There are no known risks associated with this study. There are no benefits to participation beyond the monetary payment.

Video and Audio Recording: Your voice or image may be recorded and analyzed as part of this study. Any other use of your recording would require a separate approval from you.

Confidentiality: All information regarding your decisions will remain confidential to the extent allowed by law and University policy. Your responses and choices will not be associated with your name or other identifying information. Your participation (but not your responses or behavior) in this study will be recorded in the BBRL's database and may impact your eligibility for future BBRL studies.

Additional Information: X There is no additional information.
                                   ☐ Please see the addendum for additional information.

IRB Approval: This project has been reviewed by the Institutional Review Board at the University of Arkansas which oversees research involving human subjects. Any questions or concerns can be directed to Ro Windwalker at irb@uark.edu.

Voluntary Consent: By signing the accompanying Record of Participation Payment, swiping your ID card, or providing your name or ID number, you certify that you are at least 18 years of age and have read (or have had read to you) the preceding information and that you understand its content. Additionally, you certify that you are voluntarily participating in this study and that you have had all of your questions, including those regarding the risk and benefits of participation, satisfactorily answered.

A copy of this form will be given to you upon request. Further questions can be directed to Nidhi Dahiya at ndahiya@walton.uark.edu or by phone at 479-372-2153.

Record of Participation Payment

	Name	Signature	UAID# or SS# if nonUA	Payment
1				
2				
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24				
25				

Date	Researcher Signature	Total Expenditure

Graphical Presentation of all Tasks as presented to Subjects

Task	Option A	Option B
Paper 1 Output 1 Order 1	$20	$20 + $10
Paper 2 Output 2 Order 1	$2	$2 + $5

Paper 3
Output 13
Order 1

$2 + $10 $20 | $20

$25 | $27 + $-1 $1
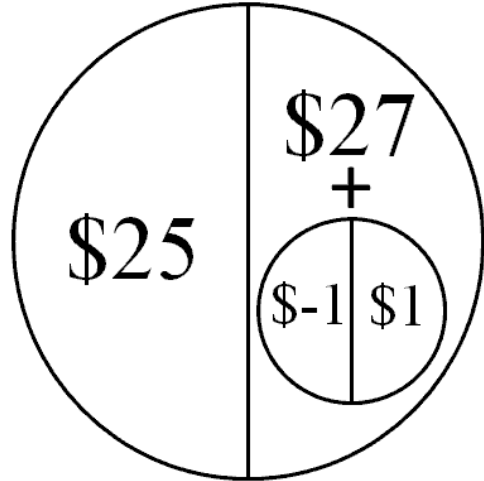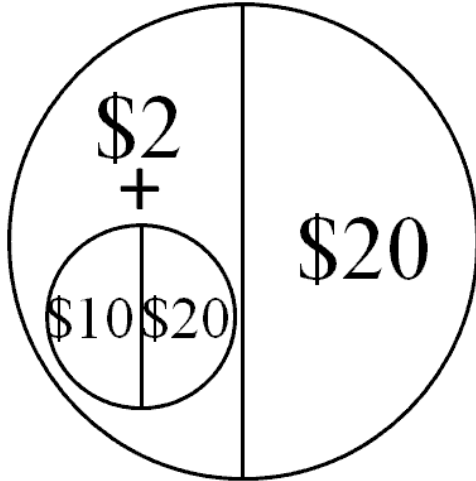
Paper 4
Output 3
Order 2

$5 | $10 + $5

$5 + $5 | $10
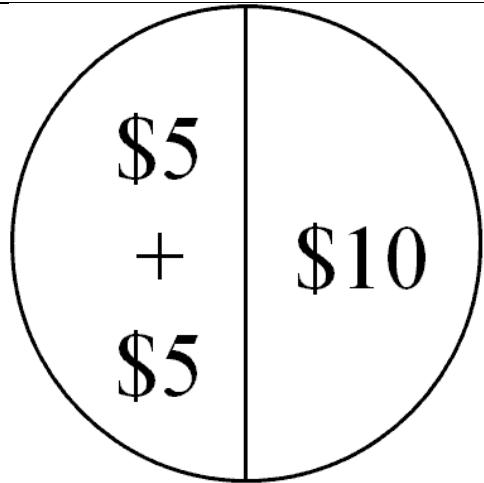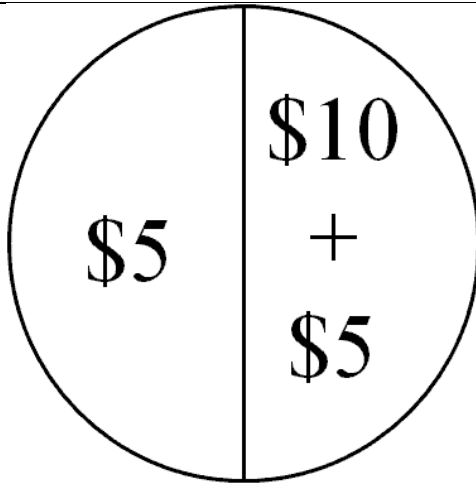
Paper 5
Output 4
Order 2

$2 | $4 + $8

$2 + $8 | $4
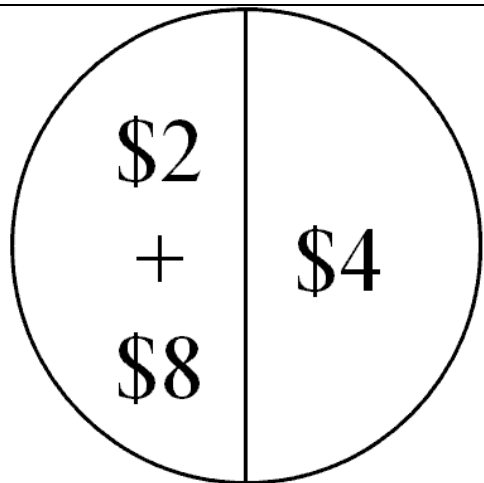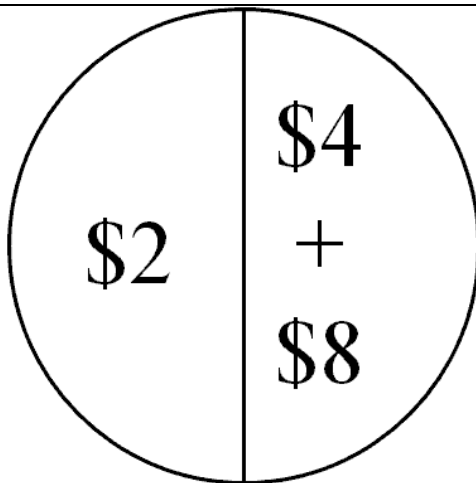
Paper 6
Output 5
Order 2

$10 | $15 + $5

$10 + $5 | $15
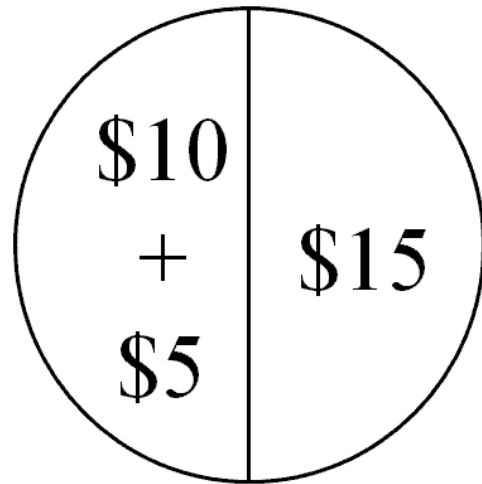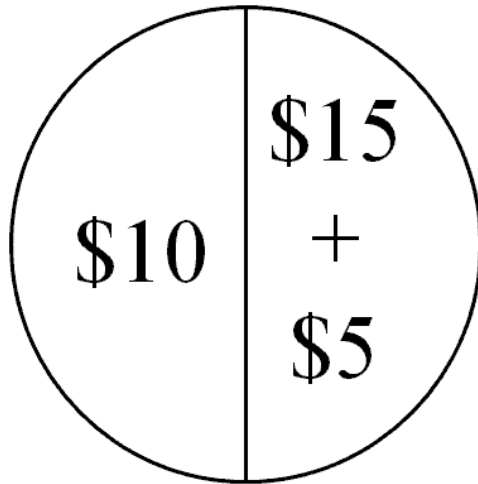
Paper 7
Output 6
Order 2

$2 | $4 + $3

$2 + $3 | $4
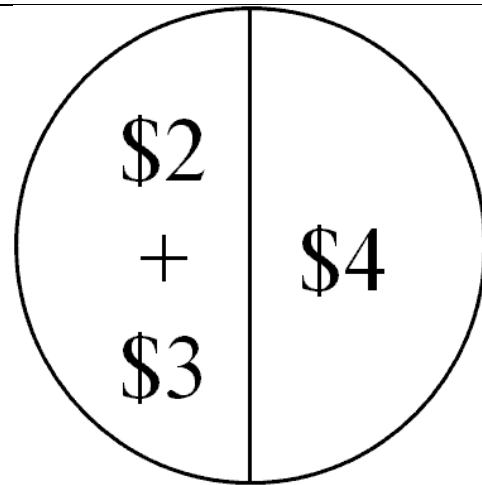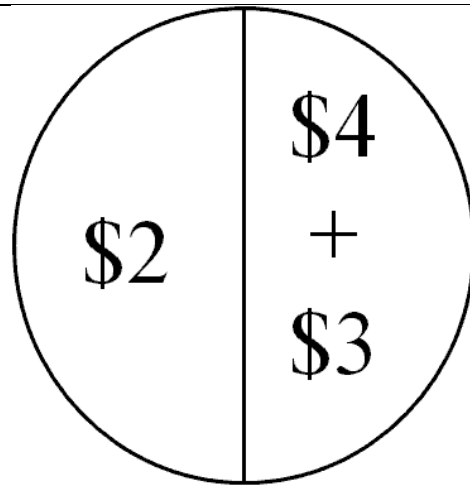
Paper 8
Output 7
Order 2

$20 | $40 + $30

$20 + $30 | $40
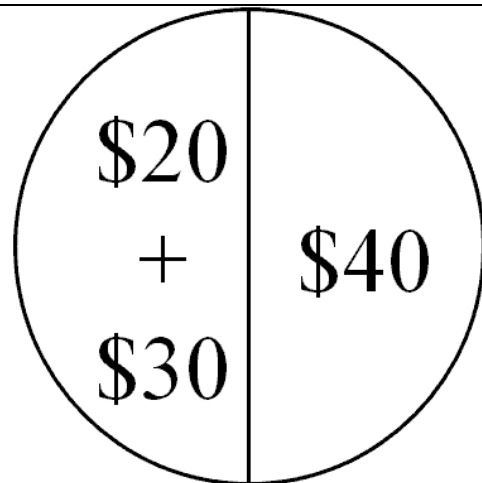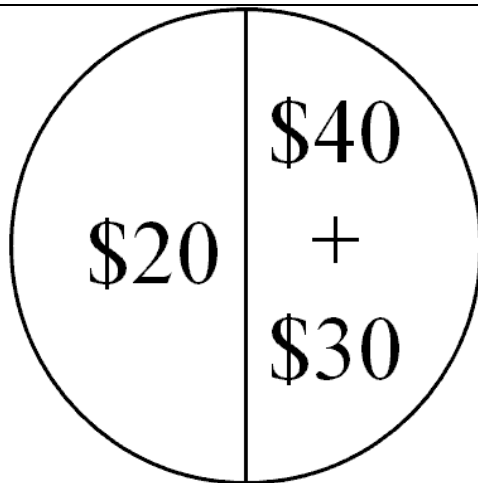
Paper 9
Output 32
Order 2

$4 | $10
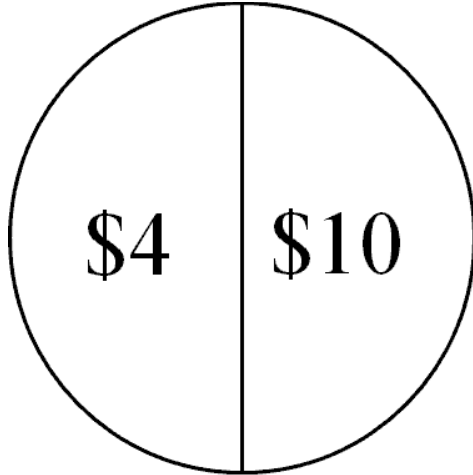
$7

Paper 10
Output 33
Order 2

$1 | $19
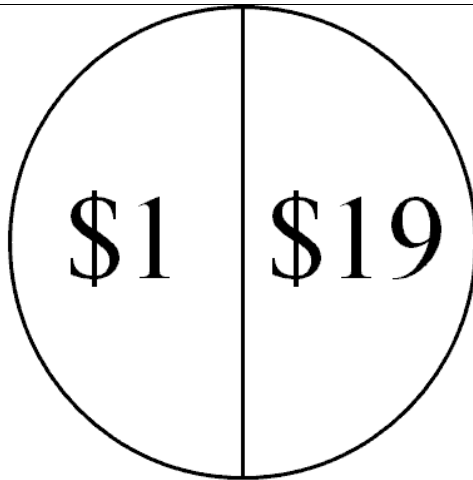
$10

Paper 11
Output 8
Order 3

$5
+
$-2 | $2 | $10

$5 | $10
+
$-2 | $2
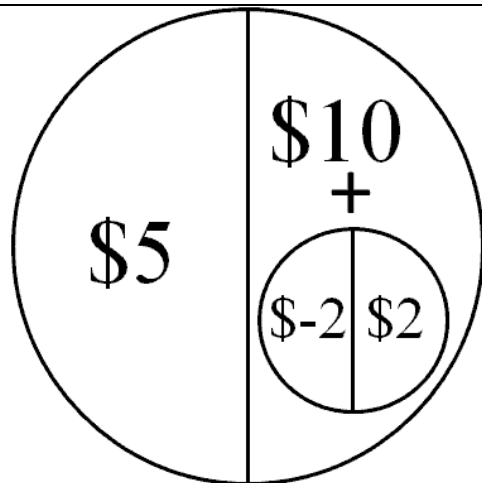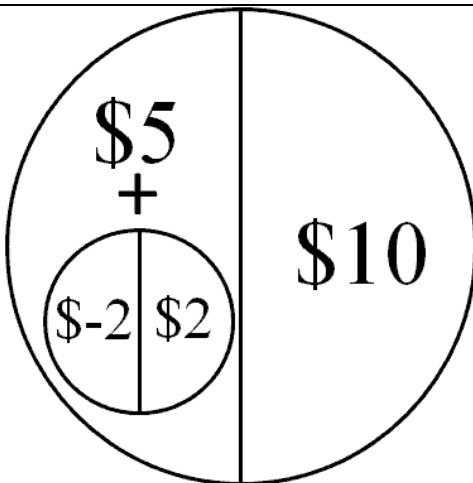
Paper 12
Output 9
Order 3

$10
+
$-4 | $4
$20

$20
+
$10
$-4 | $4
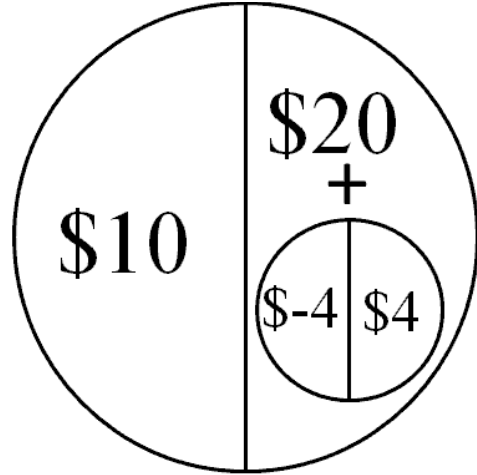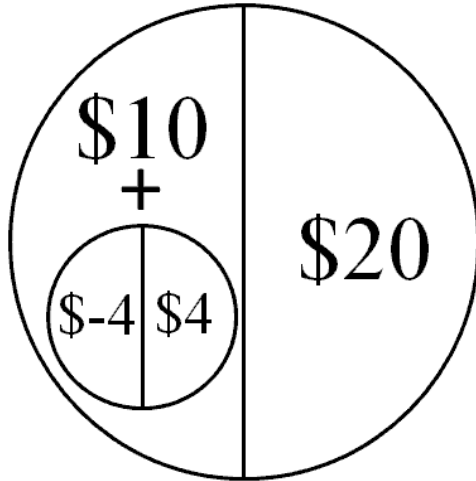
Paper 13
Output 10
Order 3

$5
+
$4 | $-4
$10

$10
+
$5
$4 | $-4
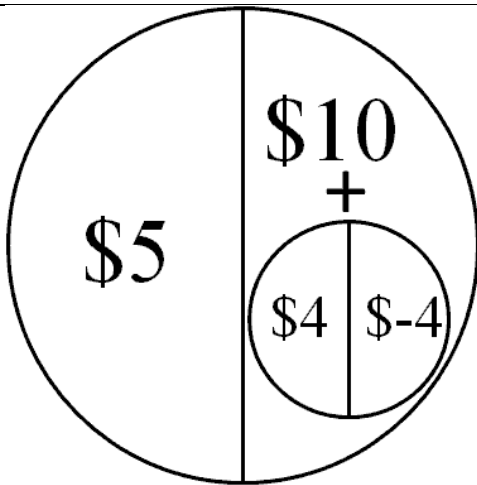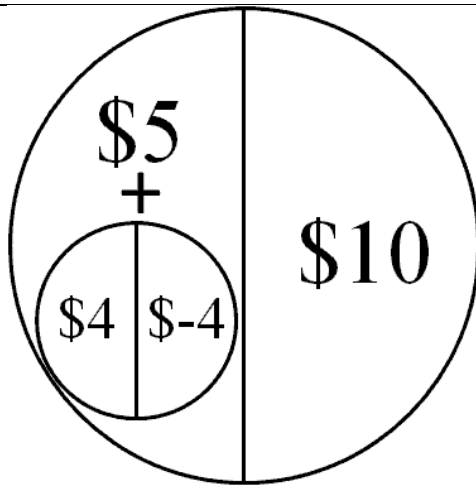
Paper 14
Output 11
Order 3

$2
+
$1 | $-1
$4

$4
+
$2
$1 | $-1
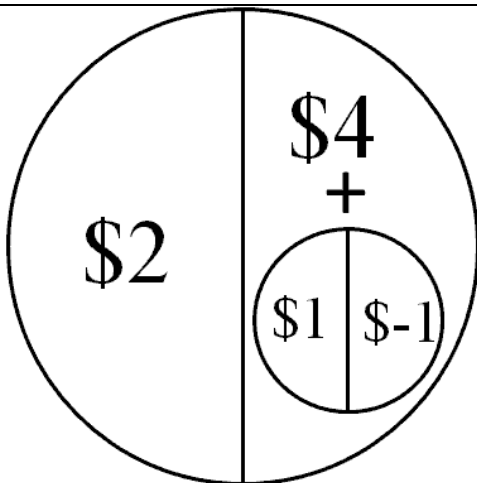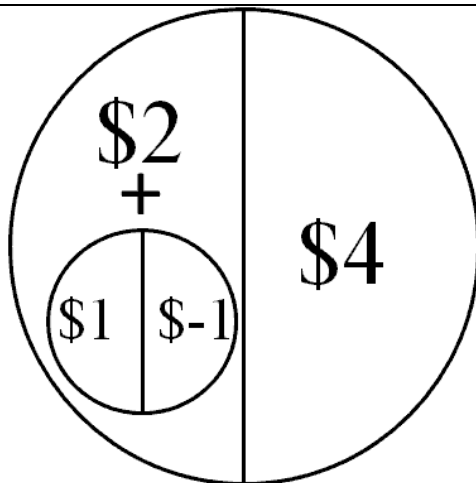
Paper 15
Output 12
Order 3

$20
+
$-10 | $10
$40

$40
+
$20
$-10 | $10
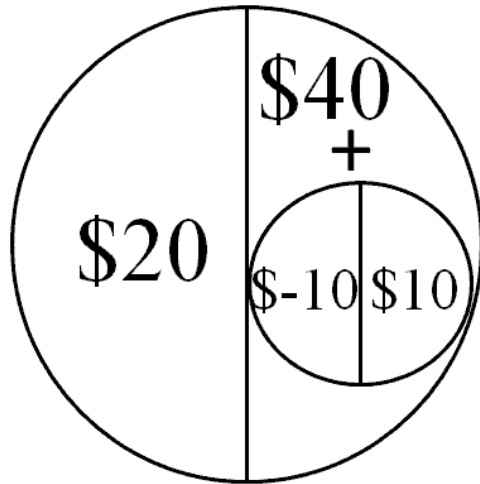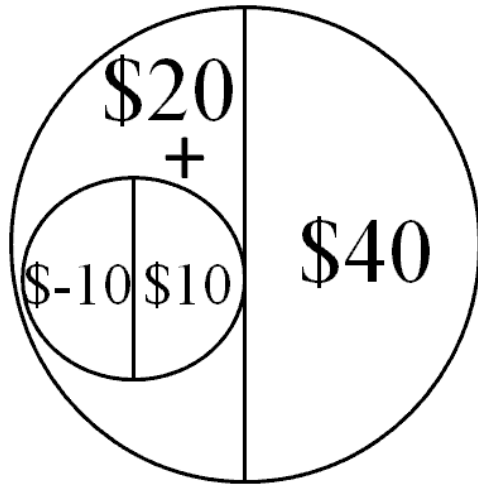
Paper 16
Output 34
Order 3

$8
+
$2 | $-2
$10

$10
+
$8
$2 | $-2
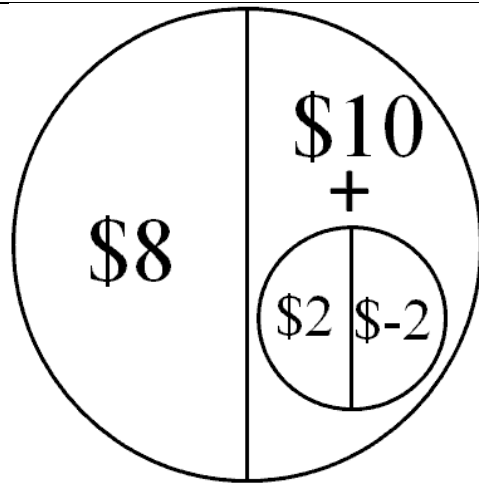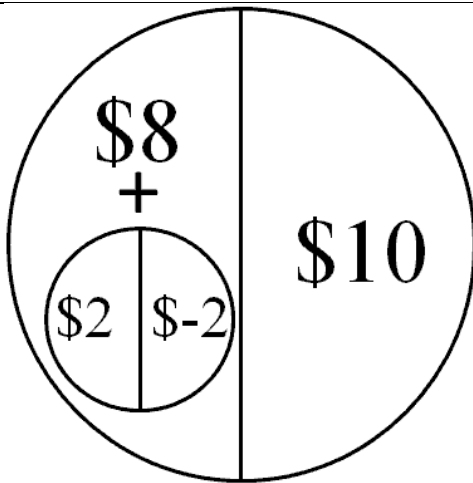
Paper 17
Output 35
Order 3

$12
+
$1 | $-1
$14

$14
+
$12
$1 | $-1
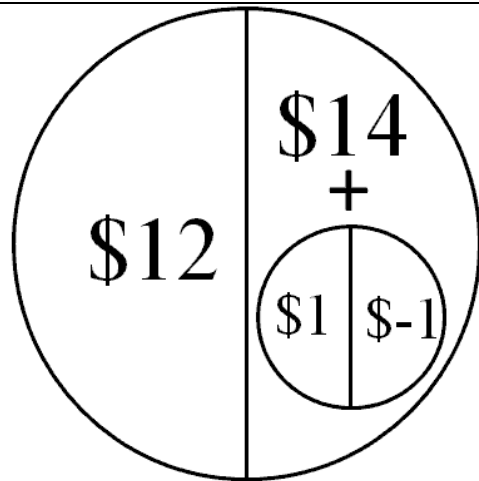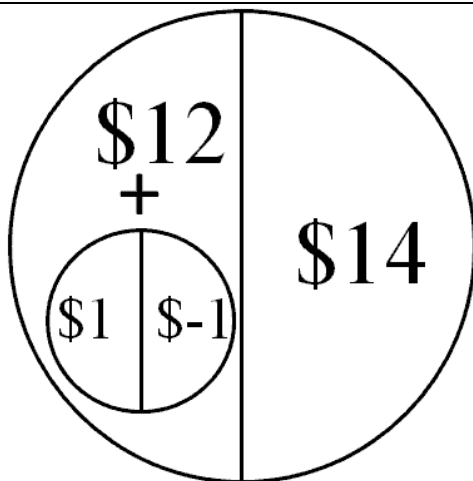
Paper 18
Output 14
Order 4

$14 | $20 $10 | $24
+   +
$14 | $20 $10 | $24

$10 | $24 $14 | $20
+   +
$14 | $20 $10 | $24
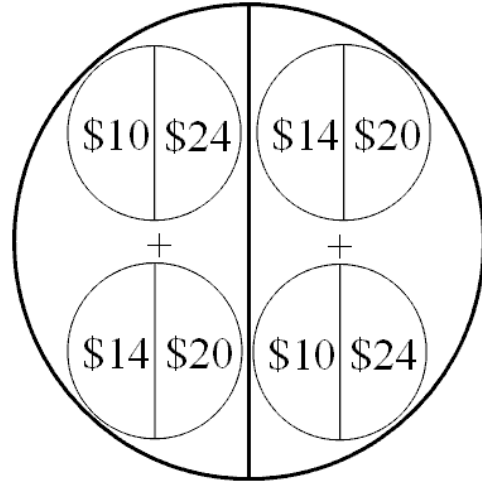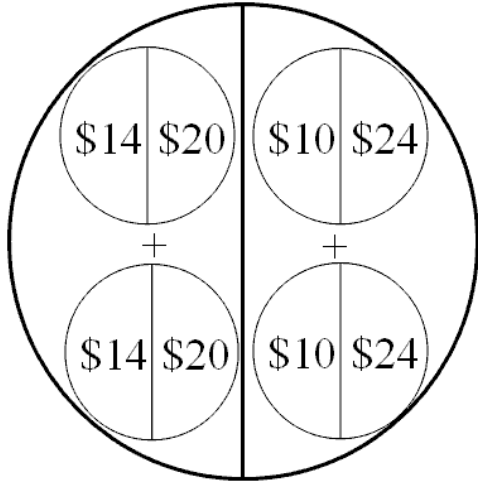
Paper 19
Output 17
Order 4

$7 | $10 $5 | $12
+   +
$7 | $10 $5 | $12

$5 | $12 $7 | $10
+   +
$7 | $10 $5 | $12
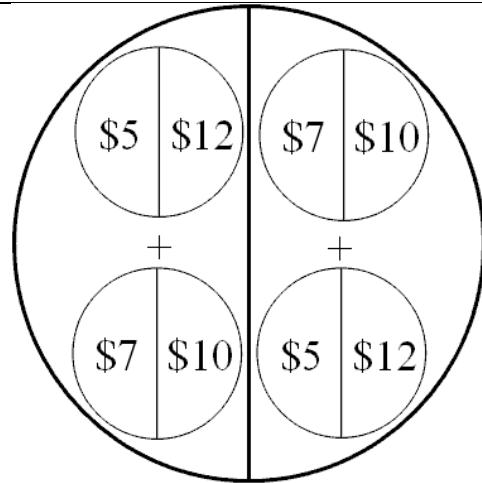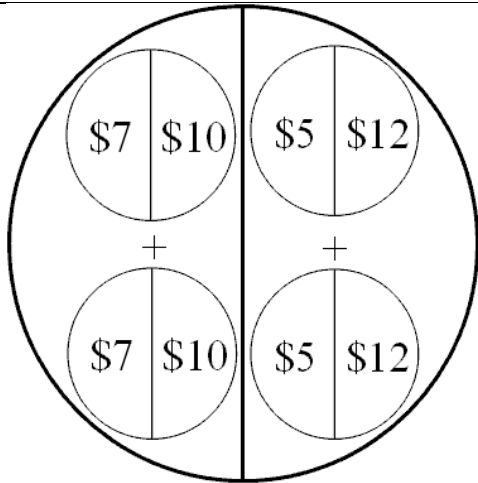
Paper 20
Output 19
Order 4

$50 | $40 $20 | $70
+   +
$5 | $4 $2 | $7

$20 | $70 $50 | $40
+   +
$5 | $4 $2 | $7
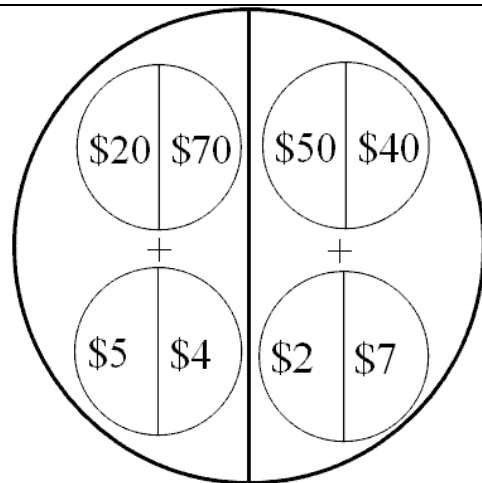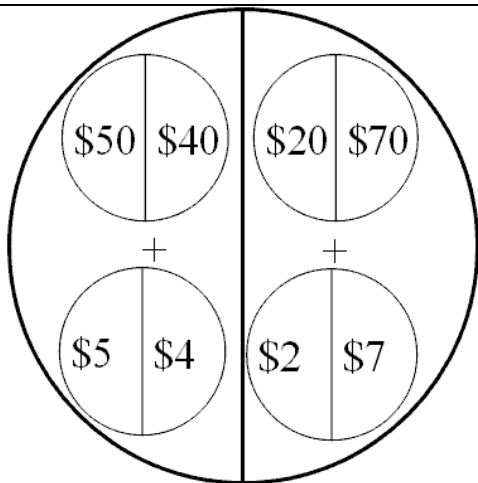
Paper 21
Output 36
Order 4

$1 | $16 $5 | $12
+   +
$1 | $16 $5 | $12

$5 | $12 $1 | $16
+   +
$1 | $16 $5 | $12
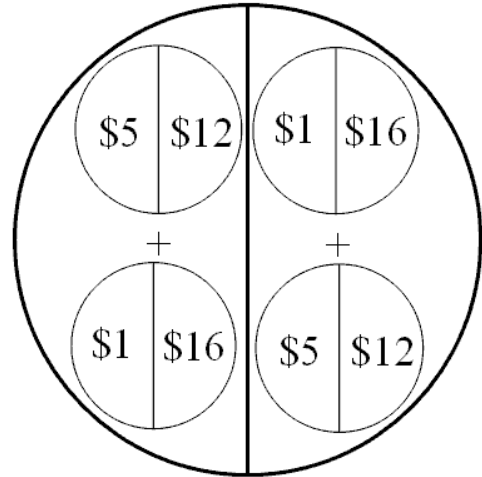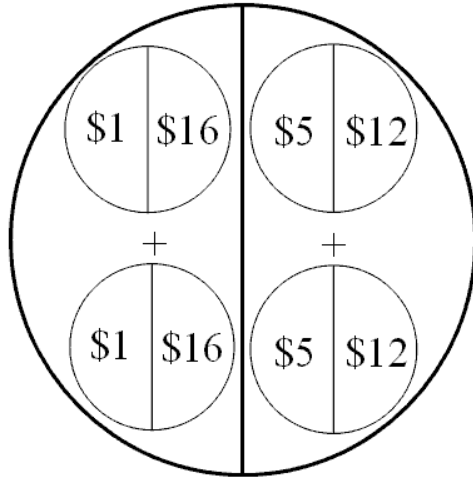
Paper 22
Output 15
Order 4

$14 $24
+   +
$10 $20
+
$-4 | $4 $10 $-4 | $4
     $20 $20

$14 $24
+   +
$20 $10
+   +
$10 $-4 | $4 $-4 | $4
                   $20
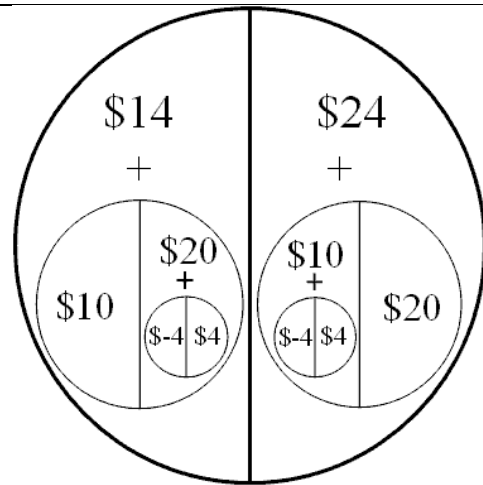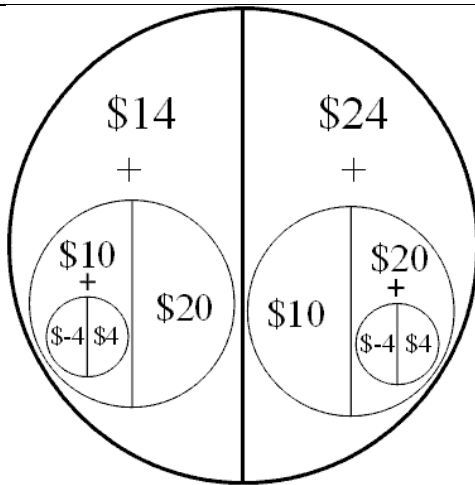
Paper 23
Output 16
Order 4

$7 $12
+   +
$5 $10
+
$-2 | $2 $5 $-2 | $2
     $10 $10

$7 $12
+   +
$10 $5
+   +
$5 $-2 | $2 $-2 | $2
                  $10
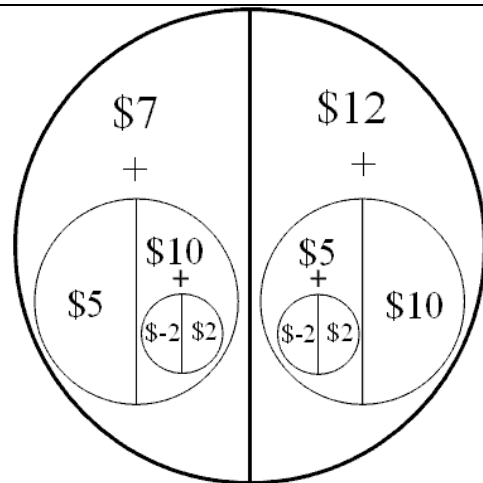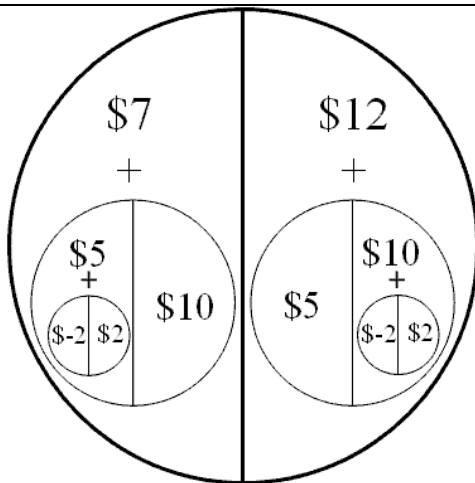
Paper 24
Output 18
Order 4

$1 $18
+ +
$5 $10 $10 $5
+ +
$-2 $2 $10 $5 $-2 $2

$1 $18
+ +
$10 $5
+ +
$5 $-2 $2 $5 $-2 $2 $10
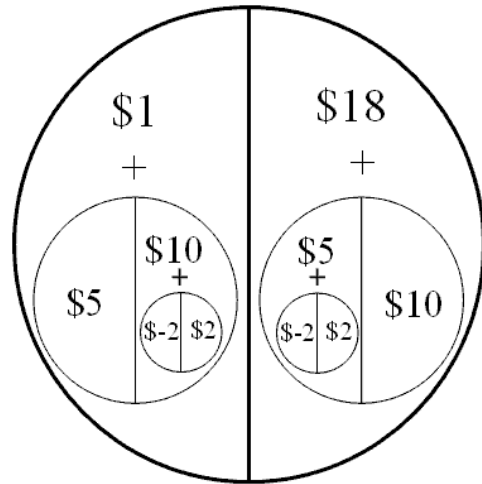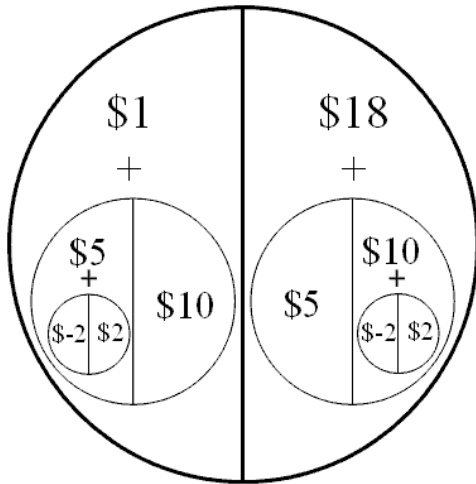
Paper 25
Output 20
Order 5

$7 $10 $5 $12
+ +
$10 $5
+ +
$5 $-2 $2 $-2 $2 $10

$7 $10 $5 $12
+ +
$5 $10
+ +
$-2 $2 $10 $5 $-2 $2
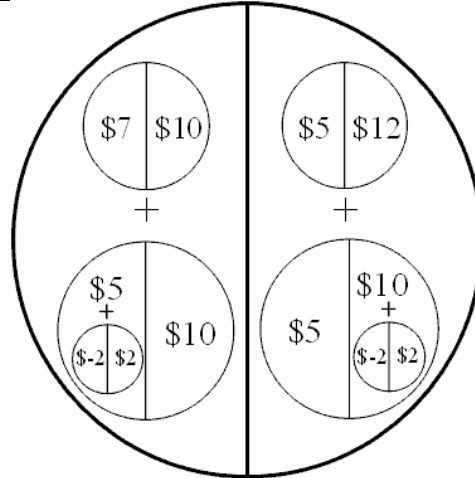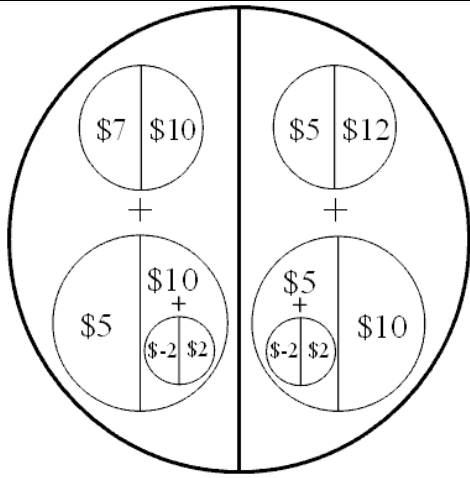
Paper 26
Output 21
Order 5

$10 $4 $2 $12
+ +
$20 $10
+ +
$10 $-4 $4 $-4 $4 $20

$10 $4 $2 $12
+ +
$10 $20
+ +
$-4 $4 $20 $10 $-4 $4
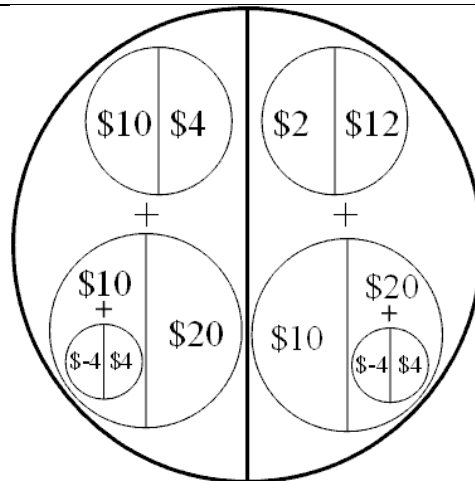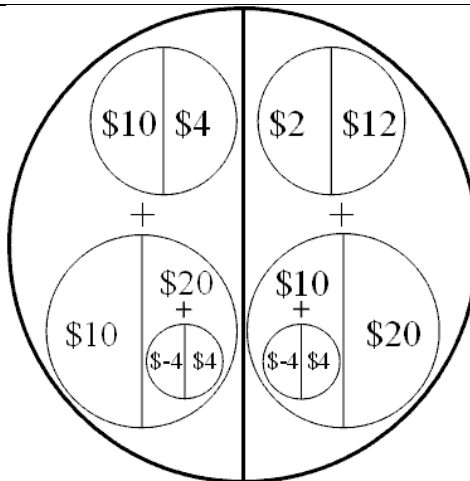
Paper 27
Output 22
Order 5
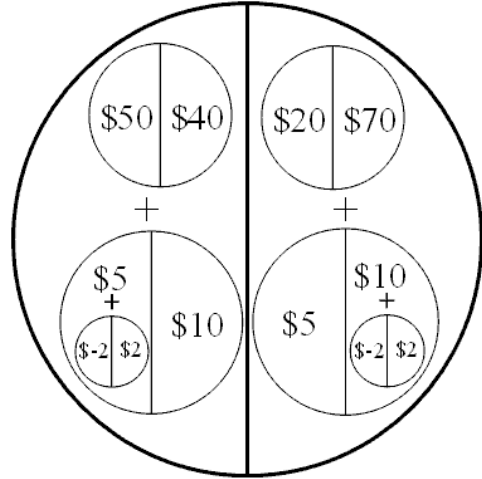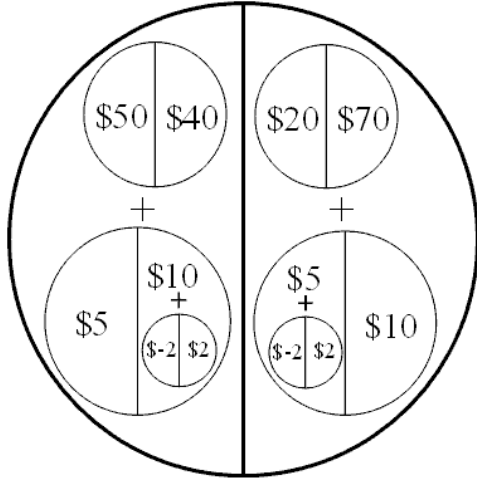
Paper 28
Output 37
Order 5
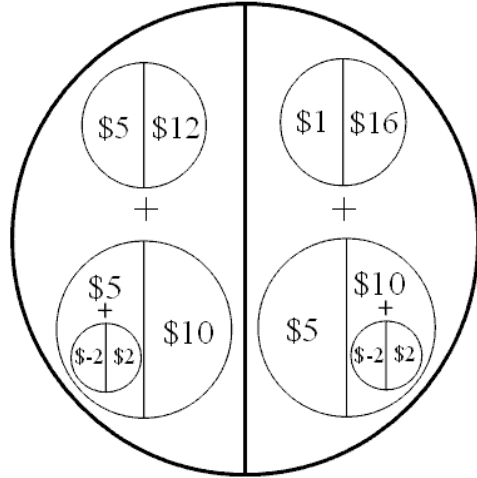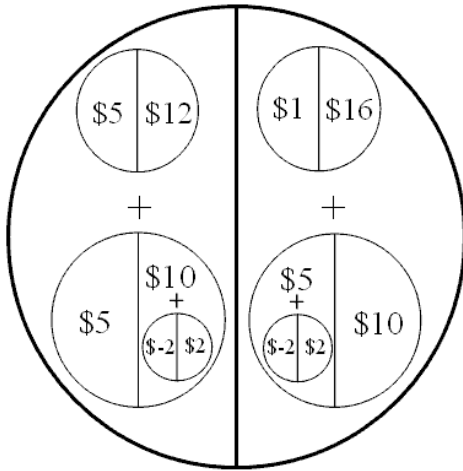
Paper 29
Output 23
Order 5
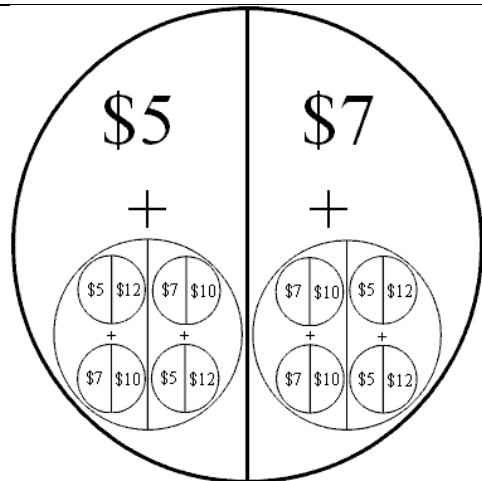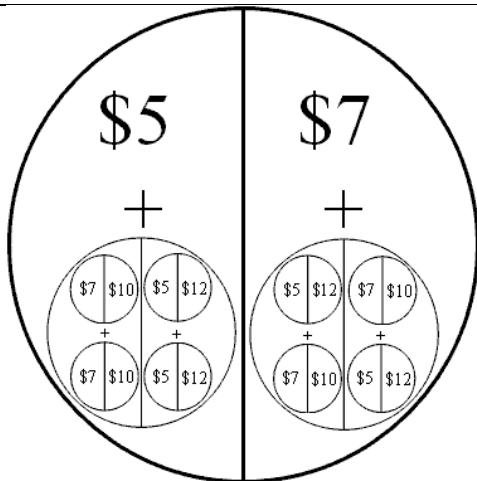
Paper 30
Output 24
Order 5

$1 $4 $1 $4

+ + + +

$10 $4 $2 $12 $2 $12 $10 $4
+ +
$7 $10 $5 $12 $7 $10 $5 $12

$2 $12 $10 $4 $10 $4 $2 $12
+ +
$7 $10 $5 $12 $7 $10 $5 $12
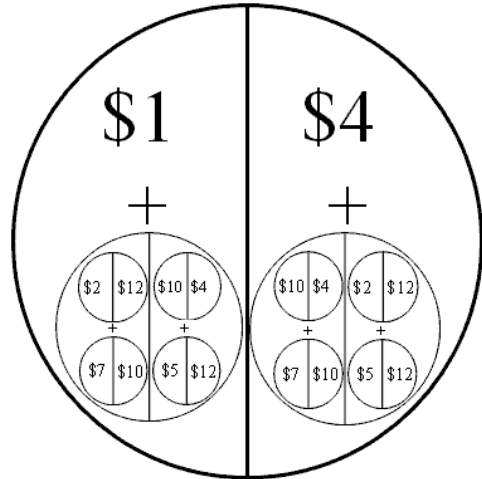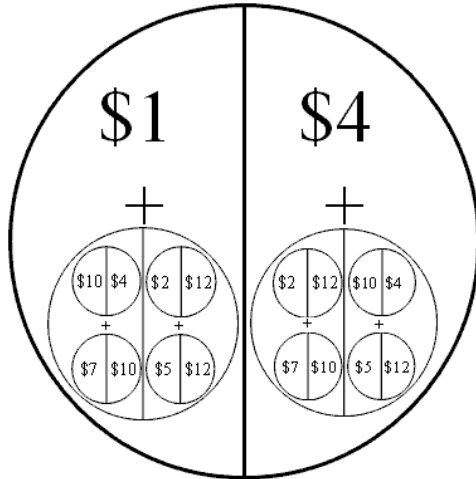
Paper 31
Output 25
Order 5

$1 $20 $1 $20

+ + + +

$50 $40 $20 $70 $20 $70 $50 $40
+ +
$5 $4 $2 $7 $5 $4 $2 $7

$20 $70 $50 $40 $50 $40 $20 $70
+ +
$5 $4 $2 $7 $5 $4 $2 $7
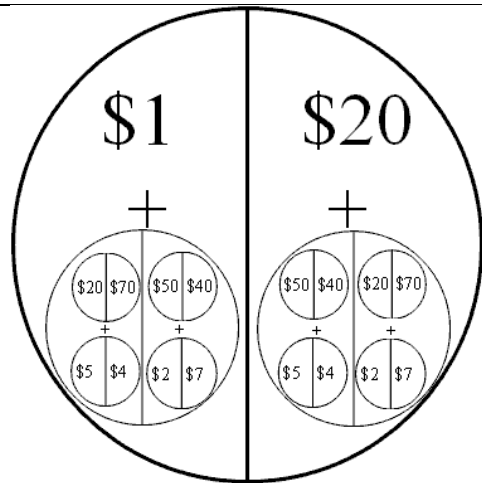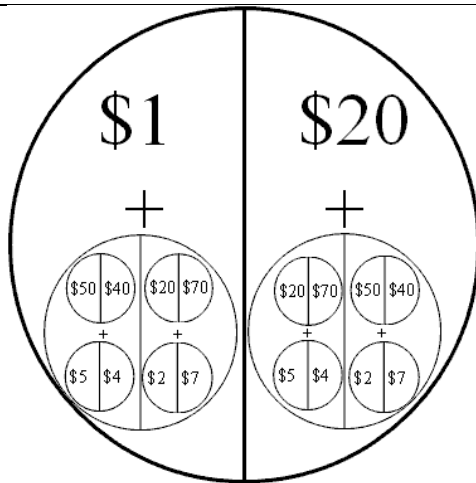
Paper 32
Output 26
Order 6

$5 $10 $5
+ $10 +
$-2 $2 $-2 $2

+ +

$5 $10 $5
+ $10 +
$-2 $2 $-2 $2

$5 $10 $5
+ $10 +
$-2 $2 $-2 $2

+ +

$5 $10 $5
+ $10 +
$-2 $2 $-2 $2
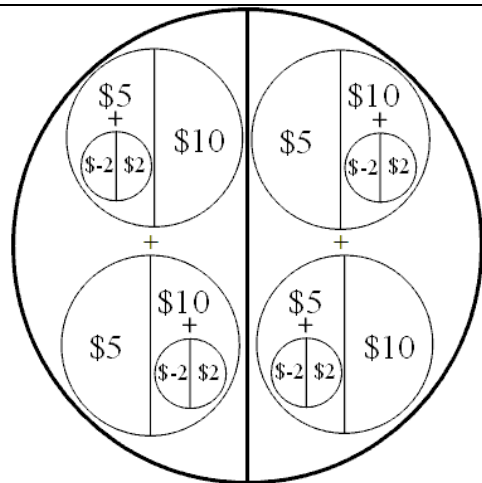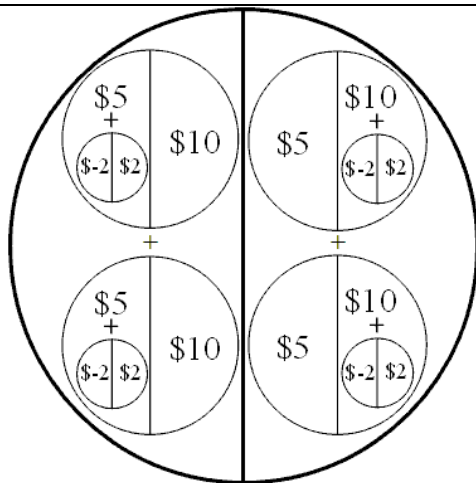
Paper 33
Output 27
Order 6

$20 $10 + $-4 $4 $10 $20 + $-4 $4
$5 + $-2 $2 $10 $5 $10 + $-2 $2
$20 $10 + $-4 $4 $10 $20 + $-4 $4
$5 $10 + $-2 $2 $5 + $-2 $2 $10
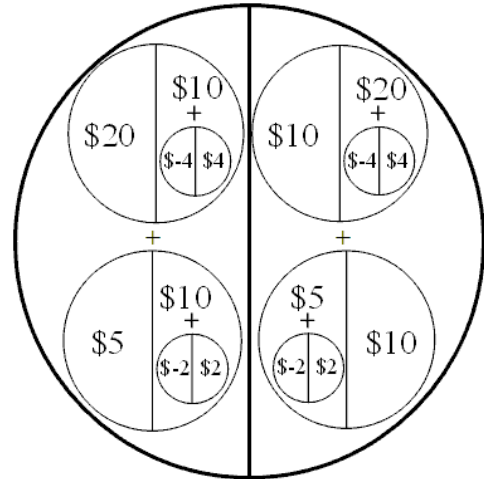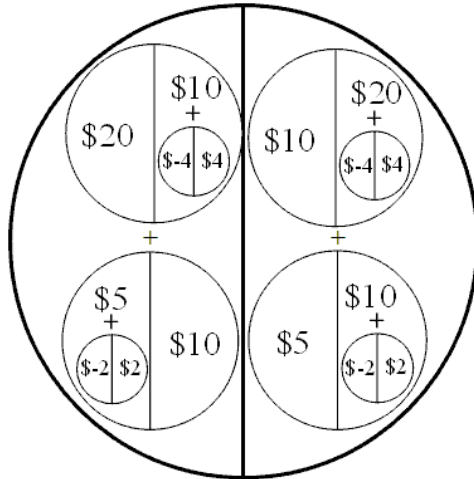
Paper 34
Output 28
Order 6

$20 $10 + $-4 $4 $10 $20 + $-4 $4
$2 + $1 $-1 $4 $2 $4 + $1 $-1
$20 $10 + $-4 $4 $10 $20 + $-4 $4
$2 $4 + $1 $-1 $2 + $1 $-1 $4
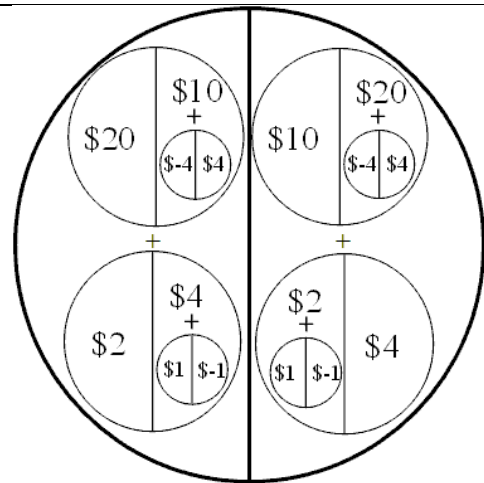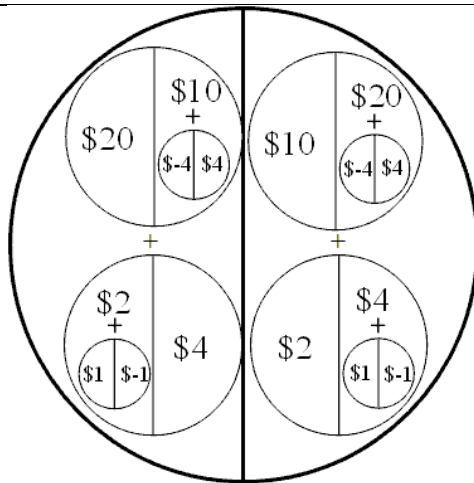
Paper 35
Output 38
Order 6

$8 + $2 $-2 $10 $8 $10 + $2 $-2
$8 + $2 $-2 $10 $8 $10 + $2 $-2
$8 + $2 $-2 $10 $8 $10 + $2 $-2
$8 $10 + $2 $-2 $8 + $2 $-2 $10
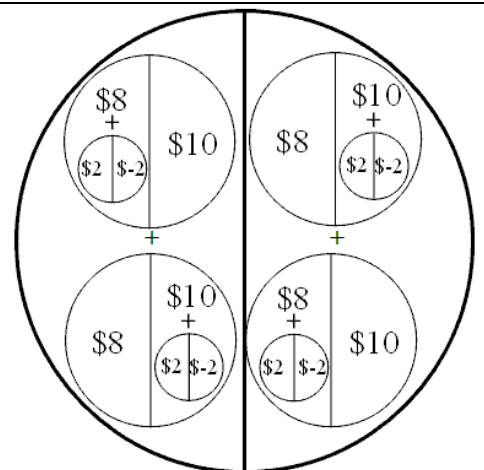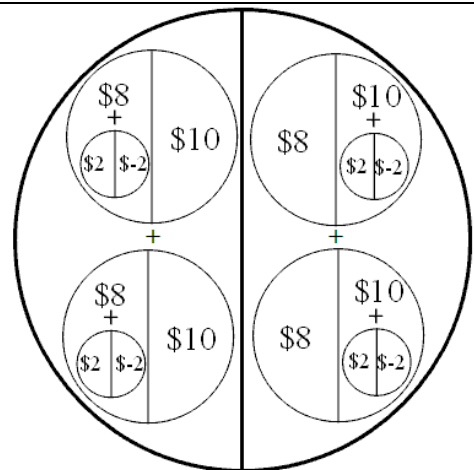
Paper 36
Output 29
Order 6
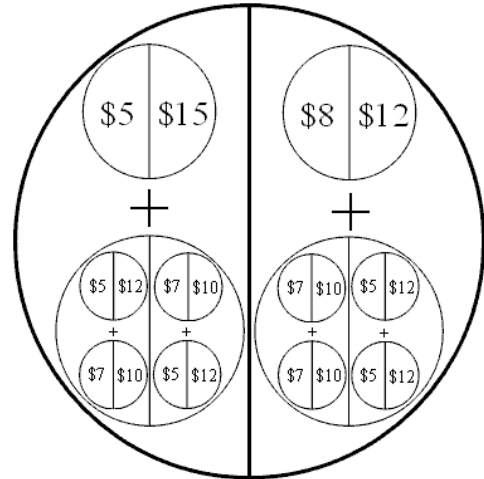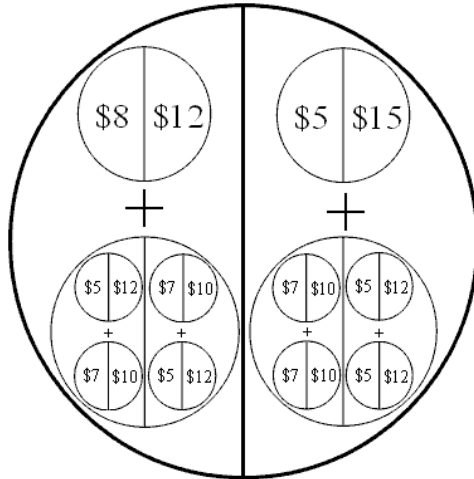
Paper 37
Output 30
Order 6
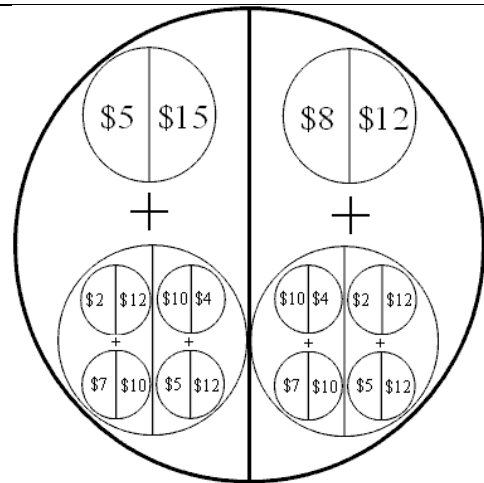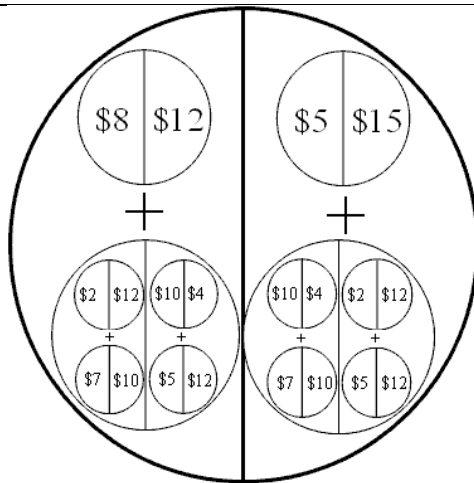
Paper 38
Output 31
Order 6
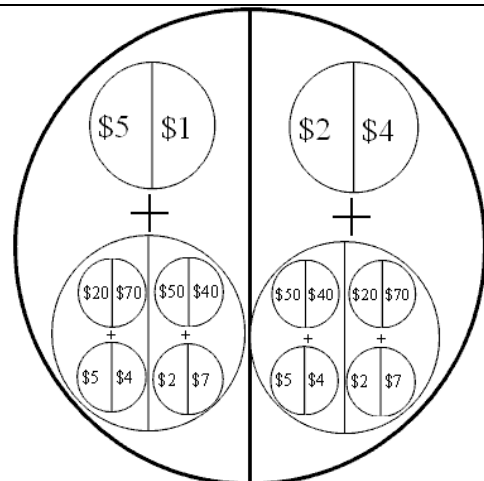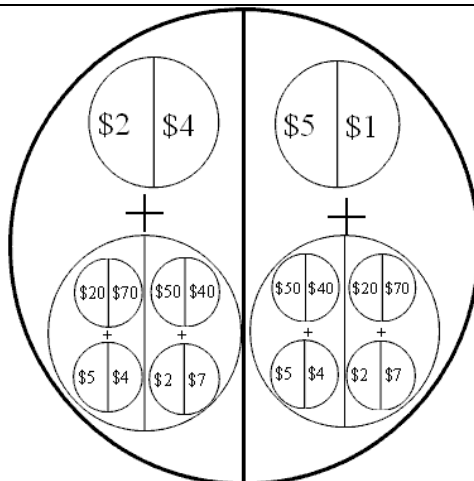
After a pilot session, additional tasks were constructed so that more observations for each order could be collected from each subject. For the ease of the reader, the tasks were grouped by order and construction then numbered sequentially in the paper. As a result the task numbers in this data output file do not match those in the paper. Both task numbers are given in this table.

ONLINE supplementary material, to accompany Noussair, Trautmann & van de Kuilen, Higher order risk attitudes, demographics, and financial decisions.

Instructions for the LISS Panel participants for the Real treatment (translated from Dutch, the instructions for the other treatments and for the students differed only slightly from those given here)

This questionnaire is about risk attitudes. Some people like to take risks while others prefer to avoid them. We ask you to make several choices between two options. Both options yield a prize, depending on rolls of six-sided dice performed by the computer. This questionnaire concerns your own preferences; there is no right or wrong answer.

[following paragraph appeared in Real and Real-lowvar treatments only]

There is a chance that you will be paid for real! At the end of the questionnaire, the computer will determine whether you will be paid for real. The chance that you will be paid for real is 1 in 10. If you are paid for real, the computer will randomly select one of the options you have chosen. The computer will then roll the dice to determine the prize from the option you have chosen. This prize will be transferred to your bank account.

You can earn money

Always choose the option you prefer. The option that you choose could be the one that is randomly selected by the computer to be paid for real.

Explanation of part 1

In part 1, you choose between two options, called "Option L" (left) and "Option R" (right). An example of a choice is given below:

[Example of a risk aversion choice]

As you see, in both options, a red die is rolled. In this example, "Option L" yields €45 if the roll of the red die is 1, 2, or 3. If the roll of the red die is 4, 5, or 6, "Option L" yields €15. In the example, "Option R" yields €25, irrespective of the roll of the red die.

You can earn money

Always choose the option you prefer; any option can be selected by the computer to be paid for real. Please make your choices between "Option L" and "Option R."

[5 risk averse questions]

Explanation of part 2

In addition to the red die, a white die will also sometimes be rolled in both options. An example of a choice is given below:

[Example of a prudence choice]

The white die is sometimes rolled

As you see in the example, the white die is rolled if the roll of the red die is 4, 5, or 6 in "Option L," while the white die is rolled if the roll of the red die is 1, 2, or 3 in "Option R."

The roll of the white die determines whether an amount will be added to, or subtracted from, the original prize resulting from the roll of the red die.

In the example, if the roll of the white die is 1, 2, or 3, €15 is added to the prize resulting from the roll of the red die. If the roll of the white die is 4, 5, or 6, €15 is subtracted from this prize.

You can earn money

Always choose the option you prefer. The option that you choose could be the one that is randomly selected by the computer to be paid for real. Please make your choices between "Option L" and "Option R."

[5 prudence questions]

Explanation of part 3

In addition to the red and the white die, a black die will also sometimes be rolled under both options. An example of a choice is given below:

[Example of a temperance choice]

The white and the black die are sometimes rolled

As you see in the example, the white and the black die are rolled if the roll of the red die is 4, 5, or 6 in "Option L". In "Option R", the white die is rolled if the roll of the red die is 4, 5, or 6, but the black die is rolled if the roll of the red die is 1, 2, or 3.

The rolls of the white die and the black die determine whether an amount will be added to, or subtracted from, the original prize resulting from the roll of the red die.

In the example, if the roll of the white die is 1, 2, or 3, €15 is added to the prize resulting from the roll of the red die. If the roll of the white die is 4, 5, or 6, €15 is subtracted from this prize.

If the roll of the black die is 1, 2, or 3, €25 is added to the prize resulting from the roll of the red die in the example. If the roll of the black die is 4, 5, or 6, €25 is subtracted from this prize.

You can earn money

Always choose the option you prefer. The option that you choose could be the one that is randomly selected by the computer to be paid for real. Please make your choices between "Option L" and "Option R."

[5 temperate choices]

Explanation of part 4, question 1 of 2

In the final part of this questionnaire, we ask you to make 2 additional choices between two options called, "Option L" and "Option R." There is no example choice; please choose between the options depicted below:

[choice RR_EU>1]

As you see, in both choices a red die will be rolled.

- Option L yields €40, if the roll of the red die is 1, 2, or 3.
- Option L yields €30, if the roll of the red die is 4, 5, or 6.
- Option R yields €50, if the roll of the red die is 1, 2, or 3.
- Option R yields €24, if the roll of the red die is 4, 5, or 6.

You can earn money

Always choose the option you prefer. The option that you choose could be the one that is randomly selected by the computer to be paid for real. Please make a choice between "Option L" and "Option R."

Explanation of part 4, question 2 of 2

Finally, please make a choice between the options depicted below:

[choice RP_EU>2]

As you see, in both choices a red die will be rolled first.

The white die is sometimes rolled

As you see, the white die is rolled if the roll of the red die is 4, 5, or 6 in Option L, while the white die is rolled if the roll of the red die is 1, 2, or 3 in Option R.

The roll of the white die determines whether an amount will be added to, or subtracted from, the original prize resulting from the roll of the red die.

If the roll of the white die is 1, 2, or 3, €25 is added to the prize resulting from the roll of the red die in "Option L". In "Option R", €15 is added.

If the roll of the white die is 4, 5, or 6, €25 is subtracted from the prize resulting from the roll of the red die in "Option L". In "Option R", €25 is subtracted.

You can earn money

Always choose the option you prefer. The option that you choose could be the one that is randomly selected by the computer to be paid for real. Please make a choice between "Option L" and "Option R."

This is the end of the questionnaire. Thank you for your participation.

Utility Estimation Procedures and Results

Closed Form Expressions

This section contains the closed form expressions for the relative and absolute coefficients of risk aversion, prudence, and temperance, for the Constant Relative Risk Aversion and Expo-Power utility functions, reported in section 6.

Table S1: Coefficients of Relative Risk Aversion, Prudence and Temperance

	CRRA	Expo-power
$RR(x)$	ρ	$r + (1-r)\alpha x^{1-r}$
$RP(x)$	$1 + \rho$	$1 + r + (r-1)\alpha x^{1-r} + \dfrac{(r-1)^2 \alpha x}{(r-1)\alpha x - rx^r}$
$RT(x)$	$2 + \rho$	$\dfrac{r(1+r)(2+r)x^{3r} - (r-1)r(4+7r)\alpha x^{1+2r} + 6(r-1)^2 r\alpha^2 x^{2+r} - (r-1)^3 x^3 \alpha^3}{r(1+r)x^{3r} - 3(r-1)r\alpha x^{1+2r} + (r-1)^2 \alpha^2 x^{2+r}}$

Table S2: Coefficients of Absolute Risk Aversion, Prudence and Temperance

	CRRA	Expo-power
$AR(x)$	$\dfrac{\rho}{x}$	$\dfrac{r}{x} + \dfrac{(1-r)\alpha}{x^r}$
$AP(x)$	$\dfrac{1+\rho}{x}$	$\dfrac{1+r}{x} + \dfrac{(1-r)\alpha}{x^r} + \dfrac{(r-1)^2 \alpha}{(r-1)\alpha x - rx^r}$
$AT(x)$	$\dfrac{2+\rho}{x}$	$\dfrac{r(1+r)(2+r)x^{3r} - (r-1)r(4+7r)\alpha x^{1+2r} + 6(r-1)^2 r\alpha^2 x^{2+r} - (r-1)^3 x^3 \alpha^3}{r(1+r)x^{1+3r} - 3(r-1)r\alpha x^{2+2r} + (r-1)^2 \alpha^2 x^{3+r}}$

Estimation Strategy and Statistical Tests

This section describes the methods used to estimate the coefficients of relative risk aversion, prudence, and temperance for a representative individual, and gives some additional detail about the estimates. The estimates are reported and discussed in section 6. We used maximum likelihood estimation to maximize the probability of observing the responses. The conditional likelihood function is:

$$\max_{\{\rho \text{ or } \alpha, r\}} : \ln L(\rho \text{ or } \alpha, r) = \Sigma_i [\ln(\theta(\Delta EU)|y_i = 1) + \ln(1-\theta(\Delta EU)|y_i = 0)],$$

where ΔEU is the difference in expected utility between the two lotteries given the parameter(s), $\theta(\Delta EU)$ is a probit function translating ΔEU into a number between 0 and 1, and $y_i = 1$ (0) denotes a choice of the left (right) lottery in decision task i. We allow for clustering at the individual level. The estimation is conducted for the pooled data from the Real, Real-lowvar, and Hypo treatments (labelled as "normal"), and separately for Hypo-Highpay (labelled as "high"). The estimation results are given in Table S3.

Table S3: Maximum Likelihood Estimation Results

	Parameter	Estimate	Standard Error	95% Confidence Interval		–LogL
CRRA	ρ_{normal}	0.883*[+]	0.015	0.853	0.913	27699.47
	ρ_{high}	0.942*[+]	0.006	0.930	0.954	10765.07
Expo-power	r_{normal}	0.482*[+]	0.010	0.462	0.502	27612.14
	α_{normal}	0.095*[+]	0.007	0.081	0.109	
	r_{high}	0.652*[+]	0.008	0.636	0.668	10740.05
	α_{high}	0.089*[+]	0.003	0.083	0.095	

* ([+]) denotes significantly different from 0 (1) at the 1% level, based on a Wald test. normal: treatments Real, Real_lowvar, and Hypo; high: treatment Hypo_highpay

For the CRRA specification, respondents are significantly risk averse in both the normal and high conditions, and respondents are significantly more risk averse in the Hypo-highpay treatment, compared to the other treatments. The coefficients of risk aversion are significantly

smaller than 1 in both cases. The estimation of the expo-power function results in significantly positive parameters α and r, indicating increasing relative risk aversion and decreasing absolute risk aversion. The coefficient r is significantly greater in the Hypo-highpay treatment than in the other treatments. The coefficient α does not differ among the two subsets of the data.

In addition, we estimated the CRRA and expo-power utility function, controlling for wealth at the individual level. That is, we estimated $u(x) = (\omega+x)^{1-\rho}(1-\rho)^{-1}$, and $u(x) = (1-\exp(-\alpha(\omega+x)^{1-r}))\alpha^{-1}$ using maximum likelihood estimation, where ω denotes the total wealth level at the individual level, as defined by Equation 1 (e.g., Andersen et al. 2008). The results are in Table S4. As can be seen in the table, for the CRRA specification, only a mild tendency for risk aversion is found (Wald test, p-value = 0.2752). Controlling for wealth does not affect the estimated coefficients in the Expo-power specification. Overall they results are robust to the inclusion of wealth, with no qualitative changes in the estimates.

Table S4: Maximum Likelihood Estimation Results Controlling for Wealth

	Parameter	Estimate	Standard Error	95% Confidence Interval		–LogL
CRRA	ρ_{normal}*	0.954	0.034	0.889	1.021	16777.47
	ρ_{high}*+	0.937	0.010	0.918	0.956	6748.74
Expo-power	r_{normal}*+	0.505	0.021	0.463	0.548	16751.70
	α_{normal}*+	0.109	0.016	0.077	0.140	
	r_{high}*+	0.644	0.011	0.623	0.664	6725.89
	α_{high}*+	0.084	0.005	0.075	0.093	

* (+) denotes significantly different from 0 (1) at the 1% level, based on a Wald test. normal: treatments Real, Real_lowvar, and Hypo; high: treatment Hypo_highpay

References in Appendix

Andersen, Steffen, Glenn W. Harrison, Morten I. Lau, & E. Elisabet Rutstrom (2008). Eliciting Risk and Time Preferences, *Econometrica* 76, 583–618.