Preferences for Rank in Competition: Is First-Place Seeking Stronger than Last-Place Aversion? Supplementary Online Materials

Contents

Section 1. Surveys

Overview: Studies 1 and 2 had several between-participant variations, to ensure robustness: 1) competition scenario (intelligence competition vs athletic competition), 2) rank wording frame (e.g., "first place" vs "rank #1"), and 3) order of measurement of ranks (5,4,3,2 or 2,3,4,5). Study 3 employed an intelligence competition scenario, and varied the rank wording (e.g., "first place" vs "rank #1") and order of measurement of ranks (5,9,2,8,3 or 5,2,9,3,8). These between-participant variations were not of primary interest in the investigation, but are provided here for completeness.

The alternate wording used in the athletic and rank number conditions are shown in brackets. The alternate order of rank questions is not shown (but is simply the reverse of the order shown below).

The probabilities used in the rank questions were dynamically generated (using bisection), and so were different for each participant, based on their choices. Example questions are shown below, with probabilities numbers shown in brackets to indicate that they are dynamically generated.

Studies 1 and 2 were conducted on MTurk and assessed ranks 2, 3, 4, and 5 in a 6-person competition. Study 3 was conducted with students and assessed ranks 2, 3, 5, 8, and 9 in a 10-person competition.

Study recruitment materials and consent forms are not shown here, but are available upon request.

<u>**Study 1 Materials**</u>

[intellectual condition:]

Puzzle Competition

Suppose you and five other people of a similar intelligence level (either gender) are matched up in a competition to see who can correctly solve the most puzzles in 10 minutes (the puzzles involve identifying the logical progression in a sequence of patterns). There are no prizes given out in this competition.

The following questions are designed to assess your preference between using a strategy that would **guarantee** a certain outcome (e.g., third place [rank #3] out of 6) vs. using another strategy that gives you a **chance** of finishing in first place [rank #1] (out of 6) and a **chance** of finishing in last place [rank #6] (out of 6). Note that first place [rank #1] means the most puzzles solved and last place [rank #6] means the least. We will vary the chances approximately five times, to estimate the percentage chance that makes you indifferent between choosing the certain rank outcome and the uncertain rank outcome.

[athletic condition:]

Athletic Competition

Suppose you and nine other people of similar fitness level (either gender) are matched up in a competition to see who takes the most steps over the next month (from a combination of walking, running, and stairs). There are no prizes given out in this competition.

The following questions are designed to assess your preference between using a strategy that would **guarantee** a certain outcome (e.g., third place [rank #3] out of 6) vs. using another strategy that gives you a **chance** of finishing in first place [rank #1] (out of 6) and a chance of finishing in last place [rank #6] (out of 6). Note that first place [rank #1] means the most steps taken and last place [rank #6] means the least. We will vary the chances approximately five times, to estimate the percentage chance that makes you indifferent between choosing the certain rank outcome and the uncertain rank outcome.

[page break]

Athletic [Puzzle] Competition

Which do you prefer:

Using a strategy that guarantees you will finish in **second place [rank #2]** (out of 6)

or

Using a strategy in which you have a 50% chance of finishing in **first place [rank #1]** (out of 6) and a 50% chance of finishing in **last place [rank #6]** (out of 6).

[page break]

Athletic [Puzzle] Competition

Which do you prefer:

Using a strategy that guarantees you will finish in **second place [rank #2]** (out of 6)

or

Using a strategy in which you have a [25%] chance of finishing in **first place [rank #1]** (out of 6) and a [75%] chance of finishing in **last place [rank #6]** (out of 6).

[page break]

Athletic [Puzzle] Competition

Which do you prefer:

Using a strategy that guarantees you will finish in **second place [rank #2]** (out of 6)

or

Using a strategy in which you have a [13%] chance of finishing in **first place [rank #1]** (out of 6) and a [87%] chance of finishing in **last place [rank #6]** (out of 6).

[page break]

Athletic [Puzzle] Competition

Which do you prefer:

Using a strategy that guarantees you will finish in **second place [rank #2]** (out of 6)

or

Using a strategy in which you have a [6%] chance of finishing in **first place [rank #1]** (out of 6) and a [94%] chance of finishing in **last place [rank #6]** (out of 6).

[page break]

Athletic [Puzzle] Competition

Which do you prefer:

Using a strategy that guarantees you will finish in **second place [rank #2]** (out of 6)

or

Using a strategy in which you have a [3%] chance of finishing in **first place [rank #1]** (out of 6) and a [97%] chance of finishing in **last place [rank #6]** (out of 6).

[page break]

Third place [Rank #3]

You have finished the set of questions about second place [rank #2]. You have finished [1 set] of rank questions, and there are [3 sets] left.

Next, we will ask you about **third place [rank #3]**.

[Repeat Above Questions for ranks 3, 4, and 5]

[page break]

Competition

1. How do you think you would actually rank in a contest such as the one described in the previous section?

first place [rank #1] second place [rank #2] third place [rank #3] fourth place [rank #4] fifth place [rank #5] last place [rank #6]

[Note: the rank in the following question was selected at random. Second place is provided as an example.]

2. If you were to finish in [second place] [rank #2], how would you feel?

Really bad				Really great		
1	2	3	4	5	6	7

3. In general, how competitive are you as a person?

Not at all
competitive   Very
                                                                           competitive

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

4. How would you rate your mental fitness?

Not at all fit   Very fit

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

5. How would you rate your physical fitness?

Not at all fit   Very fit

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

[page break]

6. Imagine that during the middle of the competition, you start struggling, and you go down a rank. Which would feel worse, dropping from first place [rank #1] to second place [rank #2], or dropping from fifth place [rank #5] to last place [rank #6]?

Dropping from first place [rank #1]   They would feel equally bad   Dropping from fifth place [rank #5]
to second place [rank #2]   to last place [rank #6]
would feel much worse   would feel much worse

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

7. Imagine that during the middle of the competition, you start improving, and you go up a rank. Which would feel better, rising from second place [rank #2] to first place [rank #1], or rising from last place [rank #6] to fifth place [rank #5]?

Rising from second place [rank #2]   They would feel equally good   Rising from last place [rank #6]
to first place [rank #1]   to fifth place [rank #5]
would feel much better   would feel much better

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

[page break]

Demographic Questionnaire

Please truthfully answer the following demographic questions about yourself.

1. Your gender:
 Female
 Male

2. What is your age?
___ years old

3. What is your primary ethnicity?
 American Indian or Alaskan Native
 Asian
 Black or African American
 Caucasian/White
 Hispanic or Latin American
 Other

[page break]

Thank You

Thank you, you have finished the survey. Your unique completion code is [#####-#####]. Please copy this code into the HIT on the Mechanical Turk website to get credit for completing the study. Once you have copied the code and completed the HIT, you can close this browser window.

Study 2 Materials

[intellectual condition:]

Puzzle Competition

Suppose you and five other people of a similar intelligence level (either gender) are matched up in a competition to see who can correctly solve the most puzzles in 10 minutes (the puzzles involve identifying the logical progression in a sequence of patterns). Imagine that there are no prizes given out in this competition, and that rankings and performance would be displayed through an anonymized leaderboard (i.e., you will not know the identity of anyone else in your competition group, nor will anyone else in your group know your identity; however, you will know which rank is yours).

The following questions are designed to assess your preference between using a strategy that would **guarantee** a certain outcome (e.g., third place [rank #3] out of 6) vs. using another strategy that gives you a **chance** of finishing in first place [rank #1] (out of 6) and a **chance** of finishing in last place [rank #6] (out of 6). Assume each of these two strategies involves the same amount of effort. Also, note that first place means the most puzzles solved and last place means the least. We will vary the chances approximately five times, to estimate the percentage chance that makes you indifferent between choosing the certain rank outcome and the uncertain rank outcome.

[athletic condition:]

Athletic Competition

Suppose you and five other people of similar fitness level (either gender) are matched up in a competition to see who takes the most steps over the next month (from a combination of walking, running, and stairs). Imagine that there are no prizes given out in this competition, and that rankings and performance would be displayed through an anonymized leaderboard (i.e., you will not know the identity of anyone else in your competition group, nor will anyone else in your group know your identity; however, you will know which rank is yours).

The following questions are designed to assess your preference between using a strategy that would **guarantee** a certain outcome (e.g., third place [rank #3] out of 6) vs. using another strategy that gives you a **chance** of finishing in first place [rank #1] (out of 6) and a **chance** of finishing in last place [rank #6] (out of 6). Assume each of these two strategies involves the same amount of effort. Also, note that first place means the most steps taken and last place means the least. We will vary the chances approximately five times, to estimate the percentage chance that makes you indifferent between choosing the certain rank outcome and the uncertain rank outcome.

[page break]

Puzzle [Athletic] Competition

Which do you prefer:

 Using a strategy that guarantees you will finish in **second place [rank #2]** (out of 6)

or

 Using a strategy in which you have a 50% chance of finishing in **first place [rank #1]** (out of 6) and a 50% chance of finishing in **last place [rank #6]** (out of 6).

[page break]

Puzzle [Athletic] Competition

Which do you prefer:

 Using a strategy that guarantees you will finish in **second place [rank #2]** (out of 6)

or

 Using a strategy in which you have a [25%] chance of finishing in **first place [rank #1]** (out of 6) and a [75%] chance of finishing in **last place [rank #6]** (out of 6).

[page break]

Puzzle [Athletic] Competition

Which do you prefer:

 Using a strategy that guarantees you will finish in **second place [rank #2]** (out of 6)

or

 Using a strategy in which you have a [13%] chance of finishing in **first place [rank #1]** (out of 6) and a [87%] chance of finishing in **last place [rank #6]** (out of 6).

[page break]

Puzzle [Athletic] Competition

Which do you prefer:

 Using a strategy that guarantees you will finish in **second place [rank #2]** (out of 6)

or

 Using a strategy in which you have a [6%] chance of finishing in **first place [rank #1]** (out of 6) and a [94%] chance of finishing in **last place [rank #6]** (out of 6).

[page break]

Puzzle [Athletic] Competition

Which do you prefer:

Using a strategy that guarantees you will finish in **second place [rank #2]** (out of 6)

or

Using a strategy in which you have a [3%] chance of finishing in **first place [rank #1]** (out of 6) and a [97%] chance of finishing in **last place [rank #6]** (out of 6).

[page break]

Third place [Rank #3]

You have finished the set of questions about second place [rank #2]. You have finished [1 set] of rank questions, and there are [3 sets] left.

Next, we will ask you about **third place** [**rank #3**].

[Repeat Above Questions for ranks 3, 4, and 5]

Competition

1. How do you think you would actually rank in a contest such as the one described in the previous section?

first place [rank #1] second place [rank #2] third place [rank #3] fourth place [rank #4] fifth place [rank #5] last place [rank #6]

[Note: the rank in the following question was selected at random. Second place is provided as an example.]

2. If you were to finish in fifth place [rank #5], how would you feel?

Really bad   Really great
1   2   3   4   5   6   7

3. In general, how competitive are you as a person?

Not at all   Very
competitive   competitive
1   2   3   4   5   6   7

4. How would you rate your mental fitness?

Not at all fit   Very fit

1	2	3	4	5	6	7

5. How would you rate your physical fitness?

Not at all fit   Very fit

1	2	3	4	5	6	7

[page break]

6. Imagine that during the middle of the competition, you start struggling, and you go down a rank. Which would feel worse, dropping from first place [rank #1] to second place [rank #2], or dropping from fifth place [rank #5] to last place [rank #6]?

Dropping from first place   They would feel equally bad   Dropping from
to second place   fifth place to last place
would feel much worse   would feel much worse

1	2	3	4	5	6	7

7. Imagine that during the middle of the competition, you start improving, and you go up a rank. Which would feel better, rising from second place to first place, or rising from last place to fifth place?

Rising from second place [rank #2]   They would feel equally good Rising from last place [rank #6]
to first place [rank #1]   to fifth place [rank #5]
would feel much better   would feel much better

1	2	3	4	5	6	7

[page break]

Demographic Questionnaire

Please truthfully answer the following demographic questions about yourself.

1. Your gender:
 Female
 Male
 Other
 Prefer not to answer

2. What is your age?

_____ years old

3. What is your primary ethnicity?
 American Indian or Alaskan Native
 Asian
 Black or African American
 Caucasian/White
 Hispanic or Latin American
 Other
 Prefer not to answer

[page break]

Thank You
Thank you, you have finished the survey. Your unique completion code is [#####-#####]. Please copy this code into the HIT on the Mechanical Turk website to get credit for completing the study. Once you have copied the code and completed the HIT, you can close this browser window.

<u>**Study 3 Materials**</u>

Puzzle Competition

This survey is about your preferences and choices in puzzle competitions.

[page break]

Puzzle Competition

Suppose you and nine other people of a similar intelligence level (either gender) are matched up in a competition to see who can correctly solve the most puzzles in 10 minutes (the puzzles involve identifying the logical progression in a sequence of patterns). There are no prizes given out in this competition.

The following questions are designed to assess your preference between using a strategy that would **guarantee** a certain outcome (e.g., second place [rank #2]) vs. using another strategy that gives you a **chance** of finishing in first place [rank #1] and a **chance** of finishing in last place [rank #10]. We will vary the chances approximately five times, to estimate the percentage chance that makes you indifferent between choosing the certain rank outcome and the uncertain rank outcome.

We will begin by assessing your preferences regarding second place.

[page break]

Puzzle Competition

Which do you prefer:

Using a strategy that guarantees you will finish in **fifth place [rank#5]** (out of 10)

or

 Using a strategy in which you have a 50% chance of finishing in **first place [rank #1]** (out of 10) and a 50% chance of finishing in **last place [rank #10]** (out of 10).

[page break]

Puzzle Competition

Which do you prefer:

Using a strategy that guarantees you will finish in **fifth place [rank #5]** (out of 10)

or

Using a strategy in which you have a [75%] chance of finishing in **first place [rank #1]** (out of 10) and a [25%] chance of finishing in **last place [rank #10]** (out of 10).

[page break]

Puzzle Competition

Which do you prefer:

 Using a strategy that guarantees you will finish in **fifth place [rank #5]** (out of 10)

or

 Using a strategy in which you have a [63%] chance of finishing in **first place [rank# 1]** (out of 10) and a [37%] chance of finishing in **last place [rank #10]** (out of 10).

[page break]

Puzzle Competition

Which do you prefer:

 Using a strategy that guarantees you will finish in **fifth place [rank #5]** (out of 10)

or

 Using a strategy in which you have a [56%] chance of finishing in **first place [rank #1]** (out of 10) and a [44%] chance of finishing in **last place [rank #10]** (out of 10).

[page break]

Puzzle Competition

Which do you prefer:

 Using a strategy that guarantees you will finish in **fifth place [rank #5]** (out of 10)

or

Using a strategy in which you have a [53%] chance of finishing in **first place [rank #1]** (out of 10) and a [47%] chance of finishing in **last place [rank #10]** (out of 10).

[page break]

Ninth Place [Rank #9]

You have finished the set of questions about fifth place. You have finished [1 set] of rank questions, and there are [4 sets] left.

Next, we will ask you about **[ninth place] [rank #9].**

[page break]

[Repeat Above Questions for ranks 9, 2, 8, and 3]

[page break]

Competition

1. How do you think you would actually rank in a contest such as the one described in the previous section?

first place [rank #1]
second place [rank #2]
third place [rank #3]
fourth place [rank #4]
fifth place [rank #5]
sixth place [rank #6]
seventh place [rank #7]
eighth place [rank #8]
ninth place [rank #9]
last place [rank #10]

2. If you were to finish in first place [rank #1], how would you feel?

Really bad				Really great		
1	2	3	4	5	6	7

3. If you were to finish in last place [rank #10], how would you feel?

Really bad				Really great		
1	2	3	4	5	6	7

4. In general, how competitive are you as a person?

Not at all competitive				Very competitive		
1	2	3	4	5	6	7

5. How would you rate your fitness level?

Not at all fit				Very fit		
1	2	3	4	5	6	7

[page break]

Demographic Questionnaire

Please truthfully answer the following demographic questions about yourself.

1. Your gender:
 Female
 Male

2. What is your age?
___ years old

3. What is your primary ethnicity?
 American Indian or Alaskan Native
 Asian
 Black or African American
 Caucasian/White
 Hispanic or Latin American
 Other

Thank You

Thank you, you have finished this survey. Please move on to the next survey, or tell the experimenter if you have finished all of the surveys.

Section 2. Table 2 category combinations

Combinations	Count Study 1	% Study 1	Count Study 2	% Study 2	Count Study 3	% Study 3
1111	512	26%	285	28%	99	23%
1110	192	10%	128	13%	26	6%
1101	354	18%	227	23%	57	13%
1100	23	1%	25	2%	7	2%
1011	68	3%	32	3%	11	3%
1010	162	8%	99	10%	16	4%
1001	58	3%	40	4%	18	4%
1000	40	2%	22	2%	12	3%
0111	273	14%	99	10%	75	18%
0110	139	7%	34	3%	36	9%
0101	57	3%	6	1%	31	7%
0100	4	0%	0	0%	4	1%
0011	7	0%	0	0%	2	0%
0010	62	3%	4	0%	21	5%
0001	4	0%	0	0%	5	1%
0000	5	0%	0	0%	3	1%
Total	1960	100%	1001	100%	423	100%

Table SOM.1

Combinations are ordered as:
1. Utility Increasing from Second-to-Last Place to Second Place
2. Convex at Second
3. Concave at Second-to-Last
4. Drop from First > Drop to Last

A "1" indicates the condition was satisfied, and a "0" indicates it was not.

Examples:

Combination	Utility Increasing from Second-to-Last Place to Second Place	Convex at Second	Concave at Second-to-Last	Drop from First > Drop to Last
1111	Yes	Yes	Yes	Yes
0110	No	Yes	Yes	No
0000	No	No	No	No

Section 3. Results of Study 3

Table SOM.2 is identical to Table 2, except that it shows the results of Study 3. The results are similar to Studies 1 and 2, in that a majority of individuals satisfies each condition separately.

Study	Utility Increasing from Second-to-Last Place to Second Place	Convex at Second	Concave at Second-to-Last	Drop from First > Drop to Last
3	58%	79%	68%	70%

Table SOM.2

As shown in Table SOM.1 in Section 2 above, when evaluating the proportion of individuals satisfying all four conditions jointly, the modal outcome for Study 3 (by a wide margin) satisfied all four conditions (23% of subjects). This is again similar to the findings from Studies 1 and 2.

Figure SOM.1 is analogous to Figure 1 of the paper and shows the average utility by rank for Study 3. This study involved a hypothetical contest among 10 participants; to reduce response burden, we did not elicit utilities for all 8 ranks from 2 through 9. Instead, we focused on ranks 2, 3, 5, 8, and 9. The bars show the 95% confidence intervals around the mean utility (n = 423)
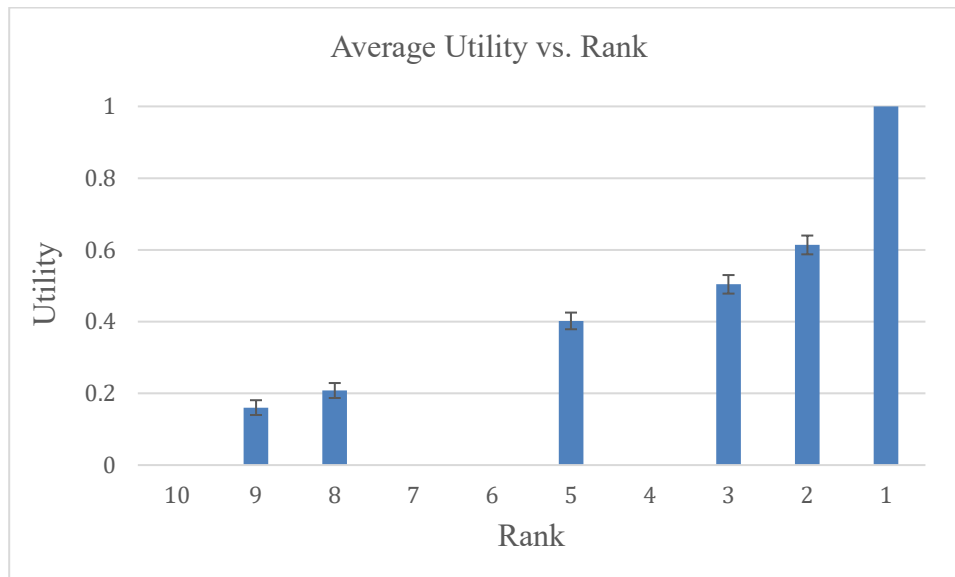

Figure SOM.1

Table SOM.3 is identical to Table 3, except that it shows the results of Study 3. Similar to Studies 1 and 2, it shows support for H1 and H4 (see discussion around Table 3 of the paper).

Study	(Utility Second) - (Utility Second-to-Last)	(Drop from First) - (Drop to Last)
3	0.45 (0.42,0.48)	0.23 (0.19,0.26)

Table SOM.3

Section 4. Box plots of utilities at each rank for each study

Study 1:
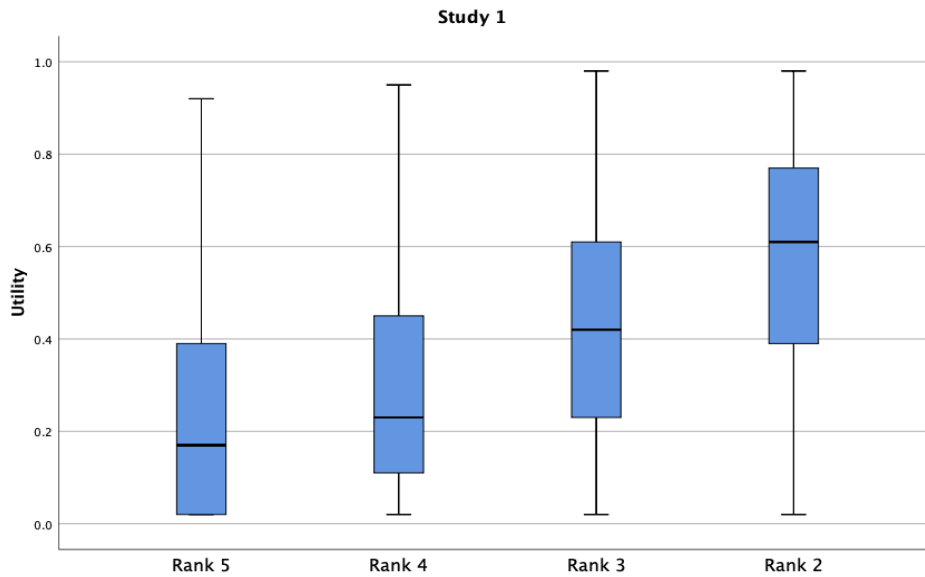
N=1960

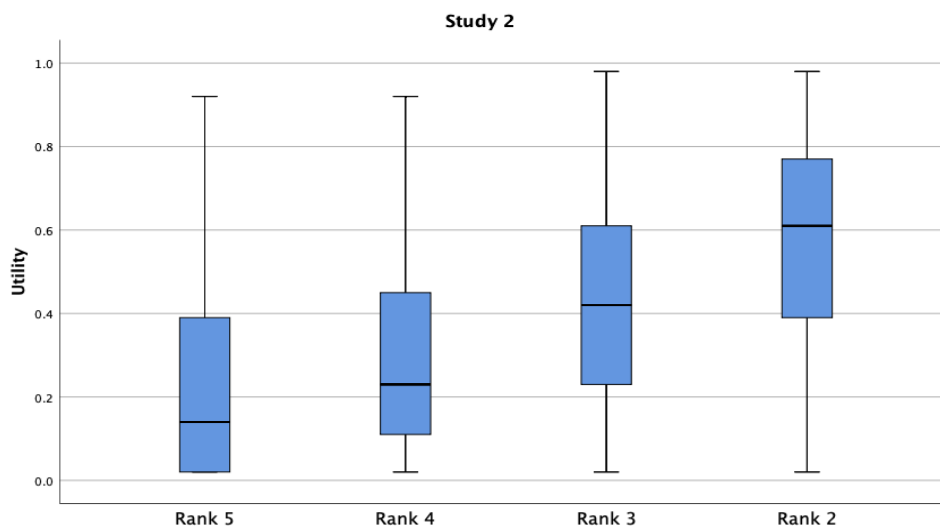**Figure SOM.2**

Study 2

N=1001

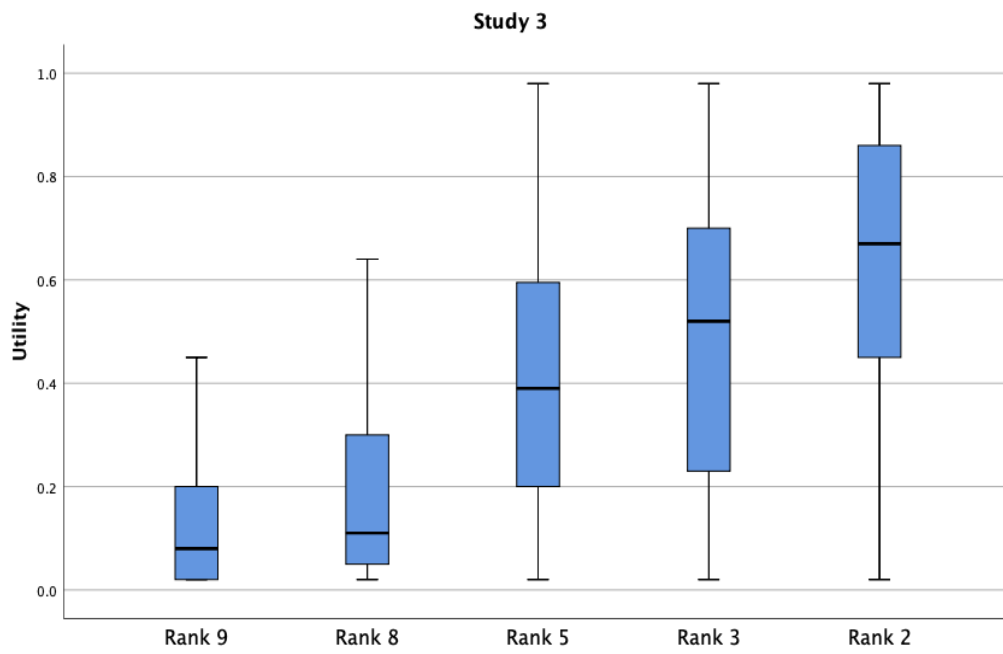**Figure SOM.3**

Study 3

N=423

Figure SOM.4

Section 5. R Script for Creating Figures and Tables

```
### IMPORT DATA
# study 1, 2, 3
data_s1 <- read.csv("Study1.csv",header = TRUE)
df_s1 <- as.data.frame(data_s1)
data_s2 <- read.csv("Study2.csv",header = TRUE)
df_s2 <- as.data.frame(data_s2)
data_s3 <- read.csv("Study3.csv",header = TRUE)
df_s3 <- as.data.frame(data_s3)
## Generating Table 1 results
# sample size
nrow(df_s1) # 1960
nrow(df_s2) # 1001
nrow(df_s3) # 423
# % male
sum(df_s1$gender == 'M')/nrow(df_s1) # 52%
sum(df_s2$gender == 'M')/nrow(df_s2) # 49%
sum(df_s3$gender == 'M')/nrow(df_s3) # 36%
# avg age
mean(df_s1$age)  # 35
mean(df_s2$age)  # 36
mean(df_s3$age)  # 21
# avg male comp
mean(df_s1[df_s1$gender == 'M', "howcompetitive"])  # 5.0
mean(df_s2[df_s2$gender == 'M', "howcompetitive"])  # 5.0
mean(df_s3[df_s3$gender == 'M', "howcompetitive"])  # 5.7
# avg female comp
mean(df_s1[df_s1$gender == 'F', "howcompetitive"])  # 4.4
mean(df_s2[df_s2$gender == 'F', "howcompetitive"])  # 4.5
mean(df_s3[df_s3$gender == 'F', "howcompetitive"])  # 5.2
## Generating Table 2 and Table SOM.2 results
# column 2
mean(df_s1$non.increasingutility) # 72%
mean(df_s2$non.increasingutility) # 86%
mean(df_s3$non.increasing.utility) # 58%
# column 3
mean(df_s1$convex_2nd) # 79%
mean(df_s2$convex_2nd) # 80%
mean(df_s3$convex_2nd) # 79%
# column 4
mean(df_s1$concave_5th) # 72%
mean(df_s2$concave_5th) # 68%
mean(df_s3$concave_9th) # 68%
# column 5
mean(df_s1$change1_2.change5_6) # 68%
mean(df_s2$change1_2.change5_6) # 69%
mean(df_s3$change1_2.change9_10) # 70%
```

```
## Generating Table 3 and Table SOM.3 results
# column 2
mean(df_s1$Urank2.Urank5) # .35
mean(df_s2$Urank2.Urank5) # .35
mean(df_s3$Urank2.Urank9) # .45
# CIs half-widths around the above:
qt(0.975,df=length(df_s1$Urank2.Urank5)-
1)*sd(df_s1$Urank2.Urank5)/sqrt(length(df_s1$Urank2.Urank5)) # .01
qt(0.975,df=length(df_s2$Urank2.Urank5)-
1)*sd(df_s2$Urank2.Urank5)/sqrt(length(df_s2$Urank2.Urank5)) # .02
qt(0.975,df=length(df_s3$Urank2.Urank9)-
1)*sd(df_s3$Urank2.Urank9)/sqrt(length(df_s3$Urank2.Urank9)) # .03
# column 3
mean(df_s1$abs.change1_2..abs.change5_6.) # .21
mean(df_s2$abs.change1_2..abs.change5_6.) # .22
mean(df_s3$abs.change1_2..abs.change9_10.) # .23
# CIs half-widths around the above:
qt(0.975,df=length(df_s1$abs.change1_2..abs.change5_6.)-
1)*sd(df_s1$abs.change1_2..abs.change5_6.)/sqrt(length(df_s1$abs.change1_2..abs.change5_6.)) # .02
qt(0.975,df=length(df_s2$abs.change1_2..abs.change5_6.)-
1)*sd(df_s2$abs.change1_2..abs.change5_6.)/sqrt(length(df_s2$abs.change1_2..abs.change5_6.)) # .02
qt(0.975,df=length(df_s3$abs.change1_2..abs.change9_10.)-
1)*sd(df_s3$abs.change1_2..abs.change9_10.)/sqrt(length(df_s3$abs.change1_2..abs.change9_10.)) #
.04

## Generating SOM.1 results
mean(df_s3$Urank2) # .61
mean(df_s3$Urank3) # .50
mean(df_s3$Urank5) # .40
mean(df_s3$Urank8) # .21
mean(df_s3$Urank9) # .16
```

Separate R script for creating Figure 1

```
#clear the workspace
rm(list = ls())

#set the working directory
setwd("E:/R")

#adhere to the sum-to-zero convention for effect weights
options(contrasts=c("contr.sum","contr.poly"))

#load the libraries we need
library(tidyr)
library(ggplot2)
library(Hmisc)

# read the data from a csv file
df<-read.csv("Study1.csv")

# show the variable names and the first few rows of values
head(df)

#count the number of rows in the datafile
nrow(df)

#make a simplified dataframe that has only the data we need
df<-df[c(1,4:7)]

#we will also fill in ranks 1 and 6 for each person, so there will be six rows per participant
df$Urank1 <- 1
df$Urank6 <- 0

#reorder the columns so they are in rank order
df<-df[c(1,6,2:5,7)]

#add a column for study number
df$study <- "Study 1"

# show the variable names and the first few rows of values
head(df)

df1 <- df

#next, follow the same steps for the study 2 data
# read the data from a csv file
df<-read.csv("Study2.csv")

# show the variable names and the first few rows of values
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head(df)

#count the number of rows in the datafile
nrow(df)

#make a simplified dataframe that has only the data we need
df<-df[c(1,4:7)]

#we will also fill in ranks 1 and 6 for each person, so there will be six rows per participant
df$Urank1 <- 1
df$Urank6 <- 0

#reorder the columns so they are in rank order
df<-df[c(1,6,2:5,7)]

#add a column for study number
df$study <- "Study 2"

# show the variable names and the first few rows of values
head(df)

df2<-df

#next, make a combined data frame with both datasets
df<-rbind(df1, df2)

head(df)
nrow(df)


#now, make a new, "long" form dataframe with one row per observation
dfl <- gather(df,rank,U,Urank1:Urank6,factor_key=TRUE)

#convert the rank to a number
dfl$rank<-as.numeric(substr(dfl$rank,6,7))

head(dfl)
nrow(dfl)

#check on one specific participant
head(dfl[which(dfl$pid==31714),])

attach(dfl)


#jitter the points so we can see them better on the graph
jitter <- position_jitter(width = 0.05, height = 0.01)
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# data should be in long format -- here that's 6 rows per person
ggplot(data = dfl,
      aes(x = rank,
          y = U, group = pid, color = study, linetype = study)) +


  # horizontal line at y = 0
  geom_hline(yintercept = 0) +

  # one line per person, 99% transparent
   geom_line(alpha = .02, position = jitter) +

  #one show the individual datapoints and make them 99% transparent
  # geom_point(alpha = .04, position = jitter) +

  # needs Hmisc package one line per study, representing mean
  stat_summary(aes(group = study),
              fun.data = "mean_cl_normal", geom = "line", size = 1) +

  # needs Hmisc package one point per study per time, representing mean + 95% CI
  stat_summary(aes(group = study, shape = study),
              fun.data = "mean_cl_normal", size = .75, geom = "pointrange") +

  # Text annotations of mean values
  # geom_text(data = dfl, aes(label = lab), vjust = -6.5, color = "black", size = 14 * (5 / 14)) +
  # geom_text(data = subset(dfl, study == 1), aes(label = EvalLab, vjust = vj), color = "darkred", size =
14 * (5 / 14)) +
  # geom_text(data = subset(dfl, study == 2), aes(label = EvalLab, vjust = vj), color = "darkblue", size =
14 * (5 / 14)) +

  # Reds and Blues, needs RColorBrewer package
  scale_color_brewer(palette = "Set1") +
  labs(x = "Rank Number", y = "Utility") +
  scale_y_continuous(breaks = c(0,.2,.4,.6,.8,1)) +

  #reverse the x-axis, so we go from rank 6 to rank 1
  scale_x_reverse(breaks = c(1,2,3,4,5,6)) +

  guides(color = guide_legend("Study"), linetype = guide_legend("Study"),
        shape = guide_legend("Study")) +
  coord_cartesian(ylim = c(0, 1)) +

  # a bunch of other aesthetic stuff
  # this will use a slightly different font.
  theme(
    panel.grid.major = element_blank(), # switch off major gridlines
    panel.grid.minor = element_blank(), # switch off minor gridlines
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    legend.position = c(0.1, 0.92), # manually position the legend (numbers being from 0,0 at bottom left
of whole plot to 1,1 at top right)
    legend.background = element_blank(),
    legend.title = element_blank(), # switch off the legend title
    legend.text = element_text(size = 14, color = "black"),
    legend.key = element_blank(), # switch off the rectangle around symbols in the legend

    strip.background = element_blank(), #switch off facet backgrounds

    strip.text = element_text(size = 14, color = "black"),
    axis.title.x = element_text(size = 14, color = "black"),
    axis.title.y = element_text(size = 14, color = "black"),
    axis.text.x = element_text(size = 14, color = "black"),
    axis.text.y = element_text(size = 14, color = "black"),
    panel.background = element_rect(fill = "white", color = "black")
  )
```