Rational Herding in Crowdfunding, Social Preferences under Uncertainty, and Overplacement in Known and Unknown Tasks: A Behavioral Approach

DOCTORAL DISSERTATION

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A mi madre, Maleni,

a mi padre, Ernesto,

y a mi hermana, Amanda:

por el nexo eterno de

compartir la misma sangre.

"(...) -Adiós -dijo el zorro-. He aquí mi secreto.

Es muy simple: solo se ve bien con el corazón.

Lo esencial es invisible a los ojos".

Antoine de Saint-Exupéry

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CHAPTER 0

Introducción: El individuo como artífice

Esta Tesis consiste en tres capítulos en los que se usa la metodología experimental para analizar y dar respuestas a preguntas referentes a temas distintos. En primer lugar, se analiza la racionalidad del comportamiento gregario en los mercados de micro-mecenazgo. En segundo lugar, se estudia cómo las preferencias sociales se ven afectadas ante la presencia de incertidumbre en la toma de decisiones. Finalmente, se analiza la (posible) diferencia de creencias entre mujeres u hombres sobre el propio desempeño en relación con los demás (overplacement), diferenciado por tareas conocidas y desconocidas. A continuación, se pasa a su descripción con más detalle, resaltando los antecedentes de los temas y las contribuciones de esta Tesis.

0.1 ¿Por qué la Economía Experimental y del Comportamiento?

La economía experimental y del comportamiento este año recibe un reconocimiento más con el Premio Nobel de Economía 2019 a Abhijit Banerjee, Esther Duflo y Michael Kremer: "por su enfoque experimental para aliviar la pobreza global". No es algo anecdótico ni transitorio, ya que este reconocimiento se suma a la senda que abrieron Vernon Smith junto a Daniel Kahneman en el año 2002 que refrendan el uso de esta metodología.

En la actualidad, queda libre de toda duda la utilidad que esta herramienta aporta al desarrollo de la disciplina económica. Junto a la teoría económica, ambas generan un efecto de retroalimentación ya que contribuciones en una redundan en la otra (y viceversa): la economía experimental permite afinar los supuestos sobre los que se sustenta la teoría económica (lo que es el estudio de la causalidad de los fenómenos);

al mismo tiempo, los constructos teóricos permiten explicar los resultados que deja la evidencia empírica en economía experimental. Más aún, gracias al desarrollo de la economía experimental y del comportamiento, la ciencia económica ha abrazado a otras ciencias (como es la psicología, la antropología y la neurociencia) con un efecto multiplicador en el desarrollo del conocimiento universal.

Por ello, la economía experimental y del comportamiento ha posibilitado que la Economía como área de estudio se democratice. Esto es aportar evidencias que aseveran que no todos los agentes económicos son iguales, al tiempo que las motivaciones que subyacen a la toma de decisiones económicas están caracterizadas por la heterogeneidad de las mismas. Aún cuando el origen etimológico de la palabra Economía refiere la administración del hogar para beneficio de sus habitantes (procedente del griego “oikos”, hogar, y “nemein”, administrar), la disciplina se erige como ciencia social que, no obstante, va desarrollando constructos teóricos manteniendo al margen su esencia: el individuo. Con la economía experimental y del comportamiento se le da voz precisamente al ser social como centro artífice desde el que, ahora sí, pretender conocer los mecanismos que articulan las interacciones entre las personas. Todo lo anterior permite constatar que aún queda mucho por dilucidar, por lo que hay razones más que suficientes para justificar el estudio de una Tesis en economía experimental.

A lo largo de la misma, se podrá constatar el esfuerzo realizado en aportar resultados nuevos que ayuden a entender mejor cómo se sitúa el individuo frente al colectivo donde se integra: cómo decidimos en función de los que nos precedieron, si las actitudes prosociales cambian según el contexto que nos rodea, así como la confianza de nuestros resultados frente a los demás. Además, esta Tesis se aproxima a a las cuestiones objeto de estudio mediante distintas aproximaciones: desde un diseño experimental más estándar como es el planteamiento del Juego del Dictador, a usar las funcionalidades que el desarrollo de internet nos concede (como Amazon Mechanichal Turk), así como la comparación de actividades tradicionales contra innovadoras para constatar un posible efecto en el comportamiento de los individuos.

A continuación, se pasa a la descripción del contenido de los capítulos 2, 3 y 4 con más detalle, resaltando los antecedentes de los temas y las contribuciones de esta Tesis.

0.2 Comportamiento gregario en los mercados de micromecenazgo

El capítulo segundo analiza cómo el comportamiento gregario puede (o no) interferir en las decisiones de financiación en los mercados de micro-mecenazgo (crowdfunding). Siendo éste una alternativa reciente al modo de financiación tradicional, la literatura existente se ha centrado en caracterizar este nuevo mercado, señalando como característica intrínseca la de habilitar una relación directa entre personas emprendedoras y una cantidad de personas que realizan micro-aportaciones al proyecto. Algunos autores recalcan el problema de la asimetría de la información, ya que la persona emprendedora sí conoce perfectamente el producto mientras que lo desconoce quiénes contribuyen, y la incertidumbre sobre el éxito de financiación de la campaña. Estos dos elementos afectan tanto a las plataformas como a los emprendedores y les urgen a enviar señales más precisas a los posibles financiadores. En cuanto a los motivos de por qué la gente participa de estos mecanismos, se les atribuyen tanto factores intrínsecos como extrínsecos: motivo puro de compra, motivos altruistas, y motivos de afiliación (sentirse parte de una comunidad), así como deseo de patrocinio y sentir que parte del éxito de la campaña es gracias a sus aportaciones.

Estudios más recientes analizan cómo la incertidumbre afecta los mercados de micro-mecenazgo. Entre ellos, están los que señalan la existencia de un comportamiento gregario (herding behaviour) que conduce a replicar lo que la mayoría realiza. Existe, pues, una necesidad de entender los mecanismos a través de los cuales se produce este comportamiento gregario en los mercados de micro-mecenazgo, puntualizando sí dicho comportamiento es racional y sí los sujetos realizan inferencias no sesgadas, a partir de las decisiones observadas. La investigación teórica en el aprendizaje de observación (observational learning) justifica que la imitación puede ser óptima (ex ante) en marcos de elección secuencial. Por lo tanto, si meramente se

supusiese que el comportamiento gregario es irracional, se estaría infra-estimando dicho efecto al no identificar correctamente los factores que lo determinan.

Entender la racionalidad y el comportamiento gregario en los mercados de micro-mecenazgo es fundamental para el desarrollo de herramientas de gestión en dichos mercados, con el fin de maximizar el número de micro-contribuyentes.

Por su parte, la investigación empírica ha respondido cuestiones diversas: por ejemplo, el efecto que tiene la venta total de entradas en las campañas de micro-mecenazgo basadas en recompensa; otros estudios se centran en la influencia de las recomendaciones de los expertos o de otros usuarios en la elección del producto; otros trabajo analizan cómo el "boca a boca" afecta a las decisiones de inversión; recientemente, otros autores han señalado al número de personas que aportan como el factor determinante, en aquellas campañas que exigían una alta financiación.

Entre los factores determinantes del éxito de una campaña resaltan el número de financiadores que contribuyen en los primeros momentos de iniciación de la misma. Dos son los motivos fundamentales por los que se transmite su influencia: por un lado, sirve como señal acerca de la calidad de los productos, lo que lleva consigo un aprendizaje social y al mismo tiempo se incrementa las aportaciones de otros posibles financiadores. De hecho, hay evidencia empírica que muestra que las aportaciones de los individuos se basan, en parte, en el porcentaje que ya lleva financiado la campaña. Sin embargo, como ya se ha mencionado, la asimetría de información y la incertidumbre sobre el éxito de la campaña actúan como factores que obstaculizan la financiación en los primeros días de campaña.

En este capítulo analizamos la racionalidad del comportamiento gregario en los mercados de micro-mecenazgo. El modo de aproximarnos a dicho estudio es a través de un experimento online, aprovechando las funcionalidades de Amazon Mechanical Turk (Mturk) que permite el pago de micro-tareas a las personas que están inscritas y participan en el experimento. De este modo, se tiene acceso a una población mundial y, para nuestro caso, reclutamos a 847 personas (250 mujeres y 97 mujeres de India, 250 hombres y 250 mujeres de Estados Unidos). El experimento, tomando el diseño de una plataforma de micro-mecenazgo (basada en recompensas), ha consistido en la decisión

de sujetos experimentales entre dos proyectos, que llevaban pagos asociados. En particular, un proyecto resultaba exitoso sí el 70% o más de los participantes elegían financiarlo. Los sujetos recibían 0.50 dólares por participar, más un bono de 0.15 dólares por cada proyecto que habían elegido y resultaba financiado.

Con el experimento se estudia el efecto de distintas clases de información sobre las contribuciones realizadas tanto por mujeres como por hombres, en la elección entre proyectos a financiar. En particular, la información se basaba en el número de personas que habían aportado al proyecto en sus primeros días de campaña, o en el número de opiniones realizadas por otros iguales o por expertos en los distintos proyectos. En este sentido, se desarrolla un modelo teórico muy sencillo, que explica cómo se agrega la información en los modelos de micro-mecenazgo basados en recompensas.

En el experimento, se les informa a los sujetos de que disponen de una dotación inicial de 60 dólares para poder aportar en los distintos proyectos, aunque sólo pueden aportar 15 dólares por ronda. Cada proyecto ha pasado por dos rondas de elección: en primer lugar, se obtienen las decisiones de los individuos ante dos proyectos (con información reducida) que a priori son similares, y entre los que deciden a cuál aportar; a continuación, se vuelven a presentar los dos proyectos, pero con información ampliada para ver cómo el nuevo conjunto de información afecta a la toma de decisiones previas.

Se presentan dos proyectos. Y, para cada proyecto, el conjunto de información en la segunda elección es distinto. El primero consiste en apoyar la edición de unos libros de temática muy similar y, para comprobar el efecto de las aportaciones de los contribuidores iniciales, se contraponen dos libros referidos a viajes; en cambio, para ver el efecto de las opiniones de los profesionales frente a los no profesionales, el segundo proyecto, se ofrecen libros que versan sobre comida saludable. Se ha procurado al máximo que las características de los libros a valorar fuesen completamente similares para que, a priori, les resulten indiferentes a los sujetos: concretamente, en la primera ronda de financiación, los proyectos parten de 0 euros recaudados y el mismo capital mínimo a partir del cual se considera exitosa la campaña; es en la segunda ronda de financiación, es cuando la información ampliada que los sujetos reciben se ve alterada de forma sustancial.

Un primer análisis descriptivo del comportamiento de los sujetos revela que presentar los proyectos con información ampliada tiene efectos determinantes en el comportamiento de los individuos. En este sentido, se constata cómo ante dos proyectos indiferentes, la presencia de los primeros patrocinadores genera un fuerte efecto gregario en la población ya que la distribución de elecciones se ve alterada entre la primera y la segunda ronda de financiación. De igual modo, también se constata cómo la población descarta la información sugerida por un agente profesional en favor de los comentarios positivos de otros agentes no profesionales.

Desglosando por países y sexo se encuentra que la nueva información sobre los primeros patrocinadores incrementa significativamente las aportaciones de los hombres (sea cual sea su país) y de las mujeres de los Estados Unidos (no se observa el mismo comportamiento para las mujeres de la India). En cuanto a si la nueva información referente son los comentarios de profesionales frente a no profesionales, los comentarios positivos de otros usuarios frente a los profesionales son más relevantes para el caso de las mujeres y hombres de Estados Unidos: sin embargo, no hay evidencia significativa de que afecta al comportamiento en las mujeres y hombres de India. Todo queda refrendado con el análisis no paramétrico de los datos agregados, así como en un modelo teórico que hemos desarrollado para explicar cómo los sujetos incorporan la nueva información a sus creencias sobre la probabilidad de éxito de la campaña a financiar. Así, se constata que el comportamiento gregario puede ser racionalizado a través de la elección óptima bajo incertidumbre y la revisión bayesiana de las creencias.

Los principales resultados que se obtienen son que un factor clave para el éxito de la campaña de financiación, es el número de personas que han previamente han aportado. Además, las opiniones de los iguales (peers) tienen un mayor efecto que las de los profesionales del sector. El mecanismo de transmisión de la información tiene lugar a través de las creencias o probabilidad de éxito de las campañas de los distintos proyectos, aumentando o disminuyendo dicha probabilidad (a través de la revisión Bayesiana) en las probabilidades a posteriori. Por tanto, la información disponible influye en las creencias que el posible financiador tiene acerca de la probabilidad de éxito de las distintas campañas, teniendo por ende un efecto en su toma de decisiones.

La contribución de este trabajo es proveer de evidencia sobre cómo el comportamiento gregario racional actúa como motor en estos mercados, ya que cambios de comportamiento en la elección pueden venir derivados de un reajuste racional en las creencias acerca de las probabilidades de éxito de las campañas de los distintos proyectos. Además, se respaldan anteriores resultados que resaltan la importancia de los financiadores tempranos: debido a la incertidumbre que enfrentan en los primeros días de campaña, atraerlos mediante descuentos u otros medios para poder incrementar la utilidad esperada de participar sería deseable desde el punto de vista de los emprendedores.

0.3 Preferencias sociales bajo incertidumbre

El tercer capítulo esta Tesis analiza cómo las preferencias sociales se ven afectadas ante la presencia de incertidumbre en la toma de decisiones. La literatura sobre preferencias sociales y generosidad -actitudes pro-sociales- es muy extensa, pero nos centramos en aquella que estudia cómo dichas relaciones se ven afectadas por el llamado efecto "marco" (*framing*): asociados al riesgo o daño moral hay resultados en el Juego del Dictador que demuestran qué si el enunciado del experimento alude a que la otra persona confía en ti, los dictadores se vuelven más generosos; así mismo, también afecta a las actitudes pro-sociales el que la acción a realizar sea robar o donar.

En nuestro trabajo se manipula el rol del agente decisor de modo que hay sujetos que actúan bajo el rol o bien de dictador o de receptor, con cierta probabilidad, pero que tomarán decisiones. Consecuentemente, con la probabilidad restante, los sujetos adoptarán el rol de receptores o dictadores, pero sus decisiones no serán implementadas en el juego. Las razones de este planteamiento se encuentran en la literatura previa existente, como pasamos a explicar a continuación, destacando el efecto de la incertidumbre y el sentimiento de propiedad, entre otros.

Numerosos estudios han estudiado cómo el sentido de la propiedad afecta al comportamiento generoso respecto de la cantidad a entregar. Se ha encontrado evidencia de que los sujetos entregan menos dinero cuando los sujetos se han ganado

el rol o han trabajado para producir la dotación que se va a distribuir. Otros trabajos de investigación en esta línea han versado sobre la carga cognitiva y su efecto en la generosidad. En nuestra opinión ambos efectos pueden afectar directamente a cuán generosa son las personas en un contexto del Juego del Dictador: saberse dictador crea un sentimiento de empoderamiento de los sujetos, mientras que la carga cognitiva de ser receptor implica ser consciente de que tu decisión no será implementada. Las razones que la literatura ha ofrecido para explicar dicho comportamiento generoso han sido diversas: preferencias por resultados equitativos, igualdad de oportunidades, eficiencia, reciprocidad, altruismo impuro, entre otras.

Sin embargo, la literatura en preferencias sociales en contexto de incertidumbre no es muy extensa. Hay trabajos de investigación cuya evidencia muestra que los sujetos prefieren elegir la opción con riesgo ya que elegir la opción segura arroja una distribución de los pagos asociados injusta; otros, la basan en si la decisión que se tome puede (o no) tener consecuencias para el receptor. Otros estudios encuentran cómo la gente renuncia a posibles ganancias mayores cuando las elecciones están asociadas a pagos iguales. En otra línea, la investigación llevada a cabo informa acerca de cómo mostrar los pagos como una fracción de los pagos totales tiene un impacto en las preferencias sobre el riesgo: en concreto, las personas prefieres asumir riegos a elegir una opción segura que arroje una distribución desigual de los pagos. Otros autores concluyen que a las personas no le gustan las loterías que llevan asociadas una distribución de los pagos desigual.

Finalmente, existe una exigua literatura que ha trabajado en modelos probabilísticos del Juego del Dictador. En este contexto, encuentran que las personas se preocupan acerca de la justicia en el procedimiento, sí una parte importante de los individuos comparten las oportunidades de ganar. Otros resultados en esta línea de investigación muestran una distinción entre igualdad de oportunidades (pagos esperados ex-ante) e igualdad de resultados (pagos ex-post). Resultados adicionales encuentran que, si a los sujetos se les da la posibilidad de asignar los repartos a través de un dispositivo aleatorio, la mitad de los mismos lo hará con tal de sentirse menos responsables sobre las decisiones de reparto.

Otros resultados previos refieren qué las preferencias sobre el riesgo influyen en el reparto: además de incrementar el grado de exposición al riesgo de los individuos, dá lugar a una reducción del dinero a repartir a los receptores. Un último resultado mostraría cómo los participantes de experimentos en esta línea, prefieren una norma justa que implique la misma redistribución entre personas, que tomar la misma decisión bajo riesgo.

El capítulo tercero estudia, pues, si cambios en el poder de decisión de las personas afecta al comportamiento generoso: a través del Juego del Dictador, se examina sí el nivel reparto varía cuando la probabilidad de que la decisión del dictador se implemente varía. Además, se estudia si existe un efecto framing, cuando a los sujetos se les dice que son dictadores y que su decisión será implementada con cierta probabilidad, en relación a aquellos que se les dice que son dictadores y su decisión no será implementada con cierta probabilidad.

Las tres hipótesis con las que trabajamos son las siguientes:

H1*: "la cantidad que los jugadores reparten decrece (se reduce la generosidad) conforme aumenta la probabilidad de que la decisión sea implementada".*

H2*: "aquellos que están en el tratamiento "dictador" reparten menos (se reduce la generosidad) que aquellos que están en el tratamiento "receptor".*

H3*: "aquellos dictadores (o receptores) que comienzan con probabilidades extremas (p = 100%) reparten menos dinero (se reduce la generosidad) que aquellos que nunca se enfrentan una probabilidad extrema (p = 90%).*

El experimento se ha organizado en la Facultad de Ciencias Económicas y Empresariales de la Universidad de Sevilla y se han reclutado 200 sujetos, de los cuales 173 han realizado finalmente el experimento. Se ha decidido un diseño 2x2 en el que, en primer lugar, se variaba el rol del sujeto (dictador vs receptor) y luego se variaba la probabilidad de ser un rol, para comprobar la importancia de comenzar con probabilidades extremas o no (incertidumbre pura *versus* incertidumbre impura). El problema al que se enfrentaban los sujetos experimentales era el de repartir una dotación de 10€. En cada sesión, antes de comenzar el experimento, se les especificaba en las instrucciones, que las decisiones llevaban asociadas un incentivo económico.

Además del Juego del Dictador, se obtuvo la siguiente información: variables sociodemográficas de los sujetos; grado de aversión al riesgo (medido a través del test de Holt-Laury de 5 ítems, con incentivos económicos); grado de habilidades cognitivas (a través del Cognitive Reflection Test); finalmente, se les hacían dos preguntas que, en una escala de Licket de 7 puntos, los sujetos indicaban sí les preocupaba que otras personas tuvieran menos dinero (generosidad) o qué tuvieran más dinero (envidia).

Un primer análisis no paramétrico de los datos muestra que existe una tendencia negativa en todos los tratamientos, en cuanto al nivel de reparto a medida que se incrementa la probabilidad de ser dictador (**Resultado 1**), por lo que se encuentra apoyo para **H1**.

A continuación, se ha analizado si existen diferencias significativas en cuanto a las aportaciones medias de los sujetos, según se encontrasen en el tratamiento dictador o en el tratamiento receptor. El análisis no paramétrico de los resultados confirma lo siguiente: los sujetos reparten menos (son menos generosos) cuando están en el tratamiento Dictador (**Resultado 2**). De este modo, se encuentra apoyo para **H2.**

Por último, se ha contrastado si comenzar con probabilidades extremas (p = 100%) afecta a la cantidad que se reparte. Aunque el estudio no paramétrico lo descarta para aquellos que están en el tratamiento dictador, sí que da apoyo para aquellos del tratamiento receptor. De este modo, se obtiene evidencia de que comenzar con una probabilidad extrema (p = 100%) provoca que los sujetos repartan menos (sean menos generosos) para aquellos que están en el tratamiento receptor, no afectando a los que están en el tratamiento dictador (**Resultado 3**).

Nuestros resultados son robustos en el análisis econométrico realizado posteriormente. Aprovechando la información disponible, se ha estimado, cómo el importe medio entregado podía depender de los siguientes factores: la probabilidad de ser dictador, estar en el tratamiento receptor, estar en el tratamiento incertidumbre pura (p = 0.9), ser mujer, el grado de habilidades cognitivas del individuo, su nivel de conciencia sobre la generosidad y la envidia y el nivel de aversión al riesgo.

El examen de lo anterior confirma los siguientes resultados:

- A medida que se incrementa la probabilidad de ser dictador, la cantidad a repartir disminuye (la generosidad se reduce).
- Ser llamado "receptor" conlleva a repartir más dinero (la generosidad aumenta).
- Comenzar con incertidumbre pura (p = 0.9) induce a repartir más dinero solo en el tratamiento receptor (la generosidad aumenta).
- Sexo, habilidades cognitivas, conciencia sobre generosidad o envidia, así como aversión al riesgo no afectan a la cantidad repartida.

Aunque existe literatura que estudia cómo se comporta el dictador ante una opción segura y con riesgo, y otra referente a explicar los factores que influyen en la desigualdad ex-ante y ex-post, la inclusión del poder de decisión como variable decisora no se había estudiado todavía. Nuestra contribución se centra, por tanto, en estudiar cómo el poder de decisión afecta al nivel de generosidad y se obtiene que: el nivel de generosidad disminuye a medida que la probabilidad de ser dictador aumenta (Resultado 1); estar en el rol de dictador reduce la generosidad (Resultado 2); tomar decisiones en contextos de absoluta certidumbre reduce la generosidad solo para aquellos que están en el tratamiento receptor.

Siendo conscientes de la limitación de nuestro enfoque, para investigación futuro se pretende estimar los parámetros de generosidad y envidia del modelo de Fehr-Schmidt (con modelos estructurales) para ver cómo las probabilidades de ser dictador y los tratamientos afectan a dichas variables.

0.4 Sobreconfianza en tareas conocidas y desconocidas

El cuarto capítulo se centra en analizar la (posible) diferencia de creencias entre mujeres u hombres sobre el propio desempeño en relación con los demás (overplacement), diferenciado por tareas conocidas y desconocidas. La literatura no ofrece un consenso a este respecto y la forma de abordarlo ha sido con la realización de dos tareas diferentes donde la diferencia sustancial radicaba en el grado de exposición previo del sujeto a tareas similares: tener cierta predicción te permite prever mejor el posible resultado de la tarea. A tal fin, las tareas seleccionadas son el test de matrices

progresivas de Raven y la grabación de un vídeo donde los sujetos se presentan a ellos mismos. Mientras que a lo largo de la vida de los individuos se llevan a cabo diferentes tests (como el que mide nuestro coeficiente intelectual), que hace que se sientan familiarizados con esta dinámica, es totalmente infrecuente grabar un clip directamente a cámara frente a un equipo profesional, siendo posteriormente evaluada la ejecución del mismo.

El test de Raven ha sido ampliamente utilizado convirtiéndose en un estándar para medir, a través de 60 preguntas de elección, el razonamiento analógico, la capacidad de abstracción y la percepción de los individuos.

Acerca del clip de vídeo, a las personas que participaron se les requería decir exclusivamente su nombre, dónde nacieron y el código identificador que se les había asignado. 20 evaluadores independientes (paridad en sexo), deberían responder con un sí o un no acerca de 3 cuestiones: si la persona la calificaría como bella, si les había gustado la ejecución, si les había producido sentimiento de simpatía. Sumando las respuestas de todos los evaluadores en las tres medidas referenciadas, se construía un índice que recogía la evaluación global del sujeto en esta tarea. Ambas tareas no han sido incentivadas con pagos monetarios.

Transcurridos unos días, se les enviaba un e-mail en el que debían de responder en qué tramo (decil) se situaban, por tarea, con respecto al general de la población y con respecto tanto a su propio sexo como con respecto al sexo opuesto. Al mismo tiempo eran informados de que se sortearía la pregunta que se iba a pagar y, en el caso de coincidir su respuesta con su decil real, se le abonarían 20 euros.

Ésta es la base del diseño experimental. Además, se recogió información adicional sobre variables sociodemográficas de los individuos, la aversión al riesgo puesto que ésta puede influir en las predicciones, el estado de salud revelada y se midieron las habilidades cognitivas a través del Cognitive Reflection Test (CRT).

Dada la distinta naturaleza de las tareas a realizar, así como el grado de experiencia previa en la realización de tareas similares, las dos hipótesis que se quieren verificar eran las siguientes:

H1: "*No esperamos diferencias de género en overplacement en el test de Raven".*

H2: "*Sí esperamos diferencias de género en overplacement en la tarea del video".*

Sin embargo, un primer análisis descriptivo de los datos ha mostrado que sí existen diferencias significativas, a favor de los hombres, tanto en la realización del test de Raven como en las expectativas de cómo lo han hecho. Para el caso del vídeo, aunque tanto mujeres como hombres ejecutaron la tarea de modo similar, también se encuentran diferencias significativas en cuanto a que éstas son menos optimistas en relación al resultado que esperan obtener.

Como cabía esperar, el resultado entre ambas tareas no está correlacionado (no así para el caso de los hombres), a diferencia de las expectativas en su realización: sí en el test de Raven se espera haberlo hecho bien, igual se espera haberlo hecho en la tarea del vídeo.

El análisis econométrico de los datos se estructura bajo 3 tipos de regresiones: las que explican el valor predicho, las que explican el grado de overplacement (diferencia entre el valor predicho y el valor real obtenido en cada tarea) y las que explican el grado de precisión/error (grado de overplacement en términos absolutos). Para cada tipo, se especifican los siguientes 5 modelos:

- Modelo 1: se utiliza el valor actual obtenido para estimar el valor de la predicción.
- Modelo 2: se usa la variable de género como variable dependiente.
- Modelo 3: se usan el valor actual obtenido y la variable de género.
- Modelo 4: corrige el modelo anterior introduciendo la interacción entre el valor actual obtenido y la variable de género.
- Modelo 5: es el Modelo 4 más las siguientes variables de control: estado de salud revelada, aversión al riesgo, y CRT.

Así, estas regresiones han sido contrastadas para ambas tareas y para grupo de referencia (total, sexo propio, sexo distinto).

En el caso del test de Raven, se puede establecer que:

- Total (Overall): no se encuentran diferencias de género significativas ni en las predicciones, ni en el overplacement, ni en el nivel de precisión (**Resultado 1**).

- Sexo propio (In-group): no se encuentran diferencias de género significativas ni en las predicciones, ni en el overplacement, ni en el nivel de precisión tampoco (**Resultado 2)**.
- Sexo distinto (Out-group): no se encuentran diferencias de género significativas ni en las predicciones, ni en el overplacement. Las mujeres son más precisas en sus predicciones (**Resultado 3**).

Estos tres resultados permiten afirmar que **H1,** sobre la ausencia de diferencias de género en el test de Raven, no se rechaza.

Por otra parte, en el caso de la tarea del vídeo, se puede establecer que:

- Total (Overall): no se encuentran diferencias de género significativas ni en las predicciones, ni en el overplacement. Las mujeres son más precisas en sus predicciones (**Resultado 4**).
- Sexo propio (In-group): las mujeres predicen valores más altos y muestran un mayor nivel de overplacement cuando son comparadas consigo mismas (este efecto no era significativo cuando se comparaban con toda la muestra). También son más precisas en sus predicciones (**Resultado 5**).
- Sexo distinto (Outgroup): no se encuentran diferencias de género significativas ni en las predicciones, ni en el overplacement. Las mujeres son más precisas en sus predicciones (**Resultado 6**).

A este respecto, aunque el Resultado 5 difiere de los otros resultados (sugiriendo incluso lo contrario), se puede afirmar que **H2,** sobre la existencia de diferencias de género en la tarea de video, *no se confirma*.

Como conclusión se obtiene que, en el caso de la realización de una tarea donde los participantes pueden aproximar su resultado (dada su experiencia previa en actividades similares), los resultados del análisis no permiten afirmar que el nivel de overplacement de los hombres sea mayor que el de las mujeres en la realización del test de Raven. Por tanto, la **H1** ("no hay diferencias de género en el overplacement para el test de Raven") no se rechaza.

Sin embargo, en el desarrollo de una tarea desconocida (sin experiencia previa en otras similares) sumado al incremento de dificultad de ponderar el propio resultado

(dada la existencia de evaluadores externos), consideramos que es el entorno más adecuado para que surja over(under)placement. Además, la literatura existente encuentra evidencias sobre que los hombres son más "demasiado confiados" (overconfident) que las mujeres.

Los resultados obtenidos no confirman a **H2** (los hombres muestran más overconfidence), ya que tanto en la comparación total (overall) como en la de sexo distinto (out-group), no se encuentran diferencias en las predicciones y en el nivel de overplacement (aunque sí que las mujeres son más precisas). De hecho, ha sido con el análisis de sexo propio (in-group) cuando **H2** pierde más apoyo al haber encontrado que las mujeres son más overconfident que los hombres, rechazando de forma definitiva dicha hipótesis.

CHAPTER 1

Introduction: The individual as architect

This dissertation consists of three chapters in which the experimental methodology is used to analyze and give answers to questions regarding different topics. First, the rationality of herding behaviour in crowdfunding markets is analyzed. Second, we study how social preferences are affected in the presence of uncertainty in decision making. Finally, the (possible) difference of beliefs between women or men about their own performance in relation to others (overplacement), differentiated by known and unknown tasks, is studied.

1.1 Why Experimental and Behavioural Economics?

This year, experimental and behavioral economics receive a new recognition, with the Nobel Prize in Economics 2019 going to Abhijit Banerjee, Esther Duflo and Michael Kremer: "for their experimental approach to alleviate global poverty." It is not anecdotal or transitory, since this recognition adds to the path that Vernon Smith opened with Daniel Kahneman in 2002 endorsing the use of this methodology.

At present, the utility that this tool brings to the development of the economic discipline is free of any doubt. Together with economic theory they both generate a feedback effect, since contributions into one would also result in the other (and vice versa). Experimental economics allows us to refine the assumptions on which is based the economic theory (which is the study of phenomena causality); at the same time, theoretical constructions allow us to explain the results that empirical evidence leaves in experimental economics. Moreover, and thanks to the development of experimental and behavioral economics, the science of economics has embraced other sciences (such

as psychology, anthropology and neuroscience) with a multiplier effect on the development of universal knowledge.

Therefore, experimental and behavioural economics has enabled the economy to democratize as a study field. That is, to provide evidence that not all economic agents are equal, while the underlying motivations of economic decision making are characterized by their heterogeneity. Although the etymological origin of the word Economy refers to the administration of home for the benefit of its residents (from the Greek “oikos”, home, and “nemein”, administer), the discipline stands as a social science that, nevertheless, is developing theoretical constructions while keeping its essence aside: the individual. With the experimental and behavioural economics, the voice is given specifically to the social being as an authorial centre from which, now, it is intended to understand the mechanisms that articulate the interactions between people. All of the above confirms that there is still much to be elucidated, so there are more than enough reasons to justify the study of a dissertation in experimental economics.

Throughout this dissertation, it will be possible to validate the effort made in providing new results that help to better understand how the individual stands in front of the group where she is integrated. Namely, how we decide according to those who preceded us, if the pro-social attitudes change based on the context surrounding us, as well as the confidence of our results in front of the others. Furthermore, this dissertation brings together the studied issues through different approaches: from a more standard experimental design such as the Dictator's Game approach, to using the functionalities that internet development grants us (such as Amazon Mechanical Turk), as well as the comparison of traditional and innovative activities to verify a possible effect on the behavior of individuals.

Below, a more detailed description is provided for each chapter and its content of this dissertation, highlighting the background of the topics and their contributions. contributions.

1.2 Rational herding in reward-based crowdfunding: an MTurk experiment

Chapter 2 analyzes how herding behaviour may (or may not) interfere with financing decisions in crowdfunding markets. Since this practice is a recent alternative to the traditional financing mode, the existing literature has mainly focused on characterizing this new market, highlighting the fact of enabling a direct relationship between entrepreneurs and a number of people who make micro-contributions to the project as an intrinsic characteristic. Some authors emphasize the problem of information asymmetry, given that the entrepreneur does know the product perfectly while those who contribute don't, in addition to the uncertainty about the success of the financing campaign. These two elements affect both platforms and entrepreneurs, and urge them to send more accurate signals to potential funders. As for the reasons why people participate in these mechanisms, both intrinsic and extrinsic factors are involved: pure motive of purchase, altruistic motives, and affiliation reasons (to feel part of a community), as well as desire for sponsorship and to feel that part of the campaign's success is thanks to their contributions.

Recent studies analyze how uncertainty affects crowdfunding markets. There are among them those who point out the existence of a herding behaviour that leads to replicate what the majority do. Hence, the need to understand the mechanisms through which this herding behaviour occurs in crowdfunding markets, stating if such behaviour is rational and if the subjects make non tilted inferences, based on the decisions observed. Theoretical research in observational learning justifies that imitation can be optimal (ex ante) in sequential choice frames. Therefore, if it were merely assumed that herding behaviour is irrational, this effect would be underestimated by not correctly identifying the factors that determine it.

Understanding rationality and herding behaviour in crowdfunding markets is essential for the development of management tools in these markets, in order to maximize the number of micro-contributors.

On the other hand, empirical research has answered a variety of questions: for example, the effect of total ticket sales of reward-based crowdfunding campaigns; other

studies focus on the influence of the experts or other users' recommendations in the product choice; other work analyzes how the "word of mouth" affects investment decisions; recently, other authors have pointed out the number of people who contribute as the determining factor, in those campaigns that required high funding.

Among the determinants of a campaign's success, the number of funders who contribute in the first moments of its initiation stands out. Two fundamental reasons why this influence is transmitted: on the one hand, it serves as a signal about the quality of products, which leads to social learning and at the same time increases the contributions of other possible funders. In fact, empirical evidence shows that the contributions of individuals are based, in part, on the percentage that has already been funded by the campaign. However, and as previously mentioned, information asymmetry and uncertainty about the success of the campaign act as factors that hinder funding in the first days of the campaign.

In this chapter we analyze the rationality of herding behaviour in crowdfunding markets. The approach to this study is through an online experiment, taking advantage of the features of Amazon Mechanical Turk (Mturk) that allow payment of micro-tasks to people who are registered and participate in the experiment. In this way, we have access to the world population and; in our case; 847 people are recruited (250 men and 97 women from India, 250 men and 250 women from the United States. The experiment, taking the design of a reward-based crowdfunding platform, consisted in that subjects had to decide between two projects that involve associated payments. Together with the above, a theoretical model is developed explaining how the information is added in the reward-based crowdfunding models.

The experiment studies the effect of different kinds of information on the contributions made by both women and men in the selection between the projects to be financed. In particular, the information is based on the number of people who had contributed to the project in the first days of the campaign, or on the number of opinions made by other equals or by experts in the different projects.

To this end subjects were informed that they had an initial endowment of USD60 to contribute in the different projects: however, they can only contribute with USD15 per round. Each project has to go through two funding rounds: in the first, the

preferences of individuals were elicited before two projects (with reduced information) that a priori are indifferent and subjects had to make the decision to contribute to one project or another; then, the two projects were presented again but with expanded information to evaluate how the new set of information would affect previous decision making.

The presented projects consist of supporting the publication of books with a similar theme: to test the effect of the initial contributors' donation. On one hand two travel books were opposed; on the other hand, and to verify the effect of professionals' opinions against non-professionals, the other opposed books were about healthy food. It was tried to the maximum that the characteristics of the books to be valued were completely similar so that, a priori, they would be indifferent in front of the subjects: specifically, in the first round of financing, the projects depart from 0 euros raised and the same minimum capital of which the campaign is considered successful; It is in the second round of financing when the expanded information that subjects receive is substantially altered in each project.

A first descriptive analysis of the subjects' behavior reveals that presenting the projects with expanded information has determinant effects on the behavior of the individuals. In this sense, it can be seen how, facing two indifferent projects, the presence of the first sponsors generates a strong herding effect on the population since the distribution of choices is altered between the first and the second round of financing. Similarly, it is also verified how the population discards the information suggested by a professional agent in favor of positive comments from other non-professional agents.

Breaking outcomes down by country and sex, it is found that the new information on the first sponsors significantly increases the contributions of men (whatever their country is) and of women from the United States (the same behavior is not observed for women from India). With reference to the new information concerning the comments of professionals versus non-professionals, the positive comments of other users against professionals are more relevant in the case of women and men from the United States: however, there is no significant evidence on its effect on behavior in women and men from India. Everything remains endorsed with the non-parametric analysis of the aggregated data, as well as in a theoretical model that has been developed to explain

how subjects incorporate new information to their beliefs about the probability of success of the campaign to be financed. Thus it is found that herding behavior can be rationalized through the choice of optimal decisions under uncertainty and the Bayesian updating of beliefs.

The main results obtained are that a key factor for the success of a financing campaign is the number of people who have previously contributed. In addition, peers' opinions have a greater effect than those of professionals in the sector. The mechanism of information transmission takes place through the beliefs or probability of success of the campaigns of different projects, increasing or decreasing this probability (through Bayesian updating) in the posterior probabilities. Therefore, the available information influences the beliefs which the potential funder has about the probability of success of the different campaigns, thus having an effect on their decision making.

The contribution of this work is to provide evidence on how rational herding behavior acts as an engine in these markets, since changes in choice behavior can be derived from a rational readjustment in beliefs about the chances of campaign's success of the different projects. Furthermore, previous results that highlight the importance of early funders are supported: due to the uncertainty they face in the first days of the campaign, attracting them through discounts or other means to increase the expected utility of participating would be desirable from the entrepreneurs' point of view.

1.3 Social preferences under uncertainty

Chapter 3 of this dissertation analyzes how social preferences are affected in the presence of uncertainty in decision making. The literature on social preferences and generosity - pro-social attitudes - is quite extensive, but the focus will be on that which studies how these relationships are affected by the so-called "framing" effect: results in the Dictator Game associated with a risk or moral damage, demonstrate that if the statement of experiment alludes to the other person trusting you, the dictators will become more generous; likewise, it also affects pro-social attitudes when the action to be taken is either to steal or donate.

In this experiment, the role of the deciding agent is manipulated so that there are subjects acting under the role of either a dictator or a receiver, with a certain probability, but who will be making decisions. Consequently, with the remaining probability, the subjects will adopt the role of recipients or dictators, but their decisions will not be implemented in the game. The reasons standing behind this approach are found in the previously existing literature, as will be explained further on, highlighting the effect of uncertainty and the feeling of ownership, among others.

Several studies have examined how the sense of ownership affects the generous behavior regarding the amount to be delivered. Evidence has been found that subjects give less money when they have earned the role or worked to produce the endowment to be distributed. Other research working in this line had dealt with the cognitive load and its effect on generosity. In our opinion, both effects can directly influence how generous people are in a context of the Dictator's Game: knowing oneself as a dictator creates a feeling of empowerment of the subjects, while the cognitive burden of being a recipient implies being aware that your decision will not be implemented. The reasons that literature has offered to explain such generous behavior are diverse: preferences for equitable results, equal opportunities, efficiency, reciprocity, impure altruism, and others.

However, the literature on social preferences in the context of uncertainty is not that extensive. There are research papers whose evidence shows that subjects prefer to choose the option with risk since choosing the safe option results in an unfair distribution of associated payments; others based on whether the decision made may - or may not - have consequences on the recipient. Other studies find how people give up potential higher profits when elections are associated with equal payments. In another line, the research carried out informs about how to demonstrate payments as a fraction of the total payments has an impact on risk preferences: in particular, people would rather take risks than choose a safe option that yields an unequal distribution of payments. Other authors conclude that people do not like lotteries that have an associated uneven distribution of payments.

Finally, there is a meager literature that has worked on probabilistic models of the Dictator's Game. In this context, it is found that people care about justice in the

procedure, if an important part of individuals share the opportunities to win. Other results in this line of research show a distinction between equal opportunities (expected ex-pre payments) and equal results (ex-post payments). Additional results find that, if the subjects are given the possibility of assigning the distributions through a random device, half of them will do so in order to feel less responsible about the distribution decisions.

Other previous results indicate that risk preferences influence the distribution: in addition to increasing the degree of risk exposure of individuals, it results in a reduction of the money to be distributed among the recipients. A final result would show how the participants of experiments in this line, prefer a fair norm implying the same redistribution between people, that making the same decision under risk.

Chapter 3 studies if changes in the power of people's decision affect generous behavior: through the Dictator's Game, it is examined whether the level of generosity varies when the probability that the dictator's decision is implemented varies. In addition, it is studied with a framing effect, when the subjects are told that they are dictators and that their decision will be implemented with certain probability, in relation to those who are told that they are dictators but their decision will not be implemented with certain probability.

The three hypotheses to work with are the following:

H1: *"the amount that players distribute decreases (generosity is reduced) as the probability of the decision being implemented increases."*

H2: *"those who are in the "dictator" role share less (generosity is reduced) than those who are in the "recipient" role.*

H3: *"those dictators (or recipients) who start with extreme probabilities (p = 100%) distribute less money (generosity is reduced) than those who never face an extreme probability (p = 90%).*

The experiment has been organized at the Faculty of Economic and Business Sciences of the University of Seville and 200 subjects have been recruited, of which 173 have finally completed the experiment. A 2x2 design has

been decided in which, firstly, the role of the subject was varied (dictator v/s recipient) and then the probability of having a role was varied, to verify the importance of starting with extreme probabilities or not (pure uncertainty v/s impure uncertainty). The problem faced by the experimental subjects was to distribute an allocation of €10. In each session, before beginning the experiment, they were advised in the instructions, that the decisions were associated with an economic incentive.

In addition to the Dictator Game, the following information was also obtained: socio-demographic variables of the subjects; degree of risk aversion (measured through the Holt-Laury test of 5 items, with economic incentives); degree of cognitive skills (through the Cognitive Reflection Test); finally, they were asked two questions that, on the Licket scale of 7-points, subjects indicated whether they were concerned that other people had less money (generosity) or that they had more money (envy).

A first descriptive analysis of the data, through the non-parametric Jonckheere-Terpstra test, shows that there is a negative trend in all roles, in terms of the level of distribution, as the probability of being a dictator rises (**Result 1**), hence, the support for **H1**.

Later on, it has been analyzed if significant differences exist in terms of the subjects' average contributions, depending on whether they were in the dictator role or in the recipient role. The non-parametric analysis of the results confirm the following: the subjects distribute less (they are less generous) when they are in the Dictator role (**Result 2**). Therefore, support is found for **H2**.

Finally, it has been verified that starting with extreme probabilities (p = 100%) affects the amount to be distributed. Going on with our non-parametric study does not confirm it for those in the dictator role, it does indeed provide support for those in the recipient role. This way evidence is obtained to prove that starting with an extreme probability (p = 100%) provokes subjects to distribute less (they are less generous) for those in the recipient role, not affecting those in the dictator role (**Result 3**).

Our results are vigorous in the econometric analysis carried out later. Taking advantage of the available information, it has been estimated, how the average amount

delivered could depend on the following factors: the probability of being a dictator, being in the recipient role, being in the treatment of pure uncertainty (p = 0.9), being a woman, the degree of the individual cognitive abilities, their level of awareness about generosity and envy and the level of risk aversion.

The examination of the above confirms the following results:

- As the probability of being dictator increases the amount to be distributed decreases (generosity decreases).
- As the probability of being dictator increases the amount to be distributed decreases (generosity decreases).
- Being called a "recipient" means distributing more money (generosity increases).
- Starting with pure uncertainty (p = 0.9) induces to distribute more money only in the recipient role (generosity increases).
- Sex, cognitive skills, awareness of generosity or envy, as well as risk aversion do not affect the amount distributed.

Although an existing literature studies how the dictator behaves in front of both a safe and a risky option, and another literature explains factors that influence ex-pre and ex-post inequality, the inclusion of the power of decision as a decision variable had not been studied yet. Our contribution therefore focuses on studying how the power of decision affects the level of generosity, and it is obtained that: the level of generosity decreases as the probability of being a dictator increases (**Result 1**); being in the role of dictator reduces generosity (**Result 2**); Making decisions in contexts of absolute certainty reduces generosity only for those in the recipient role.

Being aware of the limitation of our approach, it is intended for future research to estimate the parameters of generosity and envy of the Fehr-Schmidt model (with structural models) to find out how the probabilities of being a dictator and the treatments affect these variables.

1.4 Overall, in-group and out-group overplacement in known and unknown tasks: gender differences.

Chapter 4 focuses on analyzing the (possible) difference of beliefs between women or men about their own performance in relation to others (overplacement), differentiated by known and unknown tasks. The literature does not offer a consensus in this regard and the way it was dealt with has been carried out through the performance of two different tasks where the substantial difference was in the degree of previous exposure of the subject to similar tasks: having a certain prediction allows you to better anticipate the possible outcome of the task. To this end, the selected tasks are the Raven progressive matrixes test and the recording of a video where the subjects present themselves. While different tests are carried out throughout the life of individuals (such as the one that measures our IQ), which makes them feel familiar with this dynamic, it is totally uncommon to record a clip directly to the camera in front of a professional team, having the execution of the same evaluated afterwards.

The Raven's test has been widely used, becoming a standard for measuring analogical reasoning, the ability to abstract and the perception of individuals through 60 choice questions.

With reference to the video clip, people who participated were required to say exclusively their name, where they were born and the identification code they were assigned. 20 independent evaluators (parity in sex) should answer 3 questions with yes or no: if they would rate the person as beautiful, if they had liked the execution, if it had produced them a feeling of sympathy. By totaling the answers of all evaluators in the three referenced measures, an index was constructed that included an overall evaluation of the subject in this task. Both tasks have not been compensated with monetary payments.

Few days later, they were sent an e-mail where they had to reply specifying in which section (decile) they would situate themselves for each task with respect to the general population, and with respect to both their own sex and the opposite sex. At the same time, they were informed that a draw will decide the question that was going to

be paid and, in case of matching their answer with their real decile, they would be paid 20 euros.

This is the basis of the experimental design. Furthermore, additional information was gathered on the socio-demographic variables of the individuals, risk aversion given that it can influence the predictions, the state of revealed health and the cognitive abilities were measured through the Cognitive Reflection Test (CRT).

Given the different nature of the tasks to be performed, as well as the level of previous experience in performing similar tasks, the two hypotheses to be verified were the following:

H1: *"We do not expect gender differences in overplacement in the Raven test".*

H2: *"We do expect gender differences in overplacement in the task of the video"*.

However, a first descriptive analysis of the data has shown that there are significant differences, in favor of men, both in conducting the Raven test as well as in the expectations of how they have done it. In the case of the video, although both women and men executed the task in a similar way, significant differences are found in women being less optimistic in relation to the result they expect to obtain.

As expected, the result between both tasks is not correlated (not so in the case of men), unlike the expectations in its realization: it was expected to have done well in the Raven test, and the same was expected for the video task.

The econometric analysis of the data is structured under 3 types of regressions: those that explain the predicted value, those that explain the degree of overplacement (difference between the predicted value and the real value obtained in each task) and those that explain the degree of precision / error (degree of overplacement in absolute terms). For each type, the following 5 models are specified:

- Model 1: uses the current value obtained to estimate the prediction value.
- Model 2: uses the gender variable as a dependent variable.
- Model 3: uses both the current value obtained and the gender variable.
- Model 4: corrects the previous model by introducing the interaction between the current value obtained and the gender variable.

- Model 5: is the Model 4 plus the following control variables: revealed health status, risk aversion, and CRT.

Thus, these regressions have been contrasted for both tasks and for the reference group (total, same sex, different sex).

In the case of the Raven test, it can be established that:

- - Total (Overall): no significant gender differences found neither in the predictions, nor in the overplacement, or in the level of precision (**Result 1**).
- Same sex (In-group): no significant gender differences found neither in the predictions, nor in the overplacement, or in the level of precision (**Result 2**).
- Different sex (Out-group): no significant gender differences found neither in the predictions nor in the overplacement. Women are more precise in their predictions (**Result 3**).

These three results allow the confirmation of **H1**: the absence of gender differences in the Raven test is not rejected.

On the other hand, in the case of the video task, it can be established that:

- Total (Overall): no significant gender differences found neither in the predictions nor in the overplacement. Women are more precise in their predictions (**Result 4**).
- Same sex (In-group): women predict higher values and show a higher level of overplacement when compared to themselves (this effect was not significant when compared with the entire sample). They are also more precise in their predictions (**Result 5**).
- Different sex (Outgroup): no significant gender differences found neither in the predictions nor in the overplacement. Women are more precise in their predictions (**Result 6**).

In this regard, although **Result 5** differs from the other results (or even suggests the opposite), it can be said that on **H2**, the existence of gender differences in the video task, is not confirmed.

In conclusion, it is obtained that, in the case of performing a task where participants can approximate their result (given their previous experience in similar

activities), the results of the analysis do not allow to state that the level of overplacement of men is greater than that of women in carrying out the Raven test. Therefore, the **H1** ("there are no gender differences in the overplacement for the Raven test") is not rejected.

However, in the development of an unknown task (without previous experience in similar ones) in addition to the increase in the difficulty of analyzing the result itself (given the existence of external evaluators), we consider it to be the most appropriate environment for the emerging of over(under)placement. In addition, the existing literature finds evidence that men are far more "too confident" (overconfident) than women. The results obtained do not confirm **H2** (men show more overconfidence), since in both the total comparison (overall) and in the different sex (out-group), no differences are found neither in the predictions nor in the level of overplacement (although women are more precise). In fact, it has been with the analysis of same sex (in-group) when **H2** loses more support having found out that women are more overconfident than men, therefore rejecting this hypothesis definitively.

CHAPTER 2

Rational herding in reward-based crowdfunding: an MTurk experiment

2.1 Introduction

Crowdfunding has attracted much attention in recent years as a fast-growing way of financing entrepreneurial projects through the Internet. In contrast to traditional funding methods, many individuals—the crowd—provide funds directly to the entrepreneur rather than through a financial intermediary, to whom the task to oversee the investment has traditionally been delegated. In fact, Mollick (2014, p. 2) explicitly defines crowdfunding as a venture "without standard financial intermediaries." Crowdfunding platforms become a new type of intermediaries between fund seekers and a huge crowd of small fund providers (Cosh *et al*., 2009; Gierczak *et al*., 2016; Leboeuf & Schwienbacher, 2018). Given the uncertainty and asymmetric information problems associated to entrepreneurial financing, crowdfunding platforms and requesters face important challenges related to the information and signals to be sent to prospective backers.

With so much uncertainty, herding is usually found in all types of crowdfunding (see, for instance, Astebro, *et al*., 2019, and Zhang and Liu, 2012). Herding can be described as the imitation of the majority. Given the widespread herding phenomenon in crowdfunding, understanding mechanisms driving herding is of great importance. Specifically, knowing whether herding in crowdfunding is rational would help better estimate the herding effect, as rational observational learners interpret the herd by making unbiased inferences from the decisions they observe (Simonshon and Ariely, 2008). In the case of sequential choice settings may be optimal, ex ante, to imitate observed behaviors (Banerjee 1992, Bikhchandani *et al.* 1992). Thus, rational herding requires observers making unbiased inferences from the decisions they observe. If

irrational herding were merely assumed, the herding effect would be underestimated by ignoring powerful rational drivers adding to irrational herding behavior.

Therefore, learning how rationality may be integrated with herding behavior is important to design management strategies that aim to maneuver the herd. We conduct an online ad hoc experiment where subjects get rewards depending on their decisions and the context, simulating a reward-based crowdfunding webpage, with 847 subjects from the USA and from India (USA: 250 men and 250 women; India: 250 men and 97 women) through Amazon Mechanical Turk (MTurk). Additionally, we develop a model that captures what may be the main information aggregation in reward-based crowdfunding platforms. The effect of rational herding is shown in the experimental setting and explained by the model.

The experiment tests the effects that some information has on choices by women and men prospect contributors (backers): (i) the number of early contributors already financing the project; and (ii) the positive opinions from other backers and/or experts.

Previous empirical research has analyzed the effect of sold out early birds in reward-based crowdfunding (Wessel *et al*., 2019), the influence of peers and experts' recommendations in online product choice (Huang & Chen, 2006) and the impact that e-word of mouth has on funder investment decisions (Bi *et al*., 2017). Moreover, Kraus *et al*. (2016) identified that the amount of backers was the most important condition for high achieved funding. Our research, however, implements an online economic experiment in which subjects' performance determine their rewards and tests the influence of rational herding in decisions.

The results of the controlled economic experiment show that early contributions affect backers' beliefs about the campaign´s probability of success, therefore increasing contributions to the campaign. Results also confirm that positive opinions from peers are more important than experts' comments in increasing campaign contributions, thus acting as a proxy for next contributions. The revealed information influences the backers' beliefs on the projects' probability of success, and then, their choices.

The paper is organized as follows. Section 2 provides an overview of the background. Section 3 presents the paper methodology and describes the experimental design and procedures. The results' descriptive overview, as well as the analysis of the results are shown in Section 3. Some conclusions close the chapter.

2.2 Background

As explained by Belleflamme *et al.* (2014), the concept of crowdfunding is derived from a broader concept, crowdsourcing. A task previously performed by a bank employee is outsourced to a large mass of people in the form of an online open call (Bayus, 2013). This online open call reaches the crowd through the webpage of crowdfunding platforms. Project creators post their projects and a reward scheme (a menu of reward items and their prices) to attract backers. According to Agrawal *et al*. (2014), the information between project creators and backers is asymmetric. In fact, creators know the real quality of their projects and have a better proxy to the funding probability of success, while backers do not. Backers lack of the necessary information to properly estimate the chances of success of the proposed campaigns.

Out of the four major crowdfunding models, which differ in the reward backers receive —donation-based crowdfunding, reward-based crowdfunding, crowdinvesting and crowdlending[1], according Cumming & Hornuf (2018)—, reward-based crowdfunding, the one examined in this research, is mainly used by entrepreneurs to finance the manufacturing process of new products. Backers are compensated either with a tangible reward (e.g. a sample of the final product) or an intangible one (e.g. having their name written in the product packaging). As noted by Mollick (2016), this type of crowdfunding has the potential to democratize the access to innovation and entrepreneurship.

[1] In donation-based crowdfunding, backers give funds for no economic compensation; crowdinvesting refers to multiple people participating in the uncertain future cash flows of a firm or project in the form of equity, mezzanine or debt finance; and crowdlending provides fund seekers with fixed-interest loans to be repaid to a large number of lenders.

To explain the dynamics of reward-based crowdfunding is worth to take the example of Kickstarter, one of the largest platforms worldwide connecting fund seekers with contributors. Kickstarter focuses on creative projects and does not accept charity causes. Kuppuswamy and Bayus (2018) explain that members, after joining the online community, can ask for funding for their ideas, contribute to many others, and post comments. On one side, there are members aiming to undertake a project (creators). They have to publish a description of the deliverables that will be produced with the contributed funds along with visual content, a statement explaining the purpose of the project, the funding goal, and the last day of the campaign. During the funding cycle, creators can post updates as a way of encouraging additional support for their projects.

Funding is provided in an all-or-nothing basis. Although backers are refunded upon the failure of the campaign (if the project does not reach the funding goal), a backer experiences a monetary and a non-monetary opportunity cost when the fundraising goal is not achieved (Alaei *et al*., 2016). As noticed by Steigenberger (2017), supporters are mainly attracted by a purchasing motive which, in some cases, is combined with an altruistic and involvement motive, that is, a purely internal satisfaction derived from contributing a worthy cause (altruistic), and the utility obtained from having your contribution publicly recognized (involvement). Additionally, some authors suggest that contributors satisfy their human need for social affiliation by engaging in communities of like-minded members (Gerber & Hui, 2013), as well as their desire of patronage since they are aware of their role in contributing to the success of a project (Ordanini *et al*., 2011). Thus, intrinsic and extrinsic motivation for rational herding to get the project fund (Moysidou 2016), is in place.

Therefore, a major source of uncertainty is the campaign's probability of success, that is, reaching the funding goal (Alaei *et al*., 2016; Kuppuswamy & Bayus, 2018). Although reward-based crowdfunding platforms have gathered an overwhelming amount of money so far, prospective backers are often uncertain about entrepreneurs' abilities to collect enough contributions to get the project funded. Kickstarter has raised so far about $4 billion from 16 million backers, however, 64.12% of the crowdfunding projects in Kickstarter failed to reach the funding goals, as indicated in their webpage.

Although many factors might influence a campaign's success, Solomon *et al*. (2015) highlights that donations by early backers are often the only difference between a project being funded or not. Specifically, early contributions matter in two ways. First, this information signals to potential backers the quality of the project, which in turn can trigger social learning behavior (Bandura, 1989) and increase contributions from other potential backers (Colombo *et al.*, 2015.). The empirical study of Kuppuswamy and Bayus (2018) on a sample of 25,058 Kickstarter projects indicates that prospective backers usually make their pledging decisions based on how much of the project goal has already been funded by others. Second, backers who have made an early contribution are likely to spread information about the project, which may attract additional contributions (Colombo *et al*., 2015.) Both rationales indicate the importance of early backers' contributions to the campaign success. However, given the high asymmetric information and uncertainty about the funding probability of success, crowdfunding backers are often reluctant to donate in the early days of a campaign (Alaei *et al*., 2016; Colombo *et al*., 2015; Kuppuswamy & Bayus, 2018; Mollick, 2014; Skirnevski *et al*., 2017).

On the other hand, opinions posted in the platform by peers and experts can be seen as signals of social approval and trustworthiness, which are considered as determinants of social media effectiveness by Majid *et al*. (2018). In online sharing economy platforms where risk cannot be completely eliminated, product and personal reputation play a substantial role as seen by Abrate & Viglia (2019), acting the peer's opinions as a proxy for immediate backers' contributions

2.3 Research methodology

2.3.1 Rational herding in crowdfunding

Consider a crowdfunding platform that launches two quite similar projects to fund. There are two different scenarios or treatments, the first one with basic information about the projects (e.g., their characteristics and the funding goal), and the second one with more detailed information (e.g., adding the money already pledged by early backers, or the opinions of other backers and experts). There is a finite set of backers, who make decisions about which project to fund. For simplicity, assume that

the campaign only lasts for one period of time, and that the first scenario (treatment) is denoted $t = 1$, and accordingly, the second one is denoted $t = 2$. Thus, in $t = 1$, backers only know that there are two similar projects to fund with the same funding goal. Although the decision-model is not dynamic, it tries to mimic a two-period dynamic model by analyzing the change of choices, if any, from scenario 1 to scenario 2, where some new information is added. Alternatively, it can be assumed that in $t = 1$, backers could manifest their intention to choose either one project or the other, but delay their decision to $t = 2$, when some new information is released.

As explained earlier, each backer has to decide what project to fund out of two very comparable projects. A project will be deemed as successful if it achieves the funding goal common to both projects. A rational backer is the one who makes the decision that maximizes her utility given her knowledge and her conjectures on the other agents' decisions. Backers have a well-defined utility function (or preferences) over projects, $u(A)$ or $u(B)$. However, they make decisions under uncertainty. A major source of uncertainty is the probability of success, that is, whether the campaign will reach the funding goal and get financed. Therefore, and since initially there is neither information about nor coordination among backers, they have to assign a priori probability about the likelihood of success of the different projects, to be able to solve their decision making problem.

Given the underlying uncertainty, rational backers maximize their expected utility. Thus, letting A and B denote both projects, each backer considers them as uncertain prospects (or lotteries) with an assigned probability of success. Let p denote the probability of success of project A . Therefore, in time $t = 1$, each backer will compare the expected utility of the two projects and will choose the one with higher expected utility:

$$E[u(A|p)] = u(A) \times p + 0 \times (1 - p) \ \ and \ E[u(B|p)] = u(B) \times (1 - p) + 0 \times p \quad [1]$$

Then, project A will be chosen by a backer if and only if $E[u(A|p) \geq E[u(B|p)]$, and similarly with project B. Recall that in $t = 1$, there is no information on the aggregate quantity of money already pledged by the projects or on the number of backers supporting them. Therefore, backers have to make subjective conjectures about

p. Given the "veil of ignorance", these probabilities are set to be ½ each. With these probabilities clearly, $E[u(A|p) \geq E[u(B|p)$ if and only if $u(A) \geq u(B)$.

In the second scenario, $t = 2$, some information is added. As in the first situation, backers form beliefs about the probability of success, say $(p \mid information)$, and choose the project with the higher expected utility, given their information. Thus, a backer will prefer A to B, whenever:

$$E[u(A|(p|information))] \geq E[u(B|(p|information))] \quad [2]$$

Now, depending on the new probability of success of A, it is possible that backers change their choices from a situation without extensive information (scenario 1) to a new one with some more information (scenario 2). As already mentioned, although the decision-model is not dynamic, we could envision the comparison of project choices as a two-stages dynamics, where backers departing from a situation of no information, update their believes p using Bayes' rule to obtain the new beliefs $(p \mid information)$.

An important piece of the analysis is to model the backers' beliefs about the probability of success of the projects. Consider the prior probability distribution of the probability of success of project A. Backers do not have any information about it. Therefore an appropriate way to model it is to assume that p is a random variable with a given distribution. Then, we assume that p follows a Beta distribution: $p \sim Beta(\alpha, \beta)$. The beta distribution is a family of continuous probability distributions defined on the interval [0, 1] parametrized by two positive shape parameters, denoted by α and β, that appear as exponents of the random variable and control the shape of the distribution. This distribution represents a family of probabilities and is a versatile way to represent outcomes for percentages or proportions. Moreover, beta distributions can be understood as representing probability distributions of *probabilities* -that is, they represent all the possible values of a probability when they are unknown. The expected value (mean) (μ) of a Beta distribution random variable p with two parameters α and β is a function of only the ratio α/β of these parameters:

$$\mu[p] = \frac{\alpha}{\alpha+\beta} \quad [3], \quad \text{and variance } V[p] = \frac{\alpha\beta}{(\alpha+\beta+1)\,(\alpha+\beta)^2} \quad [4]$$

Hereafter, suppose that an experiment is run and let S be the numbers of successes of project A, and T the successes of project B that are observed. Then, the posterior distribution of the probability of success of A, that is, the new distribution of p conditional to this information, is:

$$(p|information) \sim Beta(\alpha + S, \beta + T) \quad [5]$$

$$\text{with mean } \mu[p|information] = \frac{\alpha+S}{\alpha+\beta+S+T} \quad [6]$$

2.3.2 Experimental design and procedures

We explore the decisions of crowdfunders (backers), in online crowdfunding markets, when dealing with new information, and the possible gender and cultural effects. To do this, this study replicates a reward-based crowdfunding webpage and run an economic experiment with 847 MTurkers from the USA and India (500 men, 347 women). This study experimentally tests subjects' decisions in two scenarios (Treatments, from now on), following the methodology presented in subsection *2.3.1*.

Table 2.1 Experimental design

Situation 1 (Testing the effect of information about early backers)			
Treatment 1 without information		**Treatment 2** with information	
		Book A	Book B
Book A	Book B	$525 raised 35 backers	$60 raised 4 backers
Situation 2 (Testing the effect of information about peers and experts advise)			
Treatment 1 without information		**Treatment 2** with information	
		Book C	Book D
Book C	Book D	$425 raised 30 backers	$425 raised 30 backers
		2 negative peer's advise	2 positive peer's advise
		1 positive expert advise	1 negative expert advise

The Amazon Mechanical Turk (MTurk) economic experiment starts, as shown in Table 2.1, presenting Situation 1 which explores the effect that information about

money already pledged by early backers has on backers' beliefs. Situation 2, however, explores the effect on beliefs of information about other backers and experts´ opinions. Each of the situations is presented in two treatments, having Treatment 2 added information.

Subjects start the experiment with an initial endowment of $60 each, and are asked to contribute $15 to one of two projects aiming to publish a book (*Book A* or *B* in Situation 1 and *Book C* or *D*, in Situation 2), in each treatment of each situation. All projects had the same funding goal requirement and deadline date. A book ends up being successful if 70% or more of the participants choose to finance that book. Subjects receive a show-up fee of $0.50 plus a bonus $0.15 per successful project chosen[2].

Specifically, Treatment 1 of Situation 1 asks participants to contribute $15 to one of two travel book projects, *Book A* or *Book B*, according to their cover. Later on, Treatment 2 releases the information that *Book A* has already been financed by 35 backers (10% of the backers needed to be successful; 315 backers left), and that *Book B* has only been financed by 4 backers (1.14% of the backers needed; 345 backers left), and asks participants to make their choice 2 and newly contribute $15 to one of two travel book projects, *Book A* or *Book B*.

Similarly, Treatment 1 of Situation 2 asks again participants to contribute $15 to one of the two projects, *Book C* or *Book D*, according to their cover. Later, Treatment 2 shows investors three opinions per book. *Book C* has two negative comments from previous backers and one positive from an expert. Oppositely, *Book D* has the positive recommendations of two previous backers and the negative one of one expert. Besides, it is indicated that both projects have raised $450 from 30 backers. As contributions from early investors are identical for both books, the only difference comes from the opinions: peers´ advice is expected to act as a proxy for other participants' choices as it was in Huang, J. H., & Chen, Y. F. (2006). when analyzing behavior of buyers in online product choice.

[2] The subjects from India received different payoffs in line with parity in purchase power. They received a show up fee of $0.25, and the bonus per successful project was $0.07.

At the end of the experiment, subjects answer five demographic questions about their education level, number of children, household income, employment status, and age, as control variables.

The experiment was launched in January 2019 through the Amazon MTurk platform to a group of 1,000 subjects (with an approval rate $\geq$ 95% from previous requesters), 500 located in the United States and 500 in India, 250 women and 250 men in each country. However, we could only recruit 97 women in India out of our 250 goal within the time limit. Thus, 847 subjects participated in the experiment: 250 women and 250 men from the USA, and 97 women and 250 men from India. Most of the participants had high school diploma or higher education (63.60% from the USA and 96.82% from India).

The experiment launched in the USA had two successful projects, *Book A* in Situation 1 Treatment 2, and *Book D* in Situation 2, Treatment 2. However, its replication in India had no successful projects. Similarly, choice 1 had not any successful project given that no additional information was shown in this treatment and, thus, subjects did not choose any project massively. The average payment, including the show-up fee and bonus, was $0.697 in the USA and $0.25 in India. Subjects received no feedback until the end of the experiment, when all choices were made.

The platform Amazon Mechanical Turk (MTurk) is, in general, well suited to run economic and psychological experiments, in general, due to the instant access that it gives to a large and culturally diverse subject pool (see Mason & Siddharth, 2011). Moreover, in the case of an experiment about subjects' behavior in the online sharing economy, as the one presented here, MTurk is especially appropriate, given that this subjects pool is familiar with online platforms and culture, as crowdfunding backers being replicated. These advantages highly outweigh the reduction in control of the attentiveness while making decisions, in comparison to a lab economic experiment. Additionally, previous research on experimental comparisons between attentiveness shown by undergraduate and MTurk subjects (as Goodman *et al.,* 2013 and Hauser and Schwarz, 2016), mostly validates MTurk appropriateness for data collection, and confirmed that classic heuristics, biases and levels of attentiveness to directions are comparable to those from traditional subject pools. Furthermore, Peer *et al.* (2014)

showed that for samples with only high-reputed MTurk subjects (HIT approval rate $\geq$ 95%), as the experiment presented here did, data quality was comparably higher as shown by the Attention Check Questions (ACQs).

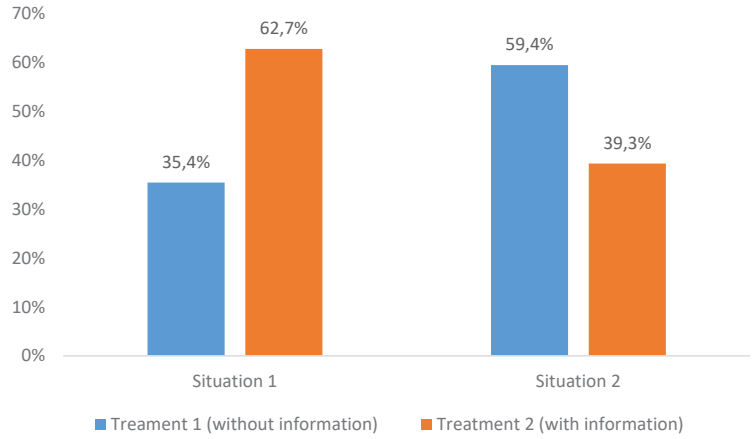
2.4 Results

2.4.1 Descriptive overview

Figure 1 illustrates the Mturk subjects' choices about which project (book) to fund in each of the situations. As expected from the theoretical model described in *2.3.1*, subjects significantly change their crowdfunding choices once new information is released (from Treatment 1 to Treatment 2) in both situations. Information on early investors is released at Treatment 2 of Situation 1: *Book A* has been already financed by 10% of the backers needed to reach the funding success, and *Book B* has been already financed by 1.14% of the backers needed. As shown in Figure 1, around 63% of the subjects choose to finance *Book A* after receiving this information. Before having this information, only a 35.4% of the subjects decided to finance *Book A*. Clearly, subjects change their beliefs about the probability of success of *Book A* and *B,* and choose the project with higher expected utility, given their information. The 8.86% difference (10% of *Book A* – 1.14% of *Book B*) in early backers acts as a proxy for project's success and, thus, subjects choose *Book A* in order to fund a project with higher success probability.

Interestingly, in Situation 2, previous backers' positive opinions act as a proxy for the project's success probability. Remember that *Book C* has two negative comments from previous backers and one positive from an expert. Oppositely, *Book D* has the positive recommendations of two previous backers and the negative one of one expert. As shown in Figure 1, subjects significantly reduce their choices of *Book C* (from 59.4% to only the 39.3%) and predominantly choose to finance *Book D*, the one with positive peers advise (although a negative expert review). This information changes the subjects' funding choices, as predicted in the theoretical model described in *2.1*, due to a change in the backers' beliefs about the projects' probability of success.

Figure 2.1 Book A´s choices (Situation 1) and Book C´s choices (Situation 2) in %, by treatment



Tables 2.2 and 2.3 present a more detailed descriptive overview of the experimental results, breaking down the subjects' choices by country and gender.

Table 2.2 shows the detailed descriptive overview of Situation 1 results. The increase in pledged funds of *Book A*'s project is significant in the backers from the US, both men and women, and for men from India. Information on early investors released at Treatment 2 has a significant effect in each of these three groups. The group of women from India increase *Book A*'s project funding too. However, this increase is not significant, probably due to the small number of subjects making decisions in this group (only 97 women from India, while 250 subjects in each of the other three groups). Panel B of the Table 2.2 shows the subjects' choices in Treatment 2, while Panel A presents the changes in choices: A/B denotes subjects' change from funding *Book A* in Treatment 1 to funding *Book B* in Treatment 2 (with information), and B/A denotes subjects' change from funding *Book B* in Treatment 1 to funding *Book A* in Treatment 2 (with information). Clearly each of the groups (men from the USA, women from the USA, men from India and women from India) mainly change from funding *Book B* in Treatment 1 to funding *Book A*, once information on early backers is released.

Table 2.2 Situation 1. Testing the influence of early investors on the investing decision. Frequencies and *p-values* by gender and country

Panel A. Change in subject's selection between Treatment 1 and 2 (with added information)

H_0: A/B = B/A		Men		Women		Men + Women	
Country		**A/B***	**B/A**	**A/B**	**B/A**	**A/B**	**B/A**
	Number	6	89	7	94	13	183
USA	%	6.3	93.7	6.9	93.1	6.6	93.4
	Proportion test	**p = 0.000**		**p = 0.000**		**p = 0.000**	
	Number	21	72	15	25	36	97
INDIA	%	22.6	77.4	37.5	62.5	27.1	72.9
	Proportion test	**p = 0.000**		**p = 0.000**		**p = 0.000**	
	Number	27	161	22	119	49	280
TOTAL	%	14.4	85.6	15.6	84.4	14.9	85.1
	Proportion test	**p = 0.000**		**p = 0.000**		**p = 0.000**	

Panel B. Subject's selection in Treatment 2 (with information)

H_0: A = B		Men		Women		Men+Women	
Country		**A**	**B**	**A**	**B**	**A**	**B**
	Number	168	82	157	93	325	175
USA	%	67.2	32.8	62.8	37.2	65	35
	Proportion test	**p = 0.000**		**p = 0.000**		**p = 0.000**	
	Number	151	99	55	42	206	141
India	%	60.4	39.6	56.7	43.3	59.4	40.6
	Proportion test	**p = 0.001**		**p = 0.191**		**p = 0.000**	
	Number	319	181	212	135	531	316
USA+INDIA	%	63.8	36.2	61.1	38.9	62.7	37.3
	Proportion test	**p = 0.000**		**p = 0.000**		**p = 0.000**	

Treatment 2: Prior to subject choices, Book A had achieved 10% of the needed funds, whereas Book B had achieved 1,14% of the needed funds.
*A/B denotes subjects' change from funding Book A in Treatment 1 to funding Book B in Treatment 2 (with information), and so on.

Table 2.3 presents the detailed descriptive overview of Situation 2 results. As shown in Panel B (subject's choices in Treatment 2), the increase in pledged funds of *Book D*'s project is significant in the backers from the US, both men and women.

Table 2.3 Situation 2. Testing the influence of peers and experts advise on the investing decision. Frequencies and p-values by gender and country

Panel A. Change in subject's selection between Treatment 1 and 2 (with added information)

H_0: C/D=D/C		Men		Women		Men + Women	
Country		**C/D***	**D/C**	**C/D**	**D/C**	**C/D**	**D/C**
	Number	52	3	83	4	135	7
USA	%	94.5	5.5	95.4	4.6	95.1	4.9
	Proportion test	**p = 0.000**		**p = 0.017**		**p = 0.000**	
	Number	49	26	28	9	77	35
INDIA	%	65.3	34.7	75.7	24.3	68.8	31.2
	Proportion test	**p = 0.011**		**p = 0.005**		**p = 0.000**	
	Number	101	29	111	13	212	42
USA+INDIA	%	77.7	22.3	89.5	10.5	83.5	16.5
	Proportion test	**p = 0.000**		**p = 0.000**		**p = 0.000**	

Panel B. Subject's selection in Treatment 2 (with information)

H_0: A = B		Men		Women		Men+Women	
Country		**C**	**D**	**C**	**D**	**C**	**D**
	Number	86	0	83	167	169	331
USA	%	34.4	0	33.2	66.8	33.8	66.2
	Proportion test	**p = 0.000**		**p = 0.000**		**p = 0.000**	
	Number	121	0	43	54	164	183
INDIA	%	48.4	0	44.3	55.7	47.3	52.7
	Proportion test	**p = 0.613**		**p = 0.267**		**p = 0.315**	
	Number	207	0	126	221	333	514
USA+INDIA	%	41.1	0	36.3	63.7	39.3	60.7
	Proportion test	**p = 0.000**		**0**		**p = 0.000**	

Treatment 2: Prior to subject choices, Book C is recommended by an expert and criticized by peers, whereas Book D is recommended by peers and criticized by an expert.
*C/D denotes subjects' change from funding Book C to funding Book D in Treatment 2 (with information), and so on.

However, men and women from India do not increase significantly the funding of *Book D*'s project once information on peers and experts' opinions is released at Treatment 2. Panel A presents changes in choices: C/D denotes subjects' change from funding *Book C* in Treatment 1 to funding *Book D* in Treatment 2 (with information), and D/C denotes subjects' change from funding *Book D* in Treatment 1 to funding *Book C* in Treatment 2 (with information). Changes in choices, when made, significantly move in the direction of increasing funding of *Book D*' project in each of the groups: men from the USA, women from the USA, men from India and women from India, once information on peers and experts' recommendations is released: 101 men change from funding *Book C*

to funding *Book D* (only 29 men change in the opposite direction) and 111 women change from funding *Book C* to funding *Book D* (only 13 men change in the opposite direction), with p=0.000. Note that *Book C* has two negative opinions from previous backers and one positive from an expert, while Book D has the positive advice of two buyers and the negative one of one expert.

2.4.2 Analysis of the agregate results

To analyze the results, this study applies the McNemar test, a statistical non-parametrical test used on two dichotomous variables to contrast the changes in the answers using the chi-squared distribution with one-degree of freedom. Its purpose is to compare the change in the proportions distribution between two measurements of a dichotomous variable and determine that this difference is not random. A value of *p<0,05* provides sufficient evidence to reject the null hypothesis, in favor of the alternative hypothesis that the marginal proportions are significantly different from each other. An interesting observation when interpreting McNemar's test is that the elements of the main diagonal do not contribute to the decision about whether the pre- or post-experimental condition is more favorable.

The first part of Table 2.4 shows the 2x2 table, bordered by the marginal probabilities, of the McNemar test for Situation 1; the second part of Table 4 presents the McNemar test for Situation 2.

The McNemar test for Situation 1 gives an exact significance of *p*=0.000, for *847* valid cases. Since *p*<0.05, the test provides sufficient evidence that new information released in Treatment 2 about early backers changes the distribution of subjects' choices.

Table 2.4 Results of the McNemar test

Situation 1

		Treatment 2 (with added information)		
	Book	A	B	Total
Treatment 1 (without added information)	A	**251**	**49**	**300**
		29.6%	5.8%	35.4%
	B	**280**	**267**	**547**
		33.06%	31.52%	64.58%
	Total	**531**	**316**	**847**
		62.7%	37.3%	100%

Situation 2

		Treatment 2 (with added information)		
	Book	C	D	Total
Treatment 1 (without added information)	C	**291**	**212**	**503**
		34.35%	25.03%	59.38%
	D	**42**	**302**	**344**
		4.96%	35.66%	40.62%
	Total	**333**	**514**	**847**
		39.32%	60.68%	100%

Thus, as shown in Table 2.4, in Treatment 1 (see theoretical model presented in *3.1*), 300 backers (35.4%) choose to finance *Book A*'s project, and 547 (64.58%) choose *Book B*'s project. However, once information about early backers is released in Treatment 2, the distribution of choices changes dramatically: 531 backers (62.7%) choose now to finance *Book A*'s project, and only 316 (37.3%) choose *Book B*. The change is due to the transfer of 280 backers (33.06%), formerly choosing *Book B*, to *Book A*. Those who formerly chose to finance *Book A* kept this choice in Treatment 2 (only 49 backers changed from *Book A* to *Book B*).

What is the reason for the change in the distribution of choices? Our claim is that, after the information about early backers is released, backers update their beliefs about the project's probability of success and maximize their expected utility given these new beliefs.

In order to model the backers' beliefs and their updating, following the theoretical framework described in *3.1*, we assume that the backers' beliefs about the probability of success p of *Book A*'s project follows a Beta distribution, and to gather the no-information choice, we assume that $\alpha = \beta = \frac{1}{2}$, i.e., $p \sim Beta\left(\frac{1}{2}, \frac{1}{2}\right)$, with mean $\mu(p) = \frac{1}{2}$ (see equation [3]) and variance $V[p] = \frac{1}{8}$ (see equation [4]). With these beliefs,

backers maximized their expected utility and made their project's choice: the 64.58% of them choose *Book B*'s project.

In Treatment 2, they get to know that 35 backers (10% of needed backers) have already funded *Book A*'s project and only 4 backers (1.14% of needed backers) have financed *Book B*'s project (only an 8.86% difference in early backers). Note that the backers do not know the distribution of the initial choices, therefore, the updating of beliefs p by backers gives them a prior distribution for the new situation, $(p|information)$, which is distributed as (see equations [5] and [6]):

$(p|information) \sim Beta\left(35+\frac{1}{2},\ 4+\frac{1}{2}\right)$, with mean $\mu(p|information)=\frac{35+\frac{1}{2}}{40}=0.887$ and $V[p|information]=0.0024$

In other words, backers assign in Treatment 2 a mean probability of success of Book A's project of 88.7%. With these beliefs, they maximized again their expected utility and make a new choice of project, resulting in a 62.7% of them choosing Book A's project.

The impact of the information on the backers' choice is easily explained by comparing the two posterior distributions of choices without (Treatment 1) and with information (Treatment 2). In Treatment 1 the posterior distribution of the probability of success of *Book A*'s project, *p*, is:

$$(p|choices_1) \sim Beta(300+\frac{1}{2}, 547+\frac{1}{2})$$

mean $\mu(p|choices_1)=\frac{300+1/2}{847+1}=0.354$; and

variance $V[p|choices_1]=0.00027$

A distribution centered around 35.4% of backers choosing *Book A*'s project (see Table 4).

After releasing information about early backers (Treatment 2), the new choices show a posterior distribution of the probability of success of *Book A*'s project:

$$(p|information, choices_2) \sim Beta\left(531+35+\frac{1}{2}, 316+4+\frac{1}{2}\right)$$

mean $\mu(p|information, choices_2)=\frac{566+\frac{1}{2}}{847+40}=0.639$; and

variance $V[p|information, choices_2]=0.00025$

A distribution centered around 63.9% of backers choosing *Book A*'s project once the information about early backers is released (see Table 4). Thus, information on a 8.86% difference in early backers in favor of *Book A*'s project generates a shift to the right of the former distribution, this meaning a positive impact on the number of backers choosing *Book A*'s project. This is due to the beliefs updating on the probability of *Book A* being a successful project, which increases the backers' expected utility of choosing *Book A* instead of *Book B*. Therefore, the sometimes called herding behavior of crowdfunding backers can be rationalized by the expected utility theory, as long as their beliefs follow an appropriate distribution function.

The second part of Table 4 presents the McNemar test about the Situation 2' choices. The McNemar test gives an exact significance of *p=0.000,* for *847* valid cases. Since *p<0.05*, the test provides sufficient evidence that information on peers' advice changes the distribution of choices.

As shown in Table 2.4, second part, in Treatment 1, 503 backers (59.38%) choose to finance *Book C*'s project, and 344 (40.62%) choose *Book D*'s project. However, once information about peers' (and expert) advice is released in Treatment 2, the distribution of choices changes: only 333 (39.32%) backers choose now to finance *Book C*'s project, and 514 (60.68%) choose *Book D*. The change is due to the transfer of 212 backers (25.03%), formerly choosing *Book C*, to *Book D*. Those who formerly chose to finance *Book D* kept this choice in Treatment 2 (only 42 backers, the 4.96%, changed from *Book D* to *Book C*).

As in Situation 1, suppose that the backers beliefs, *p*, follows a prior distribution: $p \sim Beta\left(\frac{1}{2}, \frac{1}{2}\right)$, with mean $\mu(p) = \frac{1}{2}$ and variance $V[p] = \frac{1}{8}$. With these beliefs, backers maximize their expected utility and make their choice of a project.

The posterior distribution in Treatment 1 is:

$(p|choices_1) \sim Beta(503 + \frac{1}{2},\ 344 + \frac{1}{2})$,

with mean $\mu(p|choices_1) = 0.59$, or a distribution centered around 59% of backers choosing *Book C*'s project, and with a variance of $V[p|choices_1] = 0.00028$. As in Situation 1, this distribution is not observed by the backers.

Later on, in Treatment 2, information about peers' opinions is released. In particular, they get to know that *Book C*'s project has received two negative opinions

from buyers (backers) and one positive opinion from an expert, while *Book D*'s project has received two positive opinions from buyers and a negative opinion from and expert. It is quite difficult to model the updating of the p by backers, with this information. Nevertheless, they do it in some way. We do not follow this avenue, instead we observe the backers' choices in Treatment 1 and Treatment 2 and compare the posterior distribution with the corresponding prior distribution.

The posterior distribution, in Treatment 2's choices, where only 39% of the backers choose *Book C*'s project. is:

$(p|choices_2) \sim Beta\left(333 + \frac{1}{2},\ 514 + \frac{1}{2}\right)$, with

mean $\mu(p|\ choices_2) = 0.39$; and

variance of $V[p|\ choices_2] = 0.00028$.

Given the shift to the left on the conditional prior distribution of the backers' probability of success for *Book C*'s project, results show that the two positive opinions of the buyers (backers or peers) outweigh the negative one from an expert. *Book C*'s project, the one with reduced posterior probability of success, has one positive expert's opinion and two negative buyer's opinions. In other words, the peers' opinions (buyers) are more important in the updating of backers' beliefs, and change the backers' beliefs about the project's probability of success, and the distribution of choices.

2.5 Conclusions

As herding is a widespread phenomenon in crowdfunding, understanding mechanisms driving herding is of great importance to design management strategies. Specifically, understanding the degree of rational herding in crowdfunding helps not to underestimate it by ignoring powerful rational drivers adding to irrational herding behavior. Rational herding requires observers making unbiased inferences from the decisions they observe.

We have presented a controlled online economic experiment that shows how rationality can be integrated with herding behavior. The experiment was conducted through Amazon Mechanical Turk with 847 subjects (500 men and women from the USA and 347 from India), recreating a reward-based crowdfunding webpage. Controlled

economic experiments allow establishing a causal relationship between changes in the revealed information and their influence on subjects' observable decisions.

The effect of rational herding is shown in the experimental setting and explained by the model that captures what may be the main information aggregation in reward-based crowdfunding platforms. Results of this controlled online experiment show that early contributions to the campaign affect backers' beliefs about the funding probability of success, changing choices to increase campaign contributions. Findings also confirm that positive opinions from peers are more important than experts' comments in increasing campaign contributions, acting as a proxy for subsequent contributions. The revealed information influences backers' beliefs on the projects' probability of success, and then, their choices.

Our work contributes to the literature by showing that rational herding behavior is sometimes a powerful driver of herding behavior. Changes in investors' behavior may be due to an adjustment in rational beliefs about the campaign's probability of success.

As a side-effect this research contributes to show the entrepreneur how to improve backers' beliefs of the campaign's probability of success. For example, the entrepreneur can incentive backers' payoffs by offering appealing discounts to early backers that face high uncertainty or voluntarily disclose the project status (i.e., how many contributions have been collected up to a given timestamp, or positive opinions from early buyers), which seem critical factors that influence backers' beliefs of the campaign's probability of success. Additionally, fundraisers can consider making an initial investment in their own project which will be perceived by potential backers as a positive signal and prompt the investing decision.

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2.7 Appendix

2.7.1 Instructions

Please, read the following instructions carefully. This first task recreates a rewards-crowdfunding platform in which investors can contribute relatively small amounts of money to fund different business projects. Each project has a budget requirement (i.e. the quantity of money requiered for the project to suceed) and a deadline date (i.e. the last day one can provide funds to the project). In each question, you are shown two different projects that aim to publish a book. Both projects have the same budget requierement ($5,250) and the same deadline date (January, 31, 2019).

What do I have to do?

- You have been assigned an intial endowment of $90 to invest through the next three situations ($15 per question).
- You are presented 3 different situations with two questions per situation.
- In each questions you have to choose one out of the two presented projects.

1. In the first question, you only have the basic information about the two projects.
2. In the second question, you are given additional information. Please, pay attention to the information.

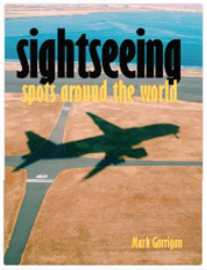
How will I be rewarded?

- You will receive a **show-up fee** of **$0.50** for participation.
- On top of that, you will be given **$0.15 per question** if the **project** you have **chosen** happens to be the **successful** one. A project will be succesful if 70% or more of the participants choose this project, which adds up to a total contribution to the project of $5,250 or more.

Situation 1: First choice

Today is the 16th of January. The two projects are presented here. No one has given funds to the projects yet. Just consider the information given below.

Option 1



$0 | 0 | 15
pledged of $5,250 goal | *backers* | *days to go*

All or nothing. The project will only be funded if it reaches its goal by the 31st of January 2018.

Option 2

$0 | 0 | 15
pledged of $5,250 goal | *backers* | *days to go*

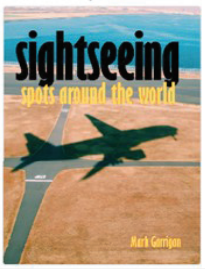
All or nothing. The project will only be funded if it reaches its goal by the 31st of January 2018.

1. Which project would you like to invest $15 in? Option one

Situation 1: Second choice

Some investors have already contributed. New information is available.

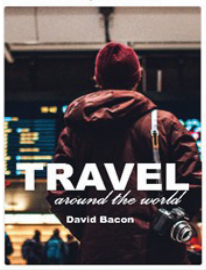
Option 1



$525 | 35 | 15
pledged of $5,250 goal | *backers* | *days to go*

All or nothing. The project will only be funded if it reaches its goal by the 31st of January 2018.

Option 2



$60 | 4 | 15
pledged of $5,250 goal | *backers* | *days to go*

All or nothing. The project will only be funded if it reaches its goal by the 31st of January 2018.

2. Which project would you like to invest $15 in? Option one

Situation 2: First choice

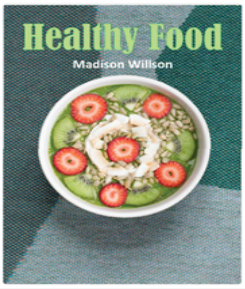
Today is the 16th of January. The two projects are presented here. No one has given funds to the projects yet. Just consider the information given below.

Option 1

$0	0	15
pledged of $5,250 goal	*backers*	*days to go*

All or nothing. The project will only be funded if it reaches its goal by the 31st of January 2018.

Option 2



$0	0	15
pledged of $5,250 goal	*backers*	*days to go*

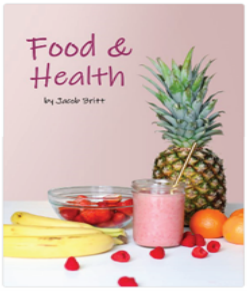
All or nothing. The project will only be funded if it reaches its goal by the 31st of January 2018.

3. Which project would you like to invest $15 in? Option one

Situation 2: Second choice

Some investors have already contributed. New information is available.

Option 1



$450	30	15
pledged of $5,250 goal	*backers*	*days to go*

All or nothing. The project will only be funded if it reaches its goal by the 31st of January 2018.

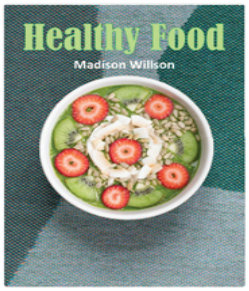
Reviews

Buyer. C. Brown. Not really ineteresting.

Buyer. S. Evans. Too messy.

Winner of MasterChef USA. H. White. This is an essential that you really want to get.

Option 2



$450	30	15
pledged of $5,250 goal	*backers*	*days to go*

All or nothing. The project will only be funded if it reaches its goal by the 31st of January 2018.

Reviews

Buyer. L. Jones. I'll definetely recommend it.

Buyer. R. Williams. So much fun and so easy.

Member of the USA Culinary Association. J. Thomas. Not too exciting.

4. Which project would you like to invest $15 in? Option one

Demographic questions

Education

- ○ Less than a high school diploma
- ○ High school degree or equivalent
- ○ Bachelor's degree (e.g. BA, BS)
- ○ Master's degree (e.g. MA, MS, MEd)
- ◉ Doctorate (e.g. PhD, EdD)

Number of children

- ○ None
- ○ 1 child
- ○ 2 children
- ○ 3 children
- ◉ 4 or more children

CHAPTER 3

Social preferences under uncertainty

3.1 Introduction

During the Nelson Mandela Lecture in Johannesburg in July 2018, Barack Obama called on the rich to support higher taxation. In his speech, the former president of the US also appeared to endorse the idea of the universal basic income (UBI). "*It's not just money that a job provides. It provides dignity and structure and a sense of place and a sense of purpose. So we're gonna have to consider new ways of thinking about these problems, like a universal income."* Arguably, Obama was not so convinced about implementing the UBI when he was serving in office. In an article with Wired in October 2016, he raised some doubts on "*[W]hether a universal income is the right model—is it gonna be accepted by a broad base of people?—that's a debate that we'll be having over the next 10 or 20 years*."

While there may be different factors to explain why Obama has changed his viewpoint, one may argue that he should have discussed (or even implemented) the UBI when he was still in office. In fact, there are other examples of former US Presidents (e.g., Richard Nixon or George H. W. Bush) who were in favor of the UBI, but did not implement it while they were in the power. This, in turn, raises the question on how generosity can be affected when the decision power changes. People may exhibit pro-social (or generous) behavior when it is unlikely that thieir choices will be implemented, while it may be harder to be generous when actions will have economic consequences *for sure*. In fact, there is evidence that people may want to appear as fair to receive recognition from others (Andreoni and Bernheim, 2009; Benabou and Tirole, 2006; Dana et al. 2007).

Our aim in this paper is to show that affecting the decision power (e.g., the likelihood that a decision will be implemented) has consequences for generous behavior. We provide experimental evidence using a dictator game where we first vary

the framing of the decision-maker. In particular, we consider a treatment (*Dictator framing*) in which subjects are asked to split the endowment after knowing that they will be the dictator with some probability. In other treatment (*Recipient framing*) subjects are informed that they will be recipients with some probability, thus their choices will be implemented with the remaining probability. By this device, we can study whether affecting the decision-power (by simply affecting the framing of the decisor) affects generosity. Our experimental design affects also the range of probabilities that the decision will be implemented. In the *pure uncertainty* condition (T_9), these probabilities range from 0.9 to 0.1, thus subjects in the role of dictators or recipients make a total of 9 choices (all of them under uncertainty). In the *impure uncertainty* condition (T_{11}), subjects face two additional choices. In one of them, they know that their choices will be implemented for sure (probability 1); while in the other one they know their choice will never be implemented (probability 0). As a result, subjects make a total of 11 choices in this treatment.

Our hypothesis is that people may express preferences for generosity when it is unlikely that their choices will be implemented, while they may behave selfishly if there is a high probability that their choices will be implemented. Hence, we expect to see that giving decreases with the probability that the choice will be implemented. We also expect to find that presenting dictators with the probability that their choice will be implemented decreases generous behavior, compared with presenting recipients with the probabilities that their choices will *not* be implemented. This is because the different frames can induce differences in the decision power of decisors. Further, it requires a higher cognitive effort to think about the consequences of the choice in the recipient framing. Finally, we expect for anchoring to occur, thus dictators (or recipients) who start with extreme probabilities that their choices will be implemented give less than dictators (or recipients) who never faced an extreme probability.

The remainder of the paper is organized as follows. In the Section 3.2, we discuss the related literature. We present the experimental design and our hypotheses in Section 3.3. Section 3.4 presents the main results. Finally, we discuss the implications of our findings in Section 3.5.

3.2 Related literature

It seems impossible to survey the entire literature on generosity. The sheer size of the literature forces us to pursue a more moderate approach (see Camerer (2003) or Schokkaert (2006) for surveys and in Engel (2011) for a meta analysis on dictators' giving). The objective of this paper is to investigate how generosity is affected when we vary the decision power of the dictator, either because we vary the framing of the decisors' role (as dictators or recipients) or because we affect the range of probabilities that the decision will be implemented.

There is a bunch of papers that examine how generosity responds to framing effects; e.g., by affecting the moral cost of the decisor. Thus, Brañas-Garza (2007) finds that dictators are more generous when the experimental instructions include a sentence "Note that he relies on you", while Capraro and Vanzo (2019) find that (moral) words associated to dictators' actions (e.g., stealing, donating, etc…) can affect generous behavior (see Capraro and Rand (2018) or Tappin and Capraro (2018) for further evidence that wording affects choices in the dictator game). In this paper, we manipulate the role of the decision-maker by considering that subjects in the role of dictators (recipients) make their choice with certain probability; with the remaning probability, subjects in the role of dictators (recipients) will be recipients (dictators) in the game and their choices will not (will) be implemented. We believe that this framing influences the sense of ownership affecting geneorous behavior as a result. A recent paper by Korenok et al. (2017) indeed suggests that the sense of ownership can affect giving. Along these lines, dictators give less when they have earned their role or work to produce the endowment to be distributed (e.g., Ruffle, 1998; Cherry et al., 2002; Rode and Le Menestrel, 2011). The dictator/recipient framing in our setting should affect the cognitive load of subjects as well. This is because subjects in the role of recipients are confronted with the probabilities that their choices will *not* be implemented. For the effect of cognitive load on generosity see Schulz et al. (2014) or Hauge et al. (2016).

The economics literature on geneorosity proposes a number of explanations for why people give money to ohers. These include preferences for equitable outcomes (Fehr and Schmidt, 1999; Bolton and Ockenfels 2002, Fehr and Schmidt, 2006),

preferences for efficiency (Charness and Rabin, 2002; Bolton and Ockenfels, 2002; Engelmann and Strobel, 2004), preferences for reciprocity (Rabin, 1993; Dufwenberg & Kirchsteiger 2004) or impure altruism (Andreoni, 1990; Chowdhury and Jeon, 2014). Our interest is to study how people make choices in a repeated dictator game, where the probability of being *decisive* changes from decision to decision.

The existing literature on social preferences under risk is not that large. Using a binary-dictator game, Bolton and Ockenfels (2010) examine how people choose between a safe and a risky option (i.e., a lottery that selects one of two possible allocations with the same probability). The authors find that the willingness to choose the risky option depends on the inequality associated to the safe option; i.e., dictators are more likely to choose the risky option when implementing the safe option yields an unfair allocation (see also Bohnet et al. 2008). On the contrary, the willingness to take the risky option does not seem to depend on whether or not the risky option yields unequal payoffs; i.e., once we keep the safe option fixed, the payoffs associated to the risky option do seem to matter for the dictator's decision. In a similar context, Bradler (2009) examines the willigness to choose between a safe and a risky option when choices may (or may not) have consequences for a recipient. Bradler (2009) finds that people are willing to bear more risk and forego a larger potential gain when choices affect the payoff of others, especially when choices are associated to equal payoffs. Gaudeul (2015) investigates whether showing the payoffs as a fraction of the total payoffs has an impact on risk preferences. She finds that people prefer taking a risk rather than choosing a safe option that yields an unequal distribution of payoffs. Furthermore, people dislike lotteries that lead to (ex-post) unequal distribution of payoffs (see also Gaudeul, 2016).

The extent to which people trade final outcomes and probabilities is also presented in Krawczyk and Le Lec (2010). They employ a *probabilistic dictator game* in which dictators can redistribute probabilities of winning a prize. The authors find that subjects care about procedural fairness in that a substantial fraction of subjects do share chances to win. These findings support Saito (2013), who studies how inequality aversion works under uncertainty and makes a distinction between equality of opportunities (ex-ante expected payoffs) and equality of outcomes (ex-post payoffs)

(see also Karni et al. (2008), Krawczyk and Le Lec (2010) or Brock et al. (2012) for other studies that look at procedural fairness and how subjects are willing to reduce the variance associated to others' payoffs). Brañas-Garza et al. (2005) give dictators the possibility to use a random device to allocate the endowment and find that half of the subjects use it to relinquish their responsibility (see also Dana et al. 2007).

More recently, Cettolin et al. (2017) study how risk and social preferences interact when sharing resources under uncertainty. In their setting, dictators make their choices knowing that a lottery that can effect the final payoffs of dictators or recipients. Two main results are highlighted. First, risk preferences explain giving behavior. Second, increasing the risk exposure for recipients lead to decrease in giving, while it has no effect for dictators. Cappelen et al. (2013) study how fairness principles apply in a context where subjects can take risky decisions that affect their payoffs. They find that participants look for a fairness norm that conveys the same redistribution between people who made the same (risky) decision, without taking into account the risk exposure.

3.3 Experimental design and hypotheses

3.3.1 Experimental design

Our aim is to study how uncertainty affects generosity. To investigate this issue, we rely on a dictator game in which subjects are asked to split an endowment of 10€ between themselves and a recipient. We rely on a 2x2 design where we vary first the role of the decision-maker by manipulating the framing of the decisor.

- **Dictator framing (D)**. Subjects make a choice regarding the division of the endowment being told that they will be dictators with probability *p* (with the remaining probability 1-*p* they will be recipient, thus their choice will not be implemented).
- **Recipient framing (R)**. Subjects make a choice regarding the division of the endowment being told that they will be recipients with probability *q* (with

the remaining 1 - *q* probability they will be dictators, thus their choice will be implemented).

We vary the range of *p, q* ∈ [0, 1] across treatments by considering two different versions of the game, in which *p* and *q* are decreasing by 0.1:

- **T_9 (Pure uncertainty) (9 choices).** Subjects make a total of 9 choices, with the probability of being dictators (*p*) or recipient (*q*) ranging from 0.9 (being dictator/recipient with high probability) to 0.1 (being dictator/recipient with low probability); i.e., *p*, *q* ∈ {0.9,…0.1}.
- **T_{11} (Impure uncertainty) (11 choices).** Subjects make a total of 11 choices, with the probability of being dictators (*p*) or recipient (*q*) ranging from 1 (being dictator/recipient for sure) to 0 (being recipient/dictator for sure); i.e., *p*, *q* ∈ {1, 0.9, …, 0.1, 0}.

Table 3.1 presents the decision table of dictators in the D-T_{11} treatment.[3]

Table 3.1 Dictators' choice in the D-T_{11} treatment

		Su decisión (tiene que sumar 10€)	
Probabilidad de ser decisor		€ para ti	€ para el receptor
	p=1		
	p=0,9		
	p=0,8		
	p=0,7		
	p=0,6		
	p=0,5		
	p=0,4		
	p=0,3		
	p=0,2		
	p=0,1		
	p=0		

[3] Subjects in the R-T_{11} faced a similar table, but they were told that they were in the role of recipients. The D-T_9 and R-T_9 treatments followed the same structure but the table did not include the first and the last rows.

The experiment was held at the Faculty of Economics and Business Sciences of the University of Seville in April 2019. We recruited a total of 200 participants by e-mail and flyers. Among them, a total of 173 showed up (Average age = 22; 54.3% female).[4]

We conducted a total of 5 sessions. In each of them, subjects were divided in two different groups and placed in different rooms. Once subjects took a seat in their room, the instructions were given to them (see Appendix A for the instructions).

Besides making their choices in the dictator game, we collected a number of individual variables regarding basic demographics (age, sex, field of studies…). Our experiment included also the elicitation of risk attitudes following Brañas et al. (2019a), who use a modified version of Holt and Laury (2002) (see Table 3.2).[5]

Table 3.2 Elicitation of risk attitudes using a modified version of Holt and Laury (2002)

	Opción A			**Opción B**	
Decisión 1:	5€ con probabilidad 0.1 + 4€ con probabilidad 0.9.	□		10€ con probabilidad 0.1 + 0.1€ con probabilidad 0.9.	□
Decisión 2:	5€ con probabilidad 0.4 + 4€ con probabilidad 0.6.	□		10€ con probabilidad 0.4 + 0.1€ con probabilidad 0.6.	□
Decisión 3:	5€ con probabilidad 0.5 + 4€ con probabilidad 0.5.	□		10€ con probabilidad 0.5 + 0.1€ con probabilidad 0.5.	□
Decisión 4:	5€ con probabilidad 0.6 + 4€ con probabilidad 0.4.	□		10€ con probabilidad 0.6 + 0.1€ con probabilidad 0.4.	□
Decisión 5:	5€ con probabilidad 0.9 + 4€ con probabilidad 0.1.	□		10€ con probabilidad 0.9 + 0.1€ con probabilidad 0.1.	□

In our questionnaire, we also elicited cognitive abilities using the reflection test in Frederick (2005) (see Brañas-Garza et al., 2019b for a meta-study). To have a meausure on generosity and envy (Fehr & Schidmit 1999), we presented subjects with two different questions, whose answers were coded using a seven-point Likert scale, from 1 (totally disagree) to 7 (totally agree).

[4] Main part of them (77%) enrolled in Economics, Business and related sciences (Economics + Law, Business and Law, Market Research and Marketing, Finance and Accounting and Finance and Accounting + Labour Relations).

[5] Brañas et al. (2019) show that this (shorter) version does not result in differences in risk aversion, compared with the original version.

(Generosity) "*Please indicate whether and how do you agree with the following sentence: "I do not care about the money I have, I do care about others having less than I have".*

(Envy) "*Please indicate whether and how do you agree with the following sentence: "I do not care about the money I have, I do care about others having more than I have".*

3.3.2 Hypothesis

Our main hypothesis is that giving decreases with the probability that the decision will be implemented, thus subjects in the role of dictators or recipients will give more when it is unlike that the recipient will receive the donation.

H1: *"Giving decreases with the probability of being that the decision will be implemented".*

We think that priming subjects as dictators will foster the role of empowerment, thus subjects will give less when they are in the role of dictators compared with being in the role of recipients. A second feature that can affect giving refers to the cognitive load associated to giving in both settings. When subjects are in the role of recipients (with some probability), they need to think that their choices as dictators will be implemented with the complementary probability. As suggested in Schulz et al. (2014) or Hauge et al. (2016) cognitive load can affect giving.

H2: "*Giving in the R-treatments (R-T_{11} & R-T_9) is higher than giving in the D-treatments (D-T_{11} & D-T_9)".*

We also expect that subjects who take a choice in the T_{11} treatment (facing the probability equal to 1 from the beginning) will affect giving.

H3: "*Giving in the T_{11}-treatments (D-T_{11} & R-T_{11}) is lower than giving in the T_9-treatments (D-T_9 & R-T_9)".*

Recall that subjects who start being dictator in the D-T_{11} treatment make their first choice under the assumption that their choices will be implemented for sure. Our conjecture is that this anchors their decision power and reinforces their sense of ownership, thus they will give less when they are in the role of dictators with probability 0.9, compared with their first decision in the D-T_9 treatment.

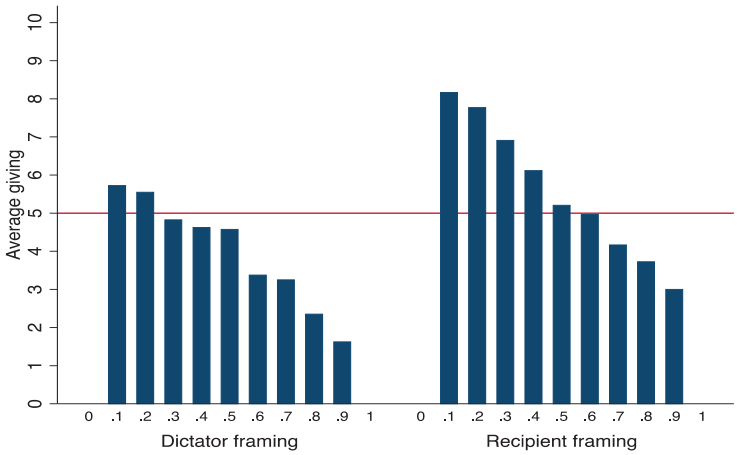
3.4 Results

Figure 3.1 shows the average amount that subjects give in each of treatments, at different levels of probabilities of being dictator.[6] The upper (lower) panel presents the behavior in the T_9 (T_{11}) treatment, respectively. The descriptive statistics are presented in Table 3.3. This includes the number of observations in each of the treatments.

[6] For subjects participating in the recipient framing we have converted the data so that the probabilities in the horizontal axis refer to the probability that the choice will be implemented (as dictators).

Figure 3.1 Giving, by treatments

(a) Giving in the T_9 treatments



(b) Giving in the T_{11} treatments

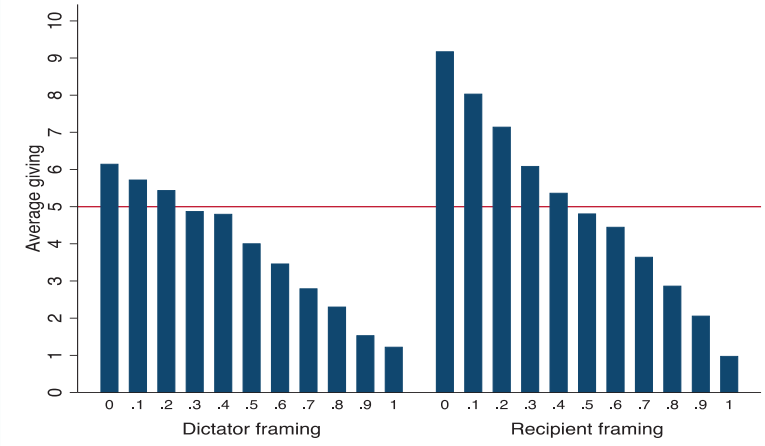


Table 3.3 Summary of decisions in each treatment

Treatment	N	Average giving* [0,…1]	Average giving** [0.1,…0.9]	% Giving nothing	% Giving half
D-T_9	42	4.01 (2.58)	4.01 (2.58)	2.38	14.29
R-T_9	43	5.53 (2.50)	5.53 (2.50)	0	4.65
D-T_{11}	44	3.69 (2.81)	3.73 (2.58)	13.64	13.64
R-T_{11}	44	4.89 (2.93)	4.87 (2.44)	0	11.36

Notes. N refers to the number of observations. We have computed the average giving using each subject as independent observation. In our third column (*) we include all observations. We restrict our attention to giving for probabilities in [0.1, 0.9] in the fourth column (**). We compute the fraction of selfish decisions (fifth column) and egalitarian decisions (sixth column).

Figure 3.1 shows that giving decreases with the probability of being dictator. The Jonckheere-Terpstra test indeed confirms that there is a negative trend in every possible treatment ($p < 0.0001$), thus we find support for our first hypothesis.

> **Result 1.** *Subjects give less (i..e, they are more selfish) when there is a high probability of being the dictator, thus giving is affected by the probability of the choice being implemented.*

Second, we compare the level of generosity across roles to see whether framing the choice as dictator or recipient has any effect on giving. We observe in Figure 3.1 that subjects in the role of recipients are more generous than subjects in the role of dictators in the T_9 and the T_{11} treatment. Table 3 shows that average giving for dictators and recipients is 4.01 vs 5.53 in the T_9 and 3.73 vs 4.87 in the T_{11} treatment.[7] Our non-parametric analysis provides evidence in favour of our second hypothesis, if we use a Wilcoxon rank-sum test ($p < 0.0001$) or the Kolmogorov-Smirnov test for equality of distribution functions ($p < 0.0001$).

> **Result 2.** *Subjects give less (i..e, they are more selfish) when they are in the Dictator framing, compared with being in the Recipient framing.*

Our third hypothesis posits that starting with a probability 1 that choices will be implemented makes dictators more selfish. We restrict our attention to giving for probabilities in [0.1, 0.9], obtaining that the average giving for subjects is 4.78 in the T_9

[7] Note also that dictators are more likely to choose a selfish allocation (i.e., giving nothing) and less likely to choose the fair allocation (i.e., giving half of the endowment), compared with recipients.

and 4.30 in the T_{11} treatment. Nevertheless, although the Wilcoxon rank-sum test does not confirm the third hypothesis for the D-treatments (p = 0.7702), it gives support for the R-treatments (p = 0.0002).

> **Result 3.** *Starting with probability 1 ("impure uncertainty") makes subjects give less in the Recipient framing, but it does not affect giving in the Dictator framing.*

In what follows, we show that our findings are robust to an econometric analysis, where we exploit the information collected in our questionnaire. In order to determine what drives the decisions under uncertainty, Table 3.4 and relatives (in the Appendix) show the relation of how much money the dictators give to recipients with the following variables: *Probability* (probability of being dictator), *Recipient* (dummy = 1 if subjects are in the Recipient framing), *Pure Uncertainty* (dummy = 1 if subjects are in the pure uncertainty treatment T_9), *TR x TIU* (interaction between Recipient and Pure Uncertainty), *Female* (dummy = 1 if the subject is a woman), *CRT Ok* (number of correct answers in the CRT), *CRT Intuitive* (number of intuitive answers in the CRT), *Generosity* and *Envy* (as measured by the answer to the survey questions) and *Risk* (as measured by the number of safe choices in the HL task).

Our findings confirm that the probability of being dictator or recipient affects the level of generosity; e.g., the larger the probability of being dictator is, the less money the dictators give to recipients. Being named as recipient leads to more generous behaviour and starting with pure uncertainty in the T_9 treatment (i.e., the first probability is equal to 0.9) conveys higher allocations to recipients, but only in the Recipient framing. Gender, cognitive abilities, social preferences or risk preferences do not seem to affect choices.

3.5 Conclusions

Previous research that has studied social preferences under uncertainty by looking at the dictator's decision when they have to choose between a safe and a risky option. There is also a bunch of research that investigates what factors influence ex-ante and ex-post inequality; e.g., asking subjects to redistribute probabilities of winning or

asking subjects to redistribute ex-post earnings after a lottery has affected the outcomes.

This paper is aimed at providing experimental evidence that generous behaviour is affected when we vary the probability that a generous choice will be implemented. Our main results confirm that (i) the level of generosity decreases at the probability of being decisor increases (*Result 1*), (ii) being in the role of dictator reduces generosity (*Result 2*), and (iii) taking decisions when the probability of being implemented is equal to 1 affects decisions of subjects in a recipient framing (*Result 3*).

We believe that these results advance our knowledge on the factors that influence generosity under risk. Our future research will be focused on calibrating the Fehr and Schmidt model with our data to estimate (using structural models) the level of envy and generosity, to see how the probabilities of being dictator and the framing of the decision affect these variables.

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3.7 Appendix

3.7.1 Giving (€) from dictators to recipients

Table 3.4 Giving (€) from dictators to recipients

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	**6.693*** **	**6.786*** **	**7.025*** **	**7.051*** **	**6.801*** **	**6.996*** **
	(0.185)	(0.208)	(0.499)	(0.339)	(0.341)	(0.652)
Probability	**-0.612*** **	**-0.612*** **	**-0.603*** **	**-0.606*** **	**-0.597*** **	**-0.600*** **
	(0.016)	(0.016)	(0.016)	(0.016)	(0.017)	(0.017)
Recipient	**1.326*** **	**1.141*** **	**1.056*** **	**1.077*** **	**1.061*** **	**1.088*** **
	(0.195)	(0.273)	(0.287)	(0.291)	(0.294)	(0.304)
Pure Uncertainty	**0.475** **	0.286	0.182	0.182	0.110	0.137
	(0.195)	(0.276)	(0.290)	(0.290)	(0.286)	(0.298)
RxPU		0.375	0.489	0.500	0.515	0.487
		(0.390)	(0.410)	(0.415)	(0.410)	(0.426)
Female			-0.057	-0.044		-0.002
			(0.213)	(0.211)		(0.221)
CRT Ok			-0.049			-0.046
			(0.183)			(0.189)
CRT Intuitive			-0.069			-0.065
			(0.173)			(0.179)
Generosity				-0.027		-0.036
				(0.064)		(0.066)
Envy				-0.036		0.030
				(0.076)		(0.081)
Risk					0.023	0.028
					(0.093)	(0.097)
Observations	1,557	1,557	1,458	1,440	1,386	1,368
Number of id	173	173	162	160	154	152
R2 within	0.525	0.525	0.513	0.514	0.51	0.511
R2 overall	0.436	0.437	0.427	0.429	0.427	0.429
R2 between	0.236	0.24	0.234	0.236	0.239	0.242
rho	0.348	0.348	0.349	0.351	0.34	0.35

*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses

3.7.2 Giving (€) from dictators to recipients (D-treatments)

Table 3.5 Giving (€) from dictators to recipients (D-treatments)

	(1)	(2)	(3)	(4)	(5)
Constant	**6.325*** **	**6.799*** **	**7.152*** **	**6.230*** **	**6.777*** **
	(0.265)	(0.961)	(0.519)	(0.537)	(1.134)
Probability	**-0.520*** **	**-0.514*** **	**-0.514*** **	**-0.517*** **	**-0.517*** **
	(0.023)	(0.023)	(0.023)	(0.024)	(0.024)
Pure Uncertainty	0.286	0.208	0.281	0.107	0.211
	(0.343)	(0.364)	(0.348)	(0.347)	(0.365)
Female		-0.204	-0.119		0.009
		(0.376)	(0.352)		(0.376)
CRT Ok		-0.115			-0.048
		(0.360)			(0.355)
CRT Intuitive		-0.118			-0.038
		(0.350)			(0.348)
Generosity			**-0.220** **		**-0.213***
			(0.107)		(0.110)
Envy			0.012		0.094
			(0.127)		(0.134)
Risk				0.083	0.100
				(0.165)	(0.167)
Observations	774	738	738	711	711
Number of id	86	82	82	79	79
R2 within	0.431	0.423	0.423	0.427	0.427
R2 overall	0.273	0.270	0.289	0.277	0.295
R2 between	0.00820	0.00814	0.0602	0.00469	0.0573
rho	0.455	0.454	0.439	0.435	0.439

*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses

3.7.3 Giving (€) from dictators to recipients (R-treatments)

Table 3.6 Giving (€) from dictators to recipients (R-treatments)

	(1)	(2)	(3)	(4)	(5)
Constant	**8.382*** **	**8.438*** **	**7.975*** **	**8.429*** **	**7.825*** **
	(0.168)	(0.433)	(0.306)	(0.308)	(0.629)
Probability	**-0.703*** **	**-0.696*** **	**-0.704*** **	**-0.682*** **	**-0.691*** **
	(0.021)	(0.022)	(0.022)	(0.023)	(0.023)
Pure Uncertainty	**0.661*** **	**0.647*** **	**0.654*** **	**0.620*** **	**0.637*** **
	(0.187)	(0.209)	(0.202)	(0.209)	(0.214)
Female		0.079	0.055		0.049
		(0.213)	(0.204)		(0.221)
CRT Ok		-0.029			0.058
		(0.171)			(0.180)
CRT Intuitive		-0.057			-0.003
		(0.156)			(0.162)
Generosity			**0.182*** **		**0.168** **
			(0.062)		(0.068)
Envy			-0.102		-0.053
			(0.073)		(0.083)
Risk				-0.031	-0.006
				(0.091)	(0.096)
Observations	783	720	702	675	657
Number of id	87	80	78	75	73
R2 within	0.617	0.606	0.611	0.599	0.604
R2 overall	0.55	0.536	0.554	0.528	0.544
R2 between	0.128	0.123	0.218	0.112	0.192
rho	0.181	0.198	0.175	0.191	0.189

*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses

3.7.4 Giving (€) from dictators to recipients (T_{11}-treatments)

Table 3.7 Giving (€) from dictators to recipients (T_{11}-treatments)

	(1)	(2)	(3)	(4)	(5)
Constant	**6.871*** **	**7.105*** **	**6.855*** **	**6.838*** **	**6.540*** **
	(0.217)	(0.604)	(0.435)	(0.393)	(0.824)
Probability	**-0.629*** **	**-0.617*** **	**-0.616*** **	**-0.615*** **	**-0.613*** **
	(0.021)	(0.022)	(0.022)	(0.023)	(0.023)
Recipient	**1.141*** **	**1.039*** **	**1.053*** **	**1.063*** **	**1.055*** **
	(0.268)	(0.275)	(0.282)	(0.273)	(0.283)
Female		-0.041	-0.124		0.069
		(0.286)	(0.281)		(0.295)
CRT Ok		0.018			-0.015
		(0.235)			(0.245)
CRT Intuitive		-0.126			-0.178
		(0.215)			(0.224)
Generosity			0.046		0.045
			(0.089)		(0.090)
Envy			-0.018		0.128
			(0.100)		(0.107)
Risk				0.040	0.072
				(0.116)	(0.126)
Observations	792	738	729	675	666
Number of id	88	82	81	75	74
R2 within	0.555	0.540	0.537	0.542	0.539
R2 overall	0.448	0.441	0.436	0.448	0.455
R2 between	0.174	0.177	0.168	0.174	0.215
rho	0.356	0.343	0.347	0.319	0.326

*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses

3.7.5 Giving (€) from dictators to recipients (T_9-treatments)

Table 3.8 Giving (€) from dictators to recipients (T_9-treatments)

	(1)	(2)	(3)	(4)	(5)
Constant	**6.983*** **	**7.038*** **	**7.403*** **	**6.891*** **	**7.728*** **
	(0.232)	(0.842)	(0.470)	(0.492)	(1.127)
Probability	**-0.594*** **	**-0.590*** **	**-0.597*** **	**-0.581*** **	**-0.588*** **
	(0.023)	(0.024)	(0.024)	(0.024)	(0.024)
Recipient	**1.516*** **	**1.541*** **	**1.572*** **	**1.570*** **	**1.545*** **
	(0.284)	(0.312)	(0.308)	(0.309)	(0.328)
Female		-0.028	0.076		0.054
		(0.320)	(0.322)		(0.336)
CRT Ok		-0.080			-0.186
		(0.295)			(0.326)
CRT Intuitive		0.012			-0.099
		(0.287)			(0.316)
Generosity			-0.096		-0.112
			(0.095)		(0.101)
Envy			-0.050		-0.044
			(0.116)		(0.127)
Risk				0.001	0.028
				(0.149)	(0.156)
Observations	765	720	711	711	702
Number of id	85	80	79	79	78
R2 within	0.494	0.486	0.492	0.480	0.486
R2 overall	0.418	0.411	0.420	0.405	0.417
R2 between	0.256	0.261	0.273	0.258	0.280
rho	0.341	0.360	0.359	0.359	0.373

*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses

3.7.6 Registration Form (example)

Google Forms

Gracias por rellenar Experimento sobre toma de decisiones - 21 de MAYO 2019 13:30hs - Aula 1 Edif. 11 (inscripción voluntaria)

Esto es lo que nos has enviado:

Experimento sobre toma de decisiones - 21 de MAYO 2019 13:30hs - Aula 1 Edif. 11 (inscripción voluntaria)

Dirección de correo electrónico *

xxxx@xxxx.com

Edad *

30-35

Correo (recibirás un mail de verificación, que puede tardar 2-3 días y es imprescindible para realizar el experimento) *

xxxx@xxxx.com

¿Eres mujer? *

- [x] Sí
- [ ] No

Curso más alto en el que estás matriculado *

- [ ] 1 de Grado
- [ ] 2 de Grado
- [ ] 3 de Grado
- [ ] 4 de Grado
- [x] Máster Universitario

¿Qué carrera/máster estudias? *

Economía

Valora en la escala, cómo de acuerdo estás con la siguiente afirmación respecto a ti: "No me preocupa cuanto dinero tengo, lo que me preocupa es que otros tienen menos que yo"

	1	2	3	4	5	6	7	
Totalmente en desacuerdo	☐	☐	☐	◉	☐	☐	☐	Totalmente de acuerdo

Valora en la escala, cómo de acuerdo estás con la siguiente afirmación respecto a ti: "No me preocupa cuanto dinero tengo, lo que me preocupa es que otros tienen más que yo"

	1	2	3	4	5	6	7	
Totalmente en desacuerdo	☐	☐	☐	◉	☐	☐	☐	Totalmente de acuerdo

Un yate y un bate cuestan 1.10 euros en total. El yate cuesta 1 euro más que el bate. ¿Cuánto cuesta el bate? *

0,05

Sí 5 máquinas, en 5 minutos, fabrican 5 artilugios, ¿Cuánto tardarían 100 máquinas en fabricar 100 artilugios? *

5

Un estadio de fútbol está duplicando el número de aficionados en cada partido. Si para llenar el estadio deben disputarse 48 partidos, ¿Cuántos partidos deben transcurrir para que se llene la mitad? *

47

El experimento es el día 21 DE MAYO a las 13:30 horas, en el Aula 1 del Edificio 11. ¿Podrás asistir? *

◉ Sí, asistiré

☐ No, no puedo asistir

Si al final has decidido que no quieres participar o no puedes participar del mismo en el día y hora estipulado, simplemente cierra la ventana y no envíes el formulario.

Sí

3.7.7 Instructions for Dictators & Impure Uncertainty (D-T11)

Bloque III: decisiones sobre reparto

Todas las decisiones en este bloque implican **dinero real**. Lo que quiere decir que sus decisiones determinan sus pagos. Vas a ser emparejado con otro participante y sus decisiones también pueden afectar a sus pagos.

Para esta tarea todos los sujetos se emparejan con otro participante de este experimento. Uno toma el papel activo (*el decisor*), es decir el que toma la decisión y el otro toma el papel no activo (*el receptor*), que solamente recibe un pago que decidido por el otro.

La tarea consiste en dividir un pastel de 10€. El decisor elige el reparto en unidades de 1 euro (es decir, se puede quedar 0€, 1€, …, 10€ para sí mismo o, lo que es lo mismo, puede darle al receptor 10€, 9€, …, 0€). Nadie va a saber quién es su pareja, ni ahora, ni después de tomar la decisión. Todo es anónimo.

Como va a ver en la tabla, el espectro de decisiones se mueve desde la absoluta certeza de ser decisor, y dicha probabilidad va variando de manera decreciente.

Todos los participantes del experimento van a tomar 11 decisiones de reparto. En cada uno de los casos, tendrán una probabilidad distinta de ser decisor. Como verá en la tabla la probabilidad va disminuyendo, lo que quiere decir que conforme ud. se mueva de una fila a la siguiente será menos probable ser el decisor. En la primera fila se es decisor con probabilidad 1 --por tanto seguro- mientras que, en la última, se es decisor con probabilidad 0, por tanto, no se es decisor.

Es importante que tenga en cuenta que los pagos sólo los determina el decisor y que el receptor no decide nada.

Al final del experimento se tirarán dos dados: El primero decide qué escenario de los 11 se implementará y el segundo qué sujetos son decisores y cuáles son receptores.

Recuerde que su tarea es **elegir un reparto en cada una de las filas** (donde la probabilidad de ser efectivamente decisor va bajando de una fila a la siguiente).

Tabla 1.

Probabilidad de ser decisor	**Su decisión (tiene que sumar 10€)**	
	€ para ti	€ para el receptor
p=1		
p=0,9		
p=0,8		
p=0,7		
p=0,6		
p=0,5		
p=0,4		
p=0,3		
p=0,2		
p=0,1		
p=0		

3.7.8 Instructions for Recipients & Impure Uncertainty (R-T_{11})

Bloque III: decisiones sobre reparto

Todas las decisiones en este bloque implican **dinero real**. Lo que quiere decir que sus decisiones determinan sus pagos. Vas a ser emparejado con otro participante y sus decisiones también pueden afectar a sus pagos.

Para esta tarea todos los sujetos se emparejan con otro participante de este experimento. Uno toma el papel activo (*el decisor*), es decir el que toma la decisión y el otro toma el papel no activo (*el receptor*), que solamente recibe un pago que decidido por el otro.

La tarea consiste en dividir un pastel de 10€. El decisor elige el reparto en unidades de 1 euro (es decir, se puede quedar 0€, 1€, …, 10€ para sí mismo o, lo que es lo mismo, puede darle al receptor 10€, 9€, …, 0€). Nadie va a saber quién es su pareja, ni ahora, ni después de tomar la decisión. Todo es anónimo.

Como va a ver en la tabla, el espectro de decisiones se mueve desde la absoluta certeza de ser receptor, y dicha probabilidad va variando de manera decreciente.

Todos los participantes del experimento van a tomar 11 decisiones de reparto. En cada uno de los casos, tendrán una probabilidad distinta de ser receptor. Como verá en la tabla la probabilidad va disminuyendo, lo que quiere decir que conforme ud. se mueva de una fila a la siguiente será menos probable ser el receptor. En la primera fila se es receptor con probabilidad 1 --por tanto seguro- mientras que, en la última, se es receptor con probabilidad 0, por tanto, no se es receptor.

Es importante que tenga en cuenta que los pagos sólo los determina el decisor y que el receptor no decide nada.

Al final del experimento se tirarán dos dados: El primero decide qué escenario de los 11 se implementará y el segundo qué sujetos son decisores y cuáles son receptores.

Recuerde que su tarea es **elegir un reparto en cada una de las filas** (donde la probabilidad de ser efectivamente receptor va bajando de una fila a la siguiente).

Tabla 1.

Probabilidad de ser receptor	**Su decisión (tiene que sumar 10€)**	
	€ para ti	€ para el dictador
p=1		
p=0,9		
p=0,8		
p=0,7		
p=0,6		
p=0,5		
p=0,4		
p=0,3		
p=0,2		
p=0,1		
p=0		

3.7.9 Instructions for Dictators & Pure Uncertainty (D-T_9)

Bloque III: decisiones sobre reparto

Todas las decisiones en este bloque implican **dinero real**. Lo que quiere decir que sus decisiones determinan sus pagos. Vas a ser emparejado con otro participante y sus decisiones también pueden afectar a sus pagos.

Para esta tarea todos los sujetos se emparejan con otro participante de este experimento. Uno toma el papel activo (*el decisor*), es decir el que toma la decisión y el otro toma el papel no activo (*el receptor*), que solamente recibe un pago que decidido por el otro.

La tarea consiste en dividir un pastel de 10€. El decisor elige el reparto en unidades de 1 euro (es decir, se puede quedar 0€, 1€, …, 10€ para sí mismo o, lo que es lo mismo, puede darle al receptor 10€, 9€, …, 0€). Nadie va a saber quién es su pareja, ni ahora, ni después de tomar la decisión. Todo es anónimo.

Como va a ver en la tabla, el espectro de decisiones se mueve desde la absoluta certeza de ser decisor, y dicha probabilidad va variando de manera decreciente.

Todos los participantes del experimento van a tomar 9 decisiones de reparto. En cada uno de los casos, tendrán una probabilidad distinta de ser decisor. Como verá en la tabla la probabilidad va disminuyendo, lo que quiere decir que conforme ud. se mueva de una fila a la siguiente será menos probable ser el decisor. En la primera fila se es decisor con probabilidad 0.9 --por tanto bastante probable- mientras que, en la última, se es decisor con probabilidad 0.1, por tanto, probablemente no se es decisor.

Es importante que tenga en cuenta que los pagos sólo los determina el decisor y que el receptor no decide nada.

Al final del experimento se tirarán dos dados: El primero decide qué escenario de los 9 se implementará y el segundo qué sujetos son decisores y cuáles son receptores.

Recuerde que su tarea es **elegir un reparto en cada una de las filas** (donde la probabilidad de ser efectivamente decisor va bajando de una fila a la siguiente).

Tabla 1.

Probabilidad de ser decisor	**Su decisión (tiene que sumar 10€)**	
	€ para ti	€ para el receptor
p=0,9		
p=0,8		
p=0,7		
p=0,6		
p=0,5		
p=0,4		
p=0,3		
p=0,2		
p=0,1		

3.7.10 Instructions for Recipients & Pure Uncertainty (R-T_9)

Bloque III: decisiones sobre reparto

Todas las decisiones en este bloque implican **dinero real**. Lo que quiere decir que sus decisiones determinan sus pagos. Vas a ser emparejado con otro participante y sus decisiones también pueden afectar a sus pagos.

Para esta tarea todos los sujetos se emparejan con otro participante de este experimento. Uno toma el papel activo (*el decisor*), es decir el que toma la decisión y el otro toma el papel no activo (*el receptor*), que solamente recibe un pago que decidido por el otro.

La tarea consiste en dividir un pastel de 10€. El decisor elige el reparto en unidades de 1 euro (es decir, se puede quedar 0€, 1€, …, 10€ para sí mismo o, lo que es lo mismo, puede darle al receptor 10€, 9€, …, 0€). Nadie va a saber quién es su pareja, ni ahora, ni después de tomar la decisión. Todo es anónimo.

Como va a ver en la tabla, el espectro de decisiones se mueve desde la absoluta certeza de ser receptor, y dicha probabilidad va variando de manera decreciente.

Todos los participantes del experimento van a tomar 9 decisiones de reparto. En cada uno de los casos, tendrán una probabilidad distinta de ser receptor. Como verá en la tabla la probabilidad va disminuyendo, lo que quiere decir que conforme ud. se mueva de una fila a la siguiente será menos probable ser el receptor. En la primera fila se es receptor con probabilidad 0.9 --por tanto bastante probable- mientras que, en la última, se es receptor con probabilidad 0.1, por tanto, probablemente no se es receptor.

Es importante que tenga en cuenta que los pagos sólo los determina el decisor y que el receptor no decide nada.

Al final del experimento se tirarán dos dados: El primero decide qué escenario de los 9 se implementará y el segundo qué sujetos son decisores y cuáles son receptores.

Recuerde que su tarea es **elegir un reparto en cada una de las filas** (donde la probabilidad de ser efectivamente receptor va bajando de una fila a la siguiente).

Tabla 1.

Probabilidad de ser receptor	**Su decisión (tiene que sumar 10€)**	
	€ para ti	€ para el dictador
p=0,9		
p=0,8		
p=0,7		
p=0,6		
p=0,5		
p=0,4		
p=0,3		
p=0,2		
p=0,1		

CHAPTER 4

Overall, in-group and out-group overplacement in known and unknown tasks: No gender differences

4.1 Introduction

Overconfidence refers to the fact that many individuals consider themselves to be indeed superior to their actual performance. This bias has been found to have both positive and negative implications. Overconfident people are more optimistic, have better mental health (Taylor et al., 2000), start more ambitious goals and are more persistent in the face of adversity (Benabou & Tirole, 2002), and improve their performance (Compte & Postlewaite, 2004). However, it could also carry on several negative consequences. Overconfidence has been found to be a factor explaining wars (Johnson, 2009), educational failures (Cabrera et al., 2017) and trading decisions when the expected earnings are negative (Odean, T., 1999). For all the aforementioned implications, to study overconfidence is crucial from an economic point of view.

The most general belief is that overconfidence is universal. According to De Bondt and Thaler (1995), “perhaps the most robust finding in the psychology of judgment is that people are overconfident”. However, the level of confidence differs across individuals and other factors. Muthukrishna et al. (2018) cite many articles showing that the degree of confidence varies across individuals since it depends on the age, gender and population, among others. Additionally, they find that overconfidence also depends on cultural traits. The kind of task performed also matters. Men are more confident in masculine tasks than women (Barber & Odean, 2001).

Although overconfidence may take several versions (see Moore et al., 2008 for a literature review), this paper focuses on overplacement of one's performance relative to others. Specifically, we examine gender differences in overplacement.

Findings on overconfidence have been found to be different across definitions. Moore & Healy (2008) develop a theory of confidence that relates all of them. They show evidences that there is a negative relationship between overconfidence and overplacement. While individuals with a high performance tend to underestimate their own performances (underconfidence), they underestimate others even more (overplacement). On the contrary, individuals with a poor performance tend to overestimate their own performances (overconfidence) and overestimate others performance even more (underplacement). Similar findings were reported Cabrera et al. (2017).

Literature on performance relative to others finds that most people think they are above the average (Alicke & Govorun, 2005). Literature on gender differences in overplacement have found mixed results so far. While some studies find that there are gender differences finding that overplacement is higher for men (Ring et al., 2016), others find that there are no gender differences (Neyse et al., 2016).[8] Therefore, further analysis is needed to shed light on this point.

Overconfidence, and in particular overplacement, has usually been measured through written questionnaires (Cognitive Reflexion Test, CRT; Elicitation of Genuite Overconfidence, EGO; trivia quizzes). Similarly, we ask participants to fill the so-called Raven test. This is a well-known questioner that measures individual's abilities using multiple choice questions. However, individuals could have experience in similar tasks and make predictions based on priors' beliefs. Then, unlike other studies, we avoid this issue evaluating participants through a video presentation. It consisted on an individual task. Each subject entered the room and did exactly the same: to read a sentence "*My name is xxxx and I was born at xxx. My code is xxx*". All videos were evaluated by external referees. Since participants have no prior experience, this would be ideal to evaluate gender differences in predictions.

[8] See Moore & Dev (2018) for further discussion on this point.

This paper also contributes to a more extended literature about gender differences. Men and women have been found to be very different in many aspects. According to Cabrera et al. (2017), women and men react different to information on owns' performance relative to others. That is, after receiving this information, women report lower levels of satisfaction and performs worse. They argue that a possible explanation is the existing difference in competition (Gneezy, 2009). On the other hand, there is a large difference in competitive positions where women are clearly underrepresented (Gneezy and Muriel, 2003). Additionally, women participate lower in the labor market (Antecol, 2001), earn lower wages (Antecol, 2000) and are more prone to smoke in gender-equal societies (Rodríguez-Planas & Sanz-de-Galdeano, 2019).

To our knowledge, this is the first paper that examines gender differences on overreplacement not only compared to the overall sample but also by the same and different gender.

We conduct a novel experiment to test for gender differences in overplacement. The participants were 191 undergraduate students in Business or Economics from the University of Granada. The experiment consisted in two parts. The first part included two independent and unrelated tasks: the so-called Raven test and an individual video presentation evaluated by external referees. While we expect individuals to have previous similar experience to questions in the Raven test, we do not expect such experience in the video presentation. Hence, the latter task could be considered as an ideal experiment to study overplacement since individuals have no prior information to make predictions about their performance related to others. On the second part of the experiment, participants were asked to predict their performance on each task compared to all participants, own-gender and opposed-gender participants. Comparing actual and predicted performance, allow as to build three measures of overplacement for each task. Controlling for risk aversion, cognitive abilities and self-reported health, we find no gender differences in overplacement in the Raven test. However, in the video task, where subjects have no previous experience, we find in-group gender bias in case of women and no evidence of overconfidence for men in any case. This is a very surprising result: women show overplacement only when compared to women (and not

when compared to men) meaning that women belief that other women perform worse than men.

The remainder of the paper is organized as follows. Section 2 describes the experimental design. Section 3 contains the hypothesis tested. Section 4 explains the data collection procedure and some descriptive statistics. Sections 5 and 6 present the results. Finally, Section 7 discusses the results and conclude.

4.2 Experimental design

The experiment consists of two parts. During the first part subjects completed the 60 items Raven test in the EGEO Experimental Economics Lab. After the lab session, participants were invited to a dedicated room where they gave a short presentation of themselves in front of a professional cameraman who recorded the speech. The video was assessed by 20 external referees with no relationship with the students. Subjects received no incentives.

The second part of the experiment occurred after the experiment. The participants received an email asking them to make valuations of their own performance. They were asked to make 6 predictions of their performance in deciles (0%, 10%, …, 90%, 100%) with monetary consequences. The precise questions that subjects faced in the computer interface were (see appendix for a copy of these computer screens):

- Task 1: Subject is asked to indicate the section of the Raven test in which he or she should be located.
- Task 2: Subject is asked to indicate the section of the video task in which he or she should be located.
- Task 3: Subject is asked to indicate the section of the Raven test in which he or she should be located if only the results from women are taken into consideration.
- Task 4: The subject is asked to indicate the section of the video task in which he or she should be located if only the results from women are taken into consideration.

- Task 5: Subject is asked to indicate the section of the Raven test in which he or she should be located if only the results from men are taken into consideration.
- Task 6: Subject is asked to indicate the section of the video task in which he or she should be located if only the results from men are taken into consideration.

They were informed that 1 out of 6 prediction would be chosen for real payment. Subjects making the right prediction in the chosen task would get 20 euros (0 euros otherwise).

Observe that in Task 1 and 2 subjects are asked to compare themselves to the entire sample (regardless the gender) while Task 3-6 uses as comparison group a specific gender sub-sample. Using this information, we will compute 3 measurements of overplacement:

- Overall overplacement: focuses on the entire sample
- In-group overplacement: focuses on their own -gender sample
- Out-group overplacement: focuses on the opposed-gender sample

All in all, we have 3 measurements in two independent tasks. We will estimate 6 models of overplacement.

Besides the main tasks of the experiments we include some informative variables. Through a 10 items Holt-Laury test (with hypothetical payments), we measured Risk Aversion since individuals risk attitudes may have an impact on predictions (see Brañas-Garza et al., 2011); Cognitive abilities as means of the Cognitive Reflection Test (see Brañas-Garza et al., 2019) and self-reported level of health. None of these additional measurements was incentivized.

No show-up fee was provided. 15 out of 125 did the right prediction in the randomly selected task and earned the 20 euros prize. On average subjects earned 2.4 euros for a 15 minutes online session.

4.3 Hypothesis

The Raven test is a well-known nonverbal task to evaluate reasoning abilities. It has been used for quite long time specially. It is made of 60 multiple choice questions, listed in order of difficulty[9]. The test was originally developed by John C. Raven in 1936 (Raven, 1936).

The use of tests to evaluate students' abilities in higher schools has become very standard in the last years. Even if the students have no particular experience in this precise test they are familiar with similar tests. Therefore, we assume that participants have experience in similar task and consequently have a *non-random prior* regarding their performance in the test. Consistently we expect participants doing accurate predictions of their score and absence of overplacement.

H1: "*We expect no gender difference in overplacement in the Raven test".*

In sharp contrast to the Raven test we will develop a new task on purpose for the experiment. We were looking for a new task where the participants find no familiarity at all. The video task is absolutely new and we expect subjects to be inexperienced and, therefore "blind". Besides the final score would be objective –since 20 external referees mark the video presentation.

Since students were not familiar with the task and their punctuation will be given by external people then we assume that participants would have a *random prior* regarding their performance on the video task. And if this is the case then this is the perfect environment for the emergence of over/under placement. Given the previous literature that states that men are more likely than women to exhibit overplacement (Niederle & Vesterlund, 2007; Cárdenas et al., 2007) we expect gender bias in our video task.

H2: "*We expect gender difference in overplacement in the Video task".*

[9] In each test item, the subject is asked to identify the missing element that completes a pattern. Many patterns are presented in the form of a 6×6, 4×4, 3×3, or 2×2 matrix, giving the test its name.

4.4 Sample

132 subjects (out of 190) entered in the website and participated in the second part of the experiment. The latter implies a 30.52% level of attrition. It is important to mention that those who decided to participate in the second stage perform better (*p=0.065*) in the Raven test that those who did not; on the contrary there is not such an effect for the Video task (*p=0.494*). The former indicates certain level of self-selection in the sample.

Among those 132 who participated in the second part, 124 subjects completed all the tasks (predictions). The main descriptive statistics are shown in Table 4.1.

Table 4.1 Summary statistics

	N	Mean	Sd	Mode	Min	Max
Raven Actual	132	5.167	2.791	6	1	10
Video Actual	132	5.03	2.921	3, 5	1	10
Raven Predicted	125	7.176	1.714	7	1	10
Video Predicted	124	7.492	1.876	8	1	10
Female	132	0.629	0.485	1	0	1
Risk	132	4.568	1.479	4	1	7
CRT	132	0.364	0.57	0	0	2
Health	132	3.682	0.804	4	2	5

The sample is a bit unbalanced in terms of gender (62.9% female). Since actual Raven and Video are shown in deciles (and therefore the *mean = 5*), the observed average and mode both for the predicted value in both Raven and Video reflect a substantial level of overall overplacement among participants. All in all, our participants are Risk Averse, not particularly good performing the CRT (*mode = 0*) but healthy –since the mean is 3.68 (out 5) and the mode = 4.

We find clear gender differences in the current performance in the Raven test ($\hat{\beta}$ *= -1.487, p = 0.003*) in favour of more skilled men (*mean females = 4.614, mean males = 6.102*). The index of reasoning ability in our sample also has a typical distribution regarding gender (see also Figure 1 panel C). Subjects score on average 49.575 (out 60). There is no consensus on this very controversial topic, although the gender differences

are usually recognized to be small or insignificant (Hedges et al., 1995; Hyde et al., 2008). A possible explanation for this difference is the different motivation in the two genders.

Consistently, we also find gender bias in the expected performance of the Raven test ($\hat{\beta}$ *= -0.830*, *p = 0.008*) in favour of men who consider themselves better than women (*mean females = 6.857, mean males = 7.688*). These expectations refer to task 1, when subjects are compared to the entire sample (overall –see also Figure 1 panel D). The particular in/group biases will be shown in their respective sections.

The actual performance of the video task is different regarding gender abilities. We find no gender bias in the Video task ($\hat{\beta}$ *= 0.210*, *p = 0.691*): the mean for female is 5.108 and for males is 4.898. Quite surprisingly, we do find contradictory gender bias in expectations for the Video task ($\hat{\beta}$ *= -0.794*, *p = 0.021*): women are less optimistic than men (*mean* females = 7.184, *mean* males = 7.979).

Although Raven and Video tasks are independent and ex-ante uncorrelated, we need to test whether this is the case. Confirming our expectations, we find that performance in Raven and Video are uncorrelated ($\rho = 0.0865$, $p = 0.324$). We find similar values for the female sample ($\rho = -0.007$, $p = 0.952$) however we observe a positive correlation for the subsample of men ($\rho = 0.291$, $p = 0.042$). The later implies that males' actual performance in both tasks is positively correlated.

We also find that participants predictions regarding their own performance in both Raven and Video tasks are highly correlated ($\rho = 0.793$, $p = 0.000$). That means that those who consider that will score high (low) in Raven also consider that will do the same in the Video task. The same figures are found for females ($\rho = 0.784$, $p = 0.000$) and males ($\rho = 0.751$, $p = 0.000$). In both cases, these figures are highly significant.

However, large predictions are not necessarily signs of overplacement. We need to correct prediction by real performance in order to assess whether the subjects consider themselves better than the rest of the sample.

In the following sections we will explore in detail the determinant of overall, in/out group overplacement. The first section will be focus on the Raven test, the next will study the Video task.

4.5 Results I: Raven Test

4.5.1 Preliminary results on overplacement

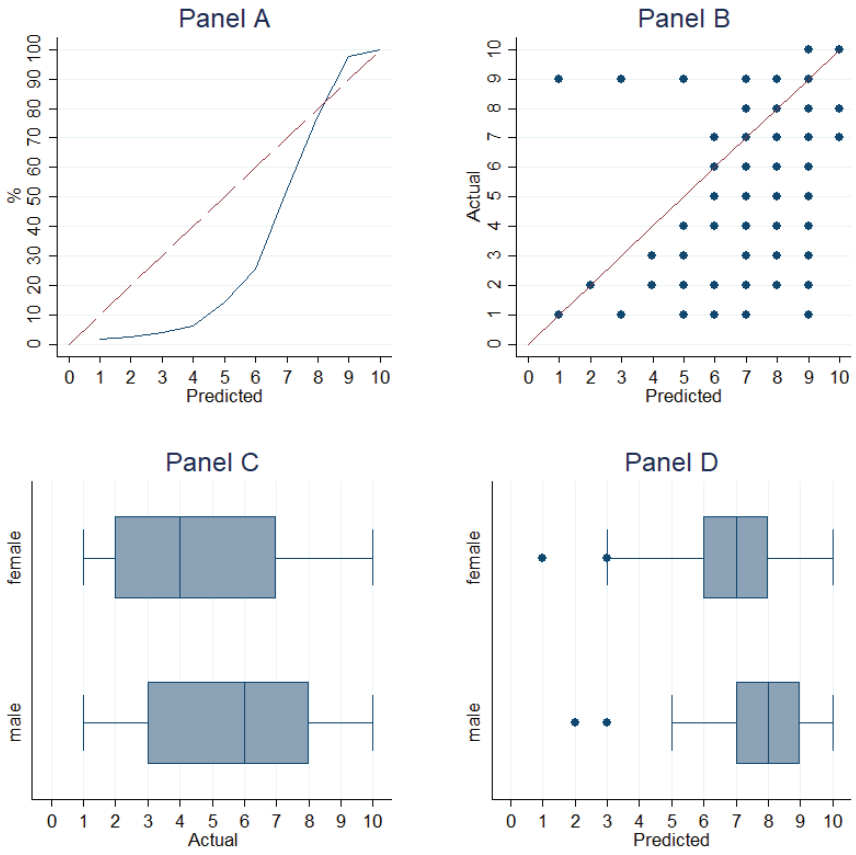
Figure 4.1 gives a general view of overplacement: beliefs regarding own performance relative to others (entire sample). Panel A shows the cumulative distribution of the predicted values and the uniform distribution (diagonal) that represents the actual performance in deciles. Panel B plots the pair (actual, predicted) at individual level. Dots placed at the diagonal show subjects with not errors (*actual = predicted*) while those below the diagonal reflects overplacement (*actual < predicted*).

It needless to say that the fraction of subjects below the diagonal is overwhelming (71.21 %), therefore there is a massive overplacement in our sample. The distance between the diagonal and the prediction precisely reflects overplacement:

- Less than 20% of the participants consider themselves below the mean of 5 (and obviously they are the 50% of the sample).
- The vast majority of the sample predicts a performance according to decile 7-9, which is again, by definition impossible.

Figure C and D show respectively the box plot graph for actual and predicted performance: it is clear that men score higher than women. Similar values are observed for predictions: there is clear gender bias in favour of more optimistic men. However, these differences might be compensated by performance. We analyse these differences in detail in the next subsection.

Figure 4.1 Actual and predicted performance in the Raven test: Gender differences



4.5.2 Overall overplacement

Table 4.2 shows three type of regressions: On the top we study predictions, in the middle we focus on $overplacement_i = predicted_i - actual_i$ and at the bottom we show errors, that is, overplacement in absolute value. We have 5 types of models:

- Model (1) uses *actual* performance as a determinant of subjects' predictions.
- Model (2) uses gender, *female*, as dependent variable.
- Model (3) uses both performance and gender.
- Model (4) corrects model (3) introducing the interaction *actual x female*.

- Model (5) extends previous model (4) introducing controls. More precisely: Risk Aversion, CRT and Health.

Table 4.2 Predictions, overplacement and errors in the Raven task

Predictions: Expectations					
	(1)	(2)	(3)	(4)	(5)
Actual	**0.168*** **		**0.137** **	0.131	0.111
	(0.0534)		(0.0553)	(0.0854)	(0.0895)
Female		**-0.830*** **	**-0.602***	-0.660	-0.560
		(0.307)	(0.315)	(0.685)	(0.702)
Actual x Female				0.0107	0.0146
				(0.112)	(0.113)
Overplacement: Predicted - Actual					
	(1)	(2)	(3)	(4)	(5)
Actual	**-0.832*** **		**-0.863*** **	**-0.869*** **	**-0.889*** **
	(0.0534)		(0.0553)	(0.0854)	(0.0895)
Female		0.832	**-0.602***	-0.660	-0.560
		(0.519)	(0.315)	(0.685)	(0.702)
Actual x Female				0.0107	0.0146
				(0.112)	(0.113)
Error: |Overplacement|					
	(1)	(2)	(3)	(4)	(5)
Actual	**-0.509*** **		**-0.534*** **	**-0.530*** **	**-0.533*** **
	(0.0548)		(0.0570)	(0.0881)	(0.0931)
Female		0.409	-0.478	-0.446	-0.471
		(0.406)	(0.325)	(0.706)	(0.730)
Actual x Female				-0.00593	-0.00357
				(0.116)	(0.118)
Observations	125	125	125	125	125

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Note that while models 1-3 are informative we are more interested in models 4-5, since model (4) incorporates simultaneously performance and gender and the interaction. Finally, model (5) refines model (4) using other available information from the very same sample. Table 2 is just a summary of several tables. The entire set of regressions, including controls is shown in the appendix.

Predictions: While subjects who perform better predict larger outcome (*p<0.05,* model 1), we find that female predict less (*p<0.01,* model 2). Same results are also visible in model (3). However, gender bias vanishes once we control for the interaction *actual*female* in model 4 (*p>0.1*). Results are confirmed in model 5 with controls.

Overplacement: Subjects with good performance are less likely to do overplacement (this is true for all the models) and gender does not impact itself (model 2) but has a very weak effect on model 3. There is no gender bias we control for the interaction *actual*female* without (model 4) or with controls (model 5).

Error: For all the models we see that good performers are less likely to make errors in predictions. Gender has no impact whatsoever (*p>0.1* in all models).

We therefore conclude:

Result 1: "*There is no gender bias in predictions and overplacement in the Raven test. No gender bias appears in accuracy".*

4.5.3 In-group overplacement

This second section focuses on in-group overplacement, that is, when subjects compare themselves with participants of their same sex. Table 3 shows three types of regressions -predictions, overplacement and accuracy- and the 5 types of models.

Predictions: Neither actual performance in the task nor participants´ gender has any impact on predictions (models 1-5). No any other variable in significant whatsoever (*p>0.1*).

Overplacement: Subjects with good performance are less likely to do overplacement (this is true for all the models, *p<0.01*). With the exception of model 3 gender is never significant in any model.

Errors: Good performers are less likely to make errors in predictions. Gender has no impact whatsoever (*p>0.1* in all models).

We therefore conclude:

- **Result 2:** *"There is no gender bias in predictions and in-group overplacement in the Raven test. No gender bias appears in accuracy".*

Observe that Result 2 is identical to Result 1. Therefore, there are not gender differences in predicting own behaviour when men or women compare themselves with the entire sample or with subjects of their own sex.

Table 4.3 In-group: Predictions, overplacement and errors in the Raven test

Predictions: Expectations					
	(1)	(2)	(3)	(4)	(5)
Actual	-0.0946		-0.0735	-0.0700	-0.0578
	(0.0671)		(0.0703)	(0.109)	(0.115)
Female		0.530	0.406	0.438	0.485
		(0.383)	(0.401)	(0.870)	(0.894)
Actual x Female				-0.00598	-0.0108
				(0.143)	(0.145)
Overplacement: Predicted - Actual					
	(1)	(2)	(3)	(4)	(5)
Actual	**-1.060*** **		**-1.124*** **	**-1.045*** **	**-1.036*** **
	(0.0727)		(0.0739)	(0.114)	(0.120)
Female		0.684	**-1.219*** **	-0.486	-0.502
		(0.681)	(0.422)	(0.912)	(0.938)
Actual x Female				-0.136	-0.137
				(0.150)	(0.152)
Error: |Overplacement|					
	(1)	(2)	(3)	(4)	(5)
Actual	**-0.346*** **		**-0.367*** **	**-0.317*** **	**-0.306** **
	(0.0692)		(0.0725)	(0.112)	(0.119)
Female		0.232	-0.388	0.0747	0.220
		(0.432)	(0.414)	(0.896)	(0.925)
Actual x Female				-0.0859	-0.0943
				(0.147)	(0.149)
Observations	126	126	126	126	126

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

4.5.4 Out-group overplacement

The third section focuses on out-group overplacement. Out-group refers to subjects who compare themselves with participants of their opposed sex.

Table 4.4 shows three types of regressions -predictions, overplacement and accuracy- and the 5 types of models.

Table 4.4 Out-group: Predictions, overplacement and errors in the Raven test

Predictions: Expectations					
	(1)	(2)	(3)	(4)	(5)
Actual	**-0.145****		-0.0893	-0.139	-0.111
	(0.0726)		(0.0745)	(0.115)	(0.121)
Female		**1.231*****	**1.080****	0.618	0.660
		(0.407)	(0.425)	(0.921)	(0.947)
Actual x Female				0.0856	0.0758
				(0.151)	(0.153)
Overplacement: Predicted - Actual					
	(1)	(2)	(3)	(4)	(5)
Actual	**-1.172*****		**-1.029*****	**-1.156*****	**-1.140*****
	(0.0836)		(0.0764)	(0.117)	(0.124)
Female		**4.495*****	**2.753*****	**1.572***	1.556
		(0.652)	(0.436)	(0.938)	(0.966)
Actual x Female				0.219	0.215
				(0.154)	(0.156)
Error: |Overplacement|					
	(1)	(2)	(3)	(4)	(5)
Actual	**-0.224*****		**-0.225*****	0.166	0.141
	(0.0712)		(0.0749)	(0.106)	(0.112)
Female		0.364	-0.0177	**3.614*****	**3.685*****
		(0.421)	(0.427)	(0.850)	(0.872)
Actual x Female				**-0.673*****	**-0.668*****
				(0.140)	(0.141)
Observations	126	126	126	126	126

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Predictions: Performance and gender only appear as significant in models 1, 2 and 3. Once we introduce the interaction *actual*female* the effect vanishes. Then we conclude that there is no gender bias in out-group predictions.

Overplacement: Subjects with good performance are less likely to do overplacement (this is true for all the models, *p<0.01*). While female appears significant and positive in model 2-4, the effect is weakly significant and vanish once we introduce controls. We therefore conclude that there is no gender bias in out-group overplacement.

Error: Women are more accurate than men doing out-group comparison than men. Among women, those on the top of the performance are less accurate.

We therefore conclude:

Result 3: "*There is no gender bias in predictions and overplacement in the Raven test. Women predicts better than men out-group performance".*

Observe that Result 3 is also very similar to previous Results 1 and 2. We therefore conclude that there is not gender bias in overplacement in the Raven test.

The evidence shown along this extensive analysis of predictions in the Raven test let us to conclude that the **H1** of absence of gender difference in overplacement in the Raven test has *not been rejected.*

4.6 Results II: The Video Task

4.6.1 Preliminary results for the Video task

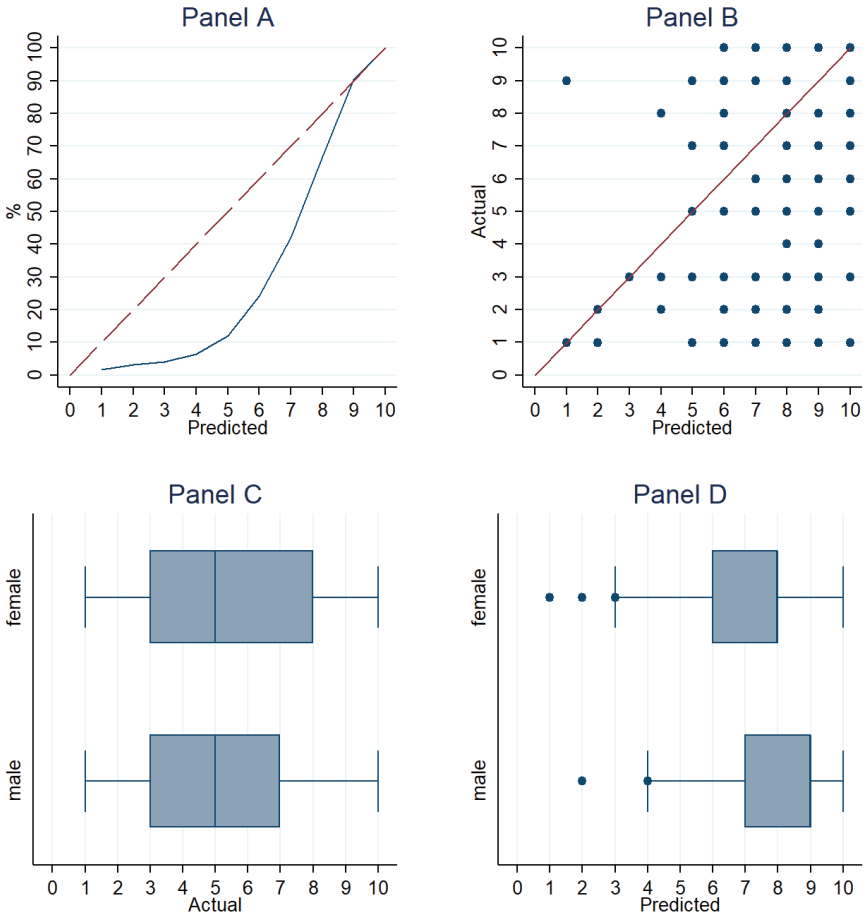
Figure 4.2 explores overplacement of one's performance relative to others and gender differences in performance and predictions.

Panels A show the cumulative distribution of the actual performance and the uniform distribution (diagonal). Panels B plots the pair (actual, predicted) at individual level. Dots at the diagonal show subjects with not errors (*actual = predicted*) while those below the diagonal reflects overplacement (*actual < predicted*).

There is very large fraction of subjects (76.51 %) placed below the diagonal. This is indicative of overplacement in our sample. We observe very similar figures in the Video task compared to the Raven test:

- Less than 10% of the sample considers herself below the mean of 5.
- The vast majority of the sample predicts that they in deciles 6-9.

Figure 4.2 Actual and predicted performance in the Video task: Gender differences



Panels C and D show respectively the box plot graph for actual and predicted performance for women and men. As in the Raven test, it is found that a vast majority predicts higher scores than their actual performance (76.51%). While women do slightly better than men, we see that men expect a larger performance.

In short women do better but men expect to do better. This difference appears to reflect a gender bias in favour of more optimistic men. Observe that these differences cannot be compensated by performance since women outperformed men. The later might be indicative of overconfident males and then a rejection of Hypothesis 2. However, we need to study these differences at individual level. We analyse these differences in detail in the next subsection.

4.6.2 Overall overplacement

We will proceed with the video task as in the Raven test. Table 4.5 shows three types of regressions: predictions, overplacement and errors and five types of regression models.

Table 4.5 Predictions, overplacement and errors in the Video task

Predictions: Expectations					
	(1)	(2)	(3)	(4)	(5)
Actual	0.0732		0.0798	**0.224****	**0.236****
	(0.0579)		(0.0568)	(0.0944)	(0.0949)
Female		**-0.795****	**-0.818****	0.297	0.373
		(0.340)	(0.339)	(0.676)	(0.674)
Actual x Female				-0.223*	-0.230*
				(0.117)	(0.118)
Overplacement: Predicted - Actual					
	(1)	(2)	(3)	(4)	(5)
Actual	**-0.927*****		**-0.920*****	**-0.776*****	**-0.764*****
	(0.0579)		(0.0568)	(0.0944)	(0.0949)
Female		-1.083*	**-0.818****	0.297	0.373
		(0.600)	(0.339)	(0.676)	(0.674)
Actual x Female				**-0.223***	**-0.230***
				(0.117)	(0.118)
Error: |Overplacement|					
	(1)	(2)	(3)	(4)	(5)
Actual	**-0.393*****		**-0.394*****	**-0.582*****	**-0.586*****
	(0.0549)		(0.0552)	(0.0905)	(0.0927)
Female		0.0417	0.155	**-1.300****	**-1.311****
		(0.390)	(0.329)	(0.649)	(0.658)
Actual x Female				**0.291****	**0.298****
				(0.113)	(0.115)
Observations	124	124	124	124	124

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Predictions: The first model shows that predictions and performance are uncorrelated, implying that subjects who perform better (worst) have no idea of their own abilities. Model 2 shows that women predict less performance than men. Once we control for the interaction *actual*female* (model 4) then good performers predict more but this effect arises from men (since the interaction is negative and weakly significative for women). Results are mostly the same in model 5 with controls. All in all, women are not more prone to predict higher values once we control by performance.

Overplacement: Overplacement is negatively and highly correlated with subjects' performance and this is true for all the models. While gender appears to be weakly significant in models 2-3 this impact vanishes once we control for the interaction *actual*female* without (model 4) or with controls (model 5). In fact, the interaction shows that women with good performance are less likely than men to exhibit overplacement but this effect is weak.

Error: Good performers are less likely to make errors in predictions, that is, they are more accurate (models 1-5). Model 4 shows that women are less likely to make errors and this effect survives to the introduction of controls (model 5). All in all, women make better predictions than men.

We therefore conclude:

Result 4: *"There is no gender bias in predictions and overplacement in the video task. Women are more accurate in their predictions".*

In sum, we do not find evidence of gender bias in overplacement across our sample when subjects compare themselves with the entire sample. However, we observe that women make more accurate prediction along the video task. This effect was not observed in the Raven test.

Observe that Result 4 does not support **H2** that states that men are more overconfidence than women.

4.6.3 In-group overplacement

Along this section we explore in-group predictions in the video task, where men and women compare themselves with participants of their own gender. Table 4.6 shows the results for the 3 measurements and 5 models.

Predictions: As before we find that predictions and performance are uncorrelated in the video task. However, compared to those results shown Table 3 we find that women predict better performance than men. This gender bias survives to introduction of the interaction *actual*female* (model 4) and controls (model 5). All in all,

women are more likely than men to predict better performance when compared to their own group.

Overplacement: Overplacement is negatively and highly correlated with subjects' performance. Women are more likely to exhibit overplacement than men when compare themselves with women (models 2-5). All in all, women exhibit systematic overplacement.

Error: Good performers are less likely to make errors in predictions but this effect does not survive to the introduction of the interaction *actual*female* (model 4) and controls (model 5) which implies that women do better than men and correctly predict their performance. As shown in models 2-5 women are more accurate than men. All in all, women make better predictions than men when compared to their own sex.

Table 4.6 In-group: Predictions, overplacement and errors in the Video task

Predictions: Expectations					
	(1)	(2)	(3)	(4)	(5)
Actual	-0.0179		-0.0277	0.0685	0.0866
	(0.0667)		(0.0631)	(0.107)	(0.106)
Female		**1.495*** **	**1.501*** **	**2.237*** **	**2.409*** **
		(0.377)	(0.378)	(0.759)	(0.749)
Actual x Female				-0.148	-0.165
				(0.132)	(0.131)
Overplacement: Predicted - Actual					
	(1)	(2)	(3)	(4)	(5)
Actual	**-0.973*** **		**-0.983*** **	**-0.911*** **	**-0.896*** **
	(0.0660)		(0.0619)	(0.105)	(0.104)
Female		**1.349** **	**1.579*** **	**2.132*** **	**2.319*** **
		(0.647)	(0.371)	(0.746)	(0.734)
Actual x Female				-0.111	-0.126
				(0.130)	(0.129)
Error: |Overplacement|					
	(1)	(2)	(3)	(4)	(5)
Actual	**-0.238*** **		**-0.242*** **	-0.126	-0.136
	(0.0638)		(0.0631)	(0.106)	(0.108)
Female		**0.689** *	**0.746** *	**1.639** **	**1.640** **
		(0.399)	(0.378)	(0.758)	(0.764)
Actual x Female				-0.179	-0.164
				(0.132)	(0.134)
Observations	125	125	125	125	125

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

We therefore conclude:

Result 5: *"Women do larger predictions and exhibit higher overplacement than men in the video task when compared to women. Women are more accurate in their predictions".*

Result 5 clearly contrasts to Result 4 where gender was not significant. Women, when compare to women, are more likely to exhibit overplacement and this bias does not appear when compare to the entire sample. This effect does not happen for men.

An important difference with Result 4 is that Result 5 not only rejects H2 but indeed suggests exactly the opposite.

4.6.4 Out-group overplacement

We finally study prediction in the video task out-group: in this case men compare themselves to women and in the other way around. Table 4.7 shows the results.

Predictions: Performance itself does not explain predictions (model 1) while women predict smaller values than men out-group (model 2). Gender bias does not survive to introduction of the interaction *actual*female* (model 4) and controls (model 5) however women with good performance predict less than men out-group but the effect is weak. We conclude therefore no gender bias out-group.

Overplacement: Overplacement is negatively and highly correlated with subjects' performance (models 1-5). Women are more likely to exhibit overplacement than men when compare themselves with men (models 2-3) but gender bias does not survive in more complete models (4 and 5). While women do not exhibit more overplacement than men out-group, those with good performance weakly predict less. Hence, we conclude no gender bias out-group.

Error: Good performers are less likely to make errors all along the models. The model with the interaction *actual*female* (model 4) and controls (model 5) show that women are more accurate than men. All in all, women make better predictions than men when compared to their own sex.

We therefore conclude:

Result 6: "*There is no gender bias in predictions and overplacement out-group in the video task. Women are more accurate in their predictions".*

Table 4.7 Out-group: Predictions, overplacement and errors in the Video task

Predictions: Expectations					
	(1)	(2)	(3)	(4)	(5)
Actual	0.0238		0.0376	**0.166***	**0.168***
	(0.0599)		(0.0547)	(0.0920)	(0.0943)
Female		**-1.654*****	**-1.665*****	-0.684	-0.639
		(0.328)	(0.329)	(0.657)	(0.667)
Actual x Female				**-0.196***	**-0.197***
				(0.114)	(0.116)
Overplacement: Predicted - Actual					
	(1)	(2)	(3)	(4)	(5)
Actual	**-0.954*****		**-0.938*****	**-0.805*****	**-0.795*****
	(0.0638)		(0.0571)	(0.0961)	(0.0980)
Female		**-2.213*****	**-1.932*****	-0.910	-0.848
		(0.612)	(0.343)	(0.686)	(0.693)
Actual x Female				**-0.205***	**-0.212***
				(0.119)	(0.121)
Error: |Overplacement|					
	(1)	(2)	(3)	(4)	(5)
Actual	**-0.210*****		**-0.209*****	**-0.572*****	**-0.567*****
	(0.0604)		(0.0607)	(0.0948)	(0.0969)
Female		-0.266	-0.204	**-2.993*****	**-3.069*****
		(0.380)	(0.364)	(0.676)	(0.686)
Actual x Female				**0.558*****	**0.552*****
				(0.117)	(0.119)
Observations	125	125	125	125	125

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Result 6 replicates Result 4 and differs from Result 5. While result 5 (in-group) shown a overplacement among women this bias disappear when women compare to the entire sample or males.

All in all, **H2** is not supported. In the video task, men are not more overconfident than women.

4.7 Discussion

This first part of this paper explores predictions, overplacement and accuracy on the self-evaluation of the Raven test compared to 3 groups of people: the entire sample (overall), participants of the same sex than the responder (in-group) and participants of the opposed sex (out-group).

We find no gender bias in predictions and overplacement in the Raven test regardless the comparison group (overall, in-group, out-group). The same absence of gender bias is found in accuracy of beliefs in overall and in-group comparisons. In sharp contrast, we find that women predict better than men when compare themselves with the opposed sex.

All in all, our results do not support the claim than men are more overconfindent than women. In this particular task, where we assume that participants have an idea of their own abilities –based on their own experience- we do not find any substantial gender bias. In conclusion, the analysis of gender differences in predictions of own performance in the Raven test let us to conclude that the **H1** (no gender differences in overplacement for the Raven test) has not been rejected.

The second part explores repeat the same analysis (predictions, overplacement and accuracy) on the self-evaluation of the Video task. Subjects compared themselves to the entire sample, participants of the same sex than the responder and participants of the opposed sex.

We developed a new task on purpose for this experiment in order to evaluate overplacement in unknown environments. Indeed, we used external referees in order to increase the difficulty of self-evaluation. Since participants are blind and would have a *random prior* regarding their own performance, we assume that this is the perfect environment for the emergence of over/under placement. According the existing literature that states that men are more overconfident than women we stated **H2**.

All in all, we did not find any support to **H2** (overconfidence in favour of men). Indeed, **H2** was systematically rejected. In overall and out-group comparisons we find no gender bias in predictions and overplacement in the Video test. We also find that women predict better than men.

H2 receive even less support in in-group comparisons where gender bias reversed in favour of women more confident than men. This excess of confidence is also transmitted to beliefs where women make more errors than men.

In sum, our results do not support the general claim than men are more overconfident than women. Even in this new and specific task where we expect subjects to be completely blind to their own abilities and then we expect to be the perfect environment for overconfidence we do not find males being more overconfident than women. Hence, we conclude that **H2** (gender differences in overplacement for the Video test) has been rejected.

4.8 References

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4.9 Appendix

4.9.1 Instructions: Raven Test & Overconfidence

The Granada Lab of Behavioral Economics(GLOBE)

TAREA 1

Queremos que nos indiques el tramo en el que tú piensas que te encuentras en el **test de Raven.**

Por ejemplo, si piensas que estás entre el 40% con la puntuación más alta, pero por debajo del 30% con la puntuación más alta, deberás señalar el tramo (61, 70). Si piensas que estás entre el 20% con la puntuación más alta pero no entre el 10% con la puntuación más alta, deberás señalar el tramo (81, 90). Por el contrario si crees que no lo has hecho demasiado bien debes de mirar a la parte izquierda de la distribución. Si crees que estás dentro del grupo de los que lo han hecho francamente mal (los "peores") debes elegir el tramo (0,10). Justo lo contrario debes de señalar (91,100) si piensas que eres de los que lo han hecho mejor de todos.

Por favor, elije el tramo en el que te clasificas. Ten en CUENTA QUE si el tramo que señalas coincide con el tramo en el que realmente te encuentras, entonces **ganarás 20 Euros.**

(0,10) (11,20) (21,30) (31,40) (41,50) (51,60) (61,70) (71,80) (81,90) (91,100)

Continuar

4.9.2 Instructions: Video task & Overconfidence

The Granada Lab of Behavioral Economics(GLOBE)

TAREA 2

Queremos que nos indiques el tramo en el que tú piensas que te encuentras en la **prueba de Video** entre los (casi) 200 sujetos que participasteis. Recuerda que nuestros expertos han valorado el Aplomo, la Imagen y la Calidad de la expresión oral y que han puntuado todos los vídeos; lo cual nos ha permitido sacar un ranking de todos los sujetos. Igual que en el caso anterior, piensa en cómo crees que hiciste dicha prueba, como crees que lo habrán hecho los demás. Como en el caso anterior queremos que posiciones tu actuación (tu prueba del video) sobre el total de la población que participó.

Por favor, elije el tramo en el que te clasificas. Ten en CUENTA QUE si el tramo que señalas coincide con el tramo en el que realmente te encuentras, entonces **ganarás 20 Euros**.

(0,10)	(11,20)	(21,30)	(31,40)	(41,50)	(51,60)	(61,70)	(71,80)	(81,90)	(91,100)

Continuar

4.9.3 Instructions: Raven test & Overplacement (Women)

The Granada Lab of Behavioral Economics(GLOBE)

TAREA 3

Piensa ahora sólo en la **Población de Mujeres** que participaron en la prueba (algo más de 100). Queremos que te compares con ellas. **Sólo con ellas**.

Ahora piensa en el **test de Raven**. Queremos que nos digas en el tramo en el que crees que te encuentras si solo tienes en cuenta el resultado obtenido por las mujeres. Es decir, si de la población que hizo el test, quitamos a los hombres, señala la posición en la que piensas que te encuentras.

Por favor, elije el tramo en el que te clasificas. Ten en CUENTA QUE si el tramo que señalas coincide con el tramo en el que realmente te encuentras, entonces ganarás 20 Euros.

(0,10) (11,20) (21,30) (31,40) (41,50) (51,60) (61,70) (71,80) (81,90) (91,100)

Continuar

4.9.4 Instructions: Video task & Overplacement (Women)

The Granada Lab of Behavioral Economics(GLOBE)

TAREA 4

Piensa ahora sólo en la **Población de Mujeres** que participaron en la prueba (algo más de 100). Queremos que te compares con ellas. **Sólo con ellas**.

Ahora piensa en la **prueba de Video**. Queremos que nos digas en el tramo en el que crees que te encuentras si solo tienes en cuenta las presentaciones realizadas por mujeres. Es decir, si de la población que hizo la prueba, quitamos a los hombres, señala la posición en la que piensas que te encuentras.

Por favor, elije el tramo en el que te clasificas. Ten en CUENTA QUE si el tramo que señalas coincide con el tramo en el que realmente te encuentras, entonces ganarás 20 Euros.

(0,10)	(11,20)	(21,30)	(31,40)	(41,50)	(51,60)	(61,70)	(71,80)	(81,90)	(91,100)

Continuar

4.9.5 Instructions: Raven test & Overplacement (Men)

The Granada Lab of Behavioral Economics(GLOBE)

TAREA 5

Piensa ahora sólo en la **Población de Hombres** que participaron en la prueba (algo menos de 100). Queremos que te compares con ellos. **Sólo con ellos**.

Ahora piensa en el **test de Raven.** Queremos que nos digas en el tramo en el que crees que te encuentras si sólo tienes en cuenta el resultado obtenido por los hombres. Es decir de la población que hizo la prueba quitamos a las mujeres. Señala la posición en la que piensas que te encuentras.

Por favor, elije el tramo en el que te clasificas. Ten en CUENTA QUE si el tramo que señalas coincide con el tramo en el que realmente te encuentras, entonces ganarás 20 Euros.

(0,10)	(11,20)	(21,30)	(31,40)	(41,50)	(51,60)	(61,70)	(71,80)	(81,90)	(91,100)

Continuar

4.9.6 Instructions: Video task & Overplacement (Men)

The Granada Lab of Behavioral Economics(GLOBE)

TAREA 6

Piensa ahora sólo en la **Población de Hombres** que participaron en la prueba (algo menos de 100). Queremos que te compares con ellos. **Sólo con ellos.**

Ahora piensa en la **prueba de Video**. Queremos que nos digas en el tramo en el que crees que te encuentras si solo tienes en cuenta las presentaciones realizadas por hombres. Es decir, si de la población que hizo la prueba, quitamos a las mujeres, señala la posición en la que piensas que te encuentras.

Por favor, elije el tramo en el que te clasificas. Ten en CUENTA QUE si el tramo que señalas coincide con el tramo en el que realmente te encuentras, entonces ganarás 20 Euros.

(0,10)	(11,20)	(21,30)	(31,40)	(41,50)	(51,60)	(61,70)	(71,80)	(81,90)	(91,100)

Continuar

4.9.7 Details on the protocol of Part I

On April 20th 2009, the 191 subjects participating in the study performed a series of computerized task including risk aversion tests, raven etc. (see Brañas-Garza & Rustichini 2009 for details). 188 completed both tasks (72 men, 116 women).

The video session was individualized: each subject came to one room where he has to read a sentence "*My name is xxxx and I was born at xxx. My code is xxx*". All the experimental subjects did the exact same task with the only difference of illumination (changing across the morning due to clouds). The video session was conducted by a professional.

All the participants are undergraduate students in Business or Economics in the last courses of their degree (average age is 22).

During the months of September to December 2009 several rating sessions where organized (3 or 4 subjects each). We completed 20 individual evaluations of the videos (10 females-voters + 10 males-voters).

The referees visualized the videos three times following a random sorting. Referees were asked to answer, for each video, the following questions:

- Do you consider that he/she is Beauty? yes (=1), not (=0)
- Did you like his/her performance? yes (=1), not (=0)

Note that both the presentation and the order of the questions were random. Referees where emphasized that at each time they should answer to the question only, that is, at the time of the beauty questions they don't have to evaluate subject performance, etc. Once they have already finished the where to ask a final question:

- Independently you consider him beauty or you liked his performance, do you feel sympathy toward him/her? yes (=1), not (=0).

The last questions intended to capture the special feelings that some people transmit.

All the referee are master students in Business or Economics (average age is 25). Regarding referees' nationalities we have:

- Women: Colombia, UK, Greece (3), Venezuela, Hong-kong, Spain (2), Romania.
- Men: Colombia (2), Albania, Venezuela, Germany, Bolivia, Vietnam, Greece (2), Spain.

For each individual we compute:

- **Beauty** ($b_i \in [0,10]$): the number of votes he/she obtains regarding his/her physical presence.
- **Performance** ($p_i \in [0,10]$): the number of votes he/she obtains.
- **Sympathy** ($s_i \in [0,10]$): the number of votes he/she obtains.

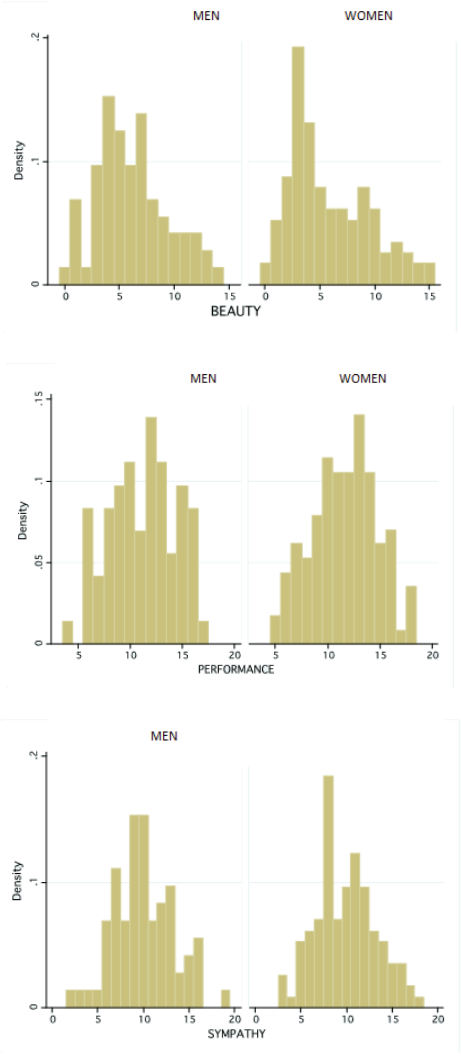
Next table shows the main stats:

Table A.1 Beauty, performance and sympathy. Descriptive stats

		Mean	St.d.	Med	Mode	Min	Max
Beauty	*All*	5.98	3.52	5	3	0	15
	Males	6.16	3.25	6	4	0	14
	Females	5.83	3.67	5	3	0	15
Performance	*All*	11.46	3.15	12	13	4	18
	Males	11.18	3.16	11.5	10	4	17
	Females	11.59	3.11	12	13	5	18
Sympathy	*All*	9.96	3.29	10	8	2	19
	Males	10.04	3.31	10	9, 10	2	19
	Females	9.89	3.30	10	8	3	18

Figure A1 shows the histograms for each variable. It's clear that subjects were much more prone to score high performance than beauty (see also Table A1).

Figure A.1 Beauty, performance and sympathy by sex. Histograms



Males are more likely to receive higher scores than females regarding beauty and sympathy. In contrast, women receive higher scoring in performance.

As expected all the variables are highly correlated. The correlation coefficient among performance and sympathy is especially high indicating that, at the very end, subjects score higher performance to those subjects who behave especially nice.

Table A.2. Beauty, performance and sympathy. Correlations

		Beauty	**Performance**
Performance	*All*	0.32, p=0.00	
	Males	0.19, p=0.10	
	Females	0.39, p=0.00	
Sympathy	*All*	0.42, p=0.00	0.56, p=0.00
	Males	0.35, p=0.00	0.50, p=0.00
	Females	0.46, p=0.00	0.60, p=0.00

The table also reports value for the subsamples of males and females separately. It is very interesting to remark that for the subsample of males, the correlation between beauty and performance valuation radically falls and becomes not significant. Finally, its worth note that regarding correlations among variables, no any difference is found between male and female referees.

CHAPTER 5

Conclusions

It has been proved in this dissertation how experimental economics continues to be a tool that, as it nourishes theoretical economics (and vice versa), it keeps producing results that are necessary to understand how to articulate social relations which, ultimately, have consequences on economic relations. In the same way that some assumptions about agents' behaviour are seen enriched by the results of experimental economics, the latter also grows on those theoretical constructions that serve to understand the behavioural functions of individuals.

Specifically, Chapter 2 has studied how the dissemination of new information affects crowdfunding markets and the generation of herding behaviour. Specifically, we provide evidence in that such behaviour is rational and could be well moulded through optimal choice under uncertainty with Bayesian review of beliefs. In this sense, the effect of the first sponsors on the agents' behaviour has been highlighted, through the change in the probabilities of success of the financing campaigns. Finally, another result shows how potential funders are more guided by the opinions of other individuals rather than those of experts. Ultimately, it should be noted that this chapter produces results supporting the use of other unconventional means for carrying out controlled experiments, such as Amazon Mechanical Turk (Mturk), which are present in research articles with an increasing frequency.

Well aware of the limitations of this study and thus creating a margin for future research on these bases. The mentioned weaknesses are configured by two aspects: the sample size is not balanced in the case of India (since it was difficult for women to join the experiment), as well as the distinction of opinions between experts and non-experts is a matter difficult to illustrate with our original approach. It is planned to perform a cleaner experimental design that allows us the production of clear results. However, there is a firm conviction that our contribution is important and that it facilitates "inputs" for the management and design of information mechanisms in crowdfunding

markets. Namely, it is proven that signalling a project with a strong initial investment of its own will have an effect on agents that intend to invest, but with doubts about what project to contribute to.

Chapter 3 of the dissertation has focused on analyzing how social preferences are affected in contexts of uncertainty. Taking an experimental (more conventional) laboratory design, a Dictator's Game was proposed in which it was verified to what extent the probability of being dictated (recipient) affected the distribution made by the agents according to the given initial endowment. The three conclusions obtained are: the level of generosity decreases as the probability of being dictator increases; being in the role of dictator reduces generosity; and starting making decisions with absolute certainty affects only those who are in the role of recipient. We did not find that variables such as sex, degree of risk aversion or cognitive abilities would affect the level of generosity of individuals.

Direct information has been collected from individuals, about how concerned they are that others have less money (generosity) or more money (envy). However, we are aware that the next step is to estimate the Fehr and Schmidt model and calibrate the proper parameters through structural equations, and observe how the probability of being dictator, as well as the dichotomy of being dictator / recipient affects these variables.

Finally, chapter 4 has focused on studying the existence -or not- of possible gender differences in the performance of tasks in which individuals must evaluate their performance. This evaluation was not only in reference to themselves (absolute), but also in relation to other reference groups (total, same sex, opposite sex). For this study, and as a control measurement, two tasks have been assigned that are different in the degree of the subjects' exposure to the performance of similar tasks (level of experience). Namely, the Raven test and the recording of a short video. The latter task adds the lack of previous experience in other similar tasks and the difficulty of self-assessment, since the evaluation was done by people who did not take part of the experiment.

The results obtained do not support the hypothesis saying that men are more optimistic than women when performing the tasks with respect to others. In the Raven test no gender differences were found. No differences in both the terms of predictions and how it has been carried out with respect to others (overplacement), and in relation to the total or those of the same sex. However, we did find that women are more precise in adjusting their results compared to men. All in all, it was concluded that, even doing a task in which individuals are supposed to have an idea of their abilities, given their previous experience, the hypothesis of absence of gender differences in the replacement for the Raven test was not rejected. For the video task, no gender differences are proved in terms of predictions and the level of replacement neither in the total group nor in groups of same sex (although women predict better). However, the analysis with respect to those of the same sex concludes that it is women who have an excess of confidence, which also has a greater effect on their level of mistakes. Therefore, whatever is the task that individuals do, the results do not show evidence that men have a higher level of confidence.

Although Chapter 4 has brought new results to the literature, we are aware of the work to be carried out in the future. In this sense, it would remain to examine whether a person who in the Raven test (known task) shows overplacement also behaves in the same way for the task of the video (unknown task); as well as if gender differences are present in the predictions about the obtained results.

CHAPTER 6

Conclusiones

Con esta Tesis se ha puesto de manifiesto cómo la economía experimental sigue siendo una herramienta que, del modo que nutre a economía teórica (y viceversa), sigue produciendo resultados que se vuelven necesarios para entender cómo se articular las relaciones sociales que, en última instancia, tiene trascendencia en las relaciones económicas. Del mismo modo que ciertos supuestos sobre el comportamiento de los agentes se están viendo enriquecidos con los resultados de la economía experimental, ésta también se nutre de aquellas construcciones teóricas que sirven para entender las funciones de comportamiento de los individuos.

En concreto, en el Capítulo 2, se ha estudiado como la divulgación de nueva información afecta a los mercados de micromecenazgo y a la generación de comportamiento gregario: aportamos evidencia en el sentido de que dicho comportamiento es racional y pude modelizarse bien a través de la elección óptima bajo incertidumbre con revisión bayesiana de las creencias. En este sentido, se ha resaltado el efecto de los primeros patrocinadores en el comportamiento de los agentes, a través del cambio de las probabilidades de éxito de las campañas de financiación. Finalmente, otro resultado evidencia cómo los posibles financiadores se dejan guiar más por las opiniones de otros individuos, que de las de los expertos. Finalmente, resaltar que con este capítulo se producen resultados que apoyan el uso de otros medios no convencionales para la realización de experimentos controlados, como es el caso de Amazon Mechanical Turk (Mturk), en el que, con cada vez más frecuencia, se van encontrando en los artículos de investigación.

Se es consciente de las limitaciones de dicho estudio y éstas conforman un margen de investigación futura sobre estas bases. Dichos puntos débiles lo configurar dos aspectos: el tamaño de la muestra no está balanceado para el caso de India (ya que resultó difícil que las mujeres se incorporasen al experimento), así como la distinción de las opiniones entre expertos y no expertos es una cuestión difícil de dilucidar con

nuestro planteamiento original. Se tiene previsto realizar un diseño experimental más limpio que permita arrojar resultados más definidos. No obstante, se tiene la firme convicción de que nuestra aportación es importante y que facilita "inputs" para la gestión y diseño de mecanismos de información en el micromecenezgo: queda comprobado que señalizar un proyecto con una fuerte inversión inicial propia va a tener un efecto en los agentes que tengan intención de invertir, pero con dudas sobre qué proyecto aportar.

El Capítulo 3 de la tesis se ha centrado en analizar cómo las preferencias sociales se ven afectadas en contextos de incertidumbre. Tomando un diseño experimental (más convencional) de laboratorio, se planteó un Juego del Dictador en el que se comprobaba en qué grado la probabilidad de ser dictado (receptor) afectaba al reparto que hacían los agentes según la dotación inicial dada. Las tres conclusiones que obtienen son: el nivel de generosidad se reduce a medida que la probabilidad de ser dictador aumenta; estar en el rol de dictador reduce la generosidad; y comenzar tomando decisiones con absoluta certeza sólo afecta a aquellos que están en el rol de receptor. No encontramos que variables como el sexo, el grado de aversión al riesgo o las habilidades cognitivas afectasen al nivel de generosidad de los individuos.

Aunque se ha recopilado información directa de los individuos, acerca de cómo les preocupa que los demás tengan menos dinero (generosidad) o más dinero (envidia), se es consciente de que el siguiente paso es estimar el modelo de Fehr y Schmidt y poder calibrar los parámetros propios a través de ecuaciones estructurales y ver cómo la probabilidad de ser dictador, así como la dicotomía de ser dictador/receptor afecta a dichas variables.

Finalmente, el Capítulo 4 se ha centrado en estudiar la existencia o no de posibles diferencias de género, en la realización de tareas en las que los individuos han de evaluar cómo las han realizado, no en referencia a ellos mismos (absoluta), sino en relación con otros grupos de referencia (total, mismo sexo, sexo opuesto). Para este estudio se han tomado como control dos tareas diferentes en el grado de exposición del individuo a la realización de tareas similares (nivel de experiencia): el test de Raven y la grabación de un breve vídeo. Esta última tarea suma la no experiencia previa en otras tareas

parecidas, la dificultad de una propia autoevaluación ya que ésta fue valorada por personas independientes al experimento.

Los resultados obtenidos no permiten apoyar la hipótesis de que los hombres sean más optimistas que las mujeres en cómo han realizado las tareas con respecto a los demás. Aunque en el test de Raven no se encuentran diferencias significativas por género, en cuanto a las predicciones y a cómo lo han realizado con respecto a los demás (overplacement), en relación al total o a los de su propio sexo, sí encontramos que las mujeres son más precisas al ajustar mejor sus resultados en relación a cómo lo han hecho los hombres. Con todo, se concluye que, incluso realizando una tarea en la que se supone que los individuos tienen una idea de sus habilidades, dada la experiencia previa, no se rechaza la hipótesis de ausencia de diferencias de género en overplacement para el test de Raven. Para la tarea del vídeo, no se encuentran diferencias de género en cuanto a las predicciones y nivel de overplacement total y con respecto a su propio sexo (aunque las mujeres predicen mejor): sin embargo, el análisis con respecto a los de su propio sexo concluye que son las mujeres las que más muestran un exceso de confianza, lo que repercute también en un mayor nivel de sus errores. Por tanto, cualquiera que sea la tarea que realicen los individuos, los resultados no arrojan evidencia acerca de que los hombres muestren un mayor nivel de confianza.

Aunque este Capítulo 4 ha aportado a la literatura nuevos resultados, somos conscientes del trabajo a realizar en un futuro. En este sentido, quedaría examinar si una persona que en el test de Raven (tarea conocida) muestra overplacement también se comporta del mismo modo para la tarea del vídeo (tarea desconocida), así como si existen diferencias de género en las predicciones acerca de los resultados obtenidos.