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Enhancing the profitability of airline tickets purchasing processes through contextual effects: a study of decoy effect

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ENHANCING THE PROFITABILITY OF AIRLINE TICKETS PURCHASING PROCESSES THROUGH CONTEXTUAL EFFECTS

A STUDY OF DECOY EFFECT

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A mis padres, por enseñarnos el camino.

Y a mi hermano, por caminarlo conmigo.

ABSTRACT

Strongly and firmly, product customization and *a la carte* features have evolved, aided by the extensive development of e-Commerce, up to becoming an essential trait in most of online purchasing processes across almost every industry. Nowadays, huge possibilities of customization are offered to the customer in order to meet the different needs of each individual through multiple extras, no matter when, where or what they are buying. Several combinations of these multiple attributes that could be chosen or added to a base product constitute the main structure of those purchasing processes, which aim to provide the appropriate product for any individual.

In this scenario, contextual effects affecting customer's behavior within these small worlds of choices become deeply relevant. Every year, the number of purchasing decisions occurring in front of a device screen increases, highlighting the importance of understanding which processes underlie below those limited sets of information and how do they influence our perceptions.

This thesis aims to contribute to the existing research on contextual effects affecting purchasing decisions focussing on decoy options. The aim of this research is to develop a better understanding on decoy options and, in particular, being able to integrate this knowledge under a real and practical approach, understanding decoy options and decoy effect as non isolated elements which are affected by other contextual effects and exposed to interactions.

In Chapter 1 of the thesis, an overview on the different contextual effects which are likely to affect the performance of decoy effects is presented. After introducing decoy effect and for every scenario, formulation of the interaction hypothesis is developed, always considering the air transport industry as a reference for practical examples. A total of nine interactions are evaluated and discussed out of nine different effects. This selection is limited to those more prone to appear in real purchasing processes as will be further discussed in the same Chapter 1.

Two different studies are developed, each one aiming to answer one specific question. In the first study, presented in Chapter 2 the experiment proposition gives an answer on how multiple decoy options within the same choice set affect decoy effect performance. Moreover, the experiment is discussed under different approaches, presenting the main theories about the cognitive processes that lead to a change in individuals' perceptions through decoy effects and testing them in this new scenario. Different types of decoy are tested and the effect of the inclusion of a no-choice option is also discussed. One of the outcomes of this study identifies which are the decoy type pairs that positively interact with each other so that the overall effect is to be enhanced. In the second study, presented in Chapter 3, the effect of fatigue understood as cognitive effort, is evaluated considering how it affects decoy effect performance. In the experiment, multiple combinations of individuals with different

levels of cognitive effort are asked to complete a task that contains several choice sets containing a decoy option. This study leads to understand how decoy options' performance is affected by the previous context of the individual and gives significant insight for designing purchasing processes with multiple and complex stages. Finally, Chapter 4 presents the summary and discussion for the conclusions obtained for the previous findings.

If you can dream—and not make dreams your master;
If you can think—and not make thoughts your aim;
If you can meet with Triumph and Disaster
And treat those two impostors just the same;
If you can bear to hear the truth you've spoken
Twisted by knaves to make a trap for fools,
Or watch the things you gave your life to, broken,
And stoop and build'em up with worn-out tools;
If you can fill the unforgiving minute
With sixty seconds' worth of distance run,
Yours is the Earth and everything that's in it

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Gracias a todos.

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ACRONYMS

DR Decoy in range / range decoy

DF Decoy in frequency / frequency decoy

DD Double decoy

MAUT Multi attribute utility theory

ANOVA Analysis of variance

RFT Regulatory fit theory

ADZ Asymmetrically dominated zone

Part I

INTRODUCTION

There exist many types of decoy options. All of them different in nature, aimed to distinctly affect the individual through multiple strategies. Other contextual effects are prone to affect decoy effect performance. These two lines are further developed in the following chapter.

First, a review of the existing literature about decoy options and its interactions with contextual effects that could affect their performance is presented. Next, two research proposals are developed: the introduction of a double decoy choice set and the evaluation of decoy effect under different levels of cognitive effort in a purchasing process.

For the research proposal concerning double decoy choice sets, different hypotheses are introduced based on the different theories aiming to explain the effect of simple decoy choice sets. These hypotheses predict different outcomes for the same experimental design, fact that could provide further support for at least one of the current explanations for decoy effects. Regarding the effect of decoy options under different levels of cognitive effort, implications for experimental design for sequential purchasing process are expected. Especially for those designed with complex options, with many steps or high number of options. Two new research proposal approaches are presented in order to enhance the current theory. Moreover, both have managerial implications concerning the real implementation of decoy options in reduced choice sets as well as in sequential purchasing processes.

1

CONTEXTUAL EFFECTS AND PSYCHOLOGICAL FEATURES INFLUENCING DECOY OPTIONS

1.1 INTRODUCCIÓN

El desarrollo de los portales de venta online ha experimentado un gran crecimiento durante la última década. La evolución de las estrategias de venta actuales, fuertemente condicionadas por el uso extensivo de los portales de venta online en los que se apoyan, posee un componente intrínseco que, si bien tiene particularidades específicas en las distintas categorías de productos, es general en los principales mercados: la elección secuencial de los distintos atributos del producto.

Los distintos niveles de necesidad de los diferentes usuarios son cubiertos a través de las múltiples opciones que configuran el producto, ya sea en forma de combinaciones de atributos del producto base o a través de otros productos o servicios extra que puedan añadirse al producto o compra inicial. La estructura resultante que vertebra este tipo de procesos de compra se presenta como un proceso de toma de decisiones secuenciales con un número limitado de alternativas y con unos atributos del producto, o del servicio, claramente identificados.

Los procesos de toma de decisiones secuenciales comprenden las múltiples opciones o niveles de atributos que se ofrecen sobre un determinado producto, y que pueden seleccionarse a través de las distintas pantallas que configuran el proceso de compra. El número de alternativas suele ser limitado y relativamente reducido en la mayoría de procesos de compra con múltiples opciones. Este hecho se deriva de la necesidad de proveer al usuario de un entorno sencillo, el propósito del cual es evitar el estado de saturación y de estrés cognitivo que genera un exceso de opciones.

Los beneficios derivados de la implementación de conjuntos de opciones con un número de alternativas limitadas están ampliamente contrastados (Iyengar and Lepper, 2000). Sin embargo, y como se detallará más adelante, existen situaciones concretas en las que el usuario puede presentar altos niveles de fatiga cognitiva que podrían influenciar de manera significativa en sus decisiones. La complejidad del diseño del portal de venta y de sus distintas opciones y variantes está condicionado por un objetivo claro: aumentar la rentabilidad obtenida de todo el proceso.

En este escenario de elección secuencial, los efectos contextuales generados por opciones *decoy* pueden ser útiles para incrementar el beneficio que se deriva de cada uno de los conjuntos de opciones que agrupan las alternativas ofertadas, variando las percepciones que tiene el usuario sobre las distintas opciones así como el atractivo percibido de una

opción específica. Estas variaciones redirigen la atención del usuario sobre una alternativa concreta con el objetivo de favorecer su posición respecto del resto del conjunto.

En este artículo se presenta un análisis sobre el uso de opciones *decoy* en procesos de venta secuenciales así como de los elementos contextuales más relevantes que son susceptibles de afectar a su efectividad. Primeramente, se presenta y se justifica su uso a través de una revisión de la literatura, exponiendo el marco teórico en el que se han desarrollado. Paralelamente se desarrollan las razones por las cuales se constituyen como elementos interesantes a considerar en el diseño de las estrategias de venta elaboradas sobre productos que cumplan las características anteriormente mencionadas.

1.2 MARCO TEÓRICO

1.2.1 *Diseño de opciones decoy*

Dentro de un conjunto de opciones (alternativas), se denomina *decoy* a aquella opción que se incorpora al conjunto con la única finalidad de modificar el atractivo percibido de una de estas opciones; en lo que se conoce como efecto de las alternativas asimétricamente dominadas y que fue identificado por Huber et al. (1982).

La opción *decoy* no se constituye como una alternativa válida dentro del conjunto de opciones sino que su utilidad radica en modificar las preferencias y el atractivo percibido por el usuario de, al menos, una de las opciones originales presentes en el conjunto.

Este efecto contextual tiene importantes implicaciones a nivel teórico ya que viola dos de los principios básicos en que se sustentan los modelos racionales de toma de decisiones. El primer principio es el de regularidad (Luce, 1977) que postula que la adición de una nueva alternativa dentro del conjunto de opciones no puede incrementar la probabilidad de escoger alguna de las opciones originales. El segundo es del principio de independencia de las alternativas irrelevantes (Luce, 2005) que postula que al añadir una nueva opción dentro de un conjunto de opciones, la disminución en el porcentaje de elección que experimentan las opciones originales es proporcional a la distribución de *share* original que presentaban.

Realizando una revisión de la literatura existente se han identificado tres efectos distintos que una opción *decoy* puede generar en función de sus características. El primero es el efecto atracción (Huber et al., 1982), que constituye el grueso de las investigaciones sobre este campo, en el que la opción *decoy* es una opción dominada (o casi) por la opción *target* en relación a los niveles que presenta en los distintos atributos que definen el producto y que genera un incremento en el porcentaje de usuarios que eligen esta opción. El segundo es el efecto compromiso, presentado por Simonson (1989), que aparece al añadir una opción extrema dentro del conjunto de opciones original que sitúa a la opción *target* en una posición media o "de compromiso". En estas circunstancias el *share* de la opción *target* en relación a la opción *competitor* es mayor en el conjunto de opciones que incorpora *decoy* que en el conjunto original.

El tercer efecto que puede generar una opción *decoy* es el llamado efecto *phantom*, introducido por Praktanis y Farquhar (1992). Este efecto sucede al incorporar al conjunto una opción altamente atractiva pero que no se encuentra disponible en el momento de la compra. La principal diferencia que existe entre el efecto *decoy phantom* y los efectos compromiso y atracción es que el primero requiere de un efecto contextual adicional además de la presencia de una opción *decoy*: la no disponibilidad de la opción *decoy* en el momento de la compra.

Este efecto es un reflejo de lo que podrían ser políticas de "bait and switch" que actualmente se aplican de manera disimulada en algunos comercios donde se ofrecen pequeñas cantidades de un producto superior a un precio muy atractivo. Este producto no estará disponible para la mayoría de clientes en el momento de la compra, que adquirirán otro similar a un precio superior (el producto *target*) motivados por la necesidad de compensar los costes derivados de la intención de adquirir ese producto en ese establecimiento, como podrían ser la inversión del tiempo invertido, los costes de transporte o las propias expectativas personales.

Seguidamente se presenta y se justifica el uso de los distintos tipos de opciones *decoy* a través de una revisión de la literatura, exponiendo el marco teórico en el que se han desarrollado. El análisis se presenta focalizado en los procesos de venta de billetes de avión.

Posteriormente, se realiza una revisión de cuales son los elementos contextuales propios de un proceso de toma de decisiones o de un proceso de compra susceptibles de afectar a la funcionalidad de las opciones *decoy* que estén presentes. Las interacciones presentes entre los distintos elementos son también analizadas, tanto las presentes en pasadas investigaciones como nuevas propuestas introducidas en este artículo. Estos elementos comprenden tanto características propias del diseño de los conjuntos de opciones como del proceso de compra general, además de características propias de algunos segmentos de mercado y su efecto sobre el impacto en las estrategias de venta que incluyan este tipo de opciones.

Distintas investigaciones han replicado los efectos de múltiples configuraciones de diversas opciones *decoy* en múltiples situaciones: desde productos comerciales (Ariely and Wallsten, 1995; Dhar and Simonson, 2003; Hamilton, 2003; Pan and Lehmann, 1993; Park, 1999; Pettibone and Wedell, 2000; Sen, 1998; Simonson, 1989; Heath and Chatterjee, 1995) en juegos (Wedell, 1991), en el entorno laboral (Highhouse, 1996) así como en la evaluación de candidatos en política (O'Curry and Pitts, 1995) y han obtenido resultados significativos contrastados que reflejan la funcionalidad y la operatividad de las opciones *decoy*.

Del mismo modo, son muchas las investigaciones que han intentado explicar qué procesos cognitivos yacen bajo este efecto contextual (Ariely and Wallsten, 1995; Dhar and Glazer, 1996; Pettibone and Wedell, 2000; Simonson and Tversky, 1992; Wedell and Pettibone, 1996; Pechtl, 2009). En estas investigaciones, se han identificado dos procesos principales que regulan la efectividad y funcionalidad de una opción *decoy*: los procesos de *value shift*, explicados a través de la teoría de rango-frecuencia y a través del principio de la densidad, y

los procesos de *value added*,. Además también es posible considerar el *weight change*, como proceso explicativo de la funcionalidad de las opciones *decoy* (Pettibone and Wedell, 2007).

Los procesos de value shift implican que se produce un cambio en el atractivo percibido de los atributos de la opción *target* o bien de la opción *competitor*, debido a la introducción de una opción *decoy* dentro del conjunto. Los procesos de *value added* se relacionan con la necesidad del usuario de "justificar" su decisión de haber elegido la opción *target* en vez de la opción *competitor* (Park and Kim, 2005; Pettibone and Wedell, 2000; Wedell and Pettibone, 1996) y con la idea de que la opción *decoy* hace parecer a la opción *target* como "menos arriesgada" aportando un valor añadido a la opción dentro del conjunto dentro del marco teórico de aversión a las pérdidas.

Finalmente, el concepto de *weight change* implica que la opción *decoy* genera variaciones en la importancia que el usuario asigna a cada uno de los atributos que definen las opciones presentes en el conjunto.

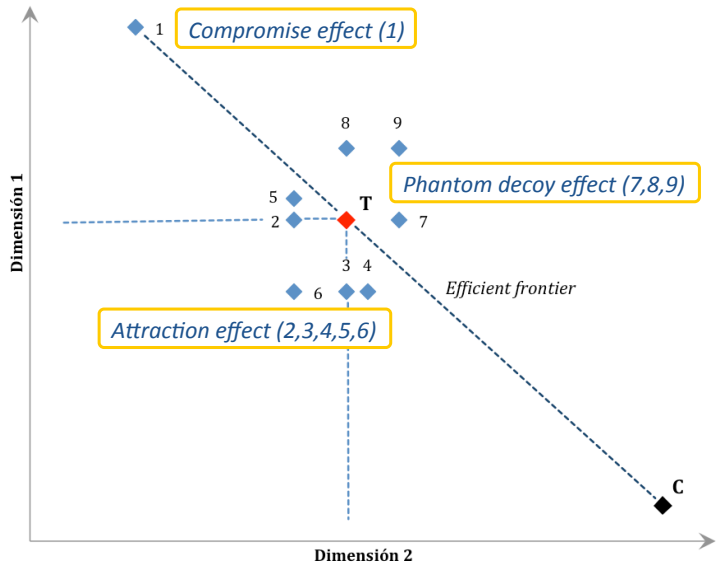
Estos tres procesos se encuentran integrados en la teoría de la utilidad multiatributo (MAUT). Se define el atractivo total percibido de una opción (AT_i) en función de la importancia o peso de cada uno de sus atributos (W_m), de los niveles que cada opción presente en cada uno de esos atributos (V_{mi}) y del valor añadido que posea esa opción (K_i), según:

$$AT_i = \sum_m W_m \cdot V_{mi} + K_i \tag{1}$$

En referencia al *decoy* phantom, sus particularidades como efecto contextual no pueden ser explicadas únicamente a través de los procesos anteriores, que sí servían para explicar el efecto atracción y el efecto compromiso. Esto se debe a que, en este caso, es la opción *decoy* la que domina asimétricamente a la opción *target* en los niveles de los dos atributos que definen el producto, además, normalmente amplía el rango de valores en que se define el atributo donde la opción *target* era más atractiva en el conjunto original. Estos dos factores deberían conducir a una reducción en el porcentaje de elección de la opción *target* en vez de incrementarlo según las teorías comentadas anteriormente. (Pettibone and Wedell, 2007)

La explicación que proporciona una respuesta más sólida al fenómeno del efecto *decoy phantom* es el modelo de ventajas relativas (Tversky and Simonson, 1993) que asume que cada alternativa es comparada con las demás en términos de "ganancias" y "pérdidas". Se asume que el usuario da un mayor valor a las pérdidas que a las ganancias debido a la voluntad de minimizar los riesgos por parte del usuario o consumidor. En este contexto, y debido a la introducción de la opción *decoy phantom*, la evaluación de la opción *target* y *competitor* en términos de ganancias y pérdidas favorece la posición de la primera.

Figure 1.1: Esquema de las distintas posiciones de una opción *decoy*



En Figure 1.1 se presentan las distintas posiciones que puede adoptar una opción *decoy* y una descripción de sus características. Las distintas opciones *decoy* representadas corresponden, según la numeración de Figure 1.1, a los siguientes tipos:

1. *Decoy* compromiso.
2. *Decoy* asimétricamente dominado en rango.
3. *Decoy* asimétricamente dominado en frecuencia.
4. *Decoy* parcialmente dominado en frecuencia.
5. *Decoy* parcialmente dominado en rango.
6. *Decoy* asimétricamente dominado en rango y frecuencia.
7. *Decoy phantom* en rango.
8. *Decoy phantom* en frecuencia.
9. *Decoy phantom* en rango y frecuencia.

Las distintas relaciones que puede establecer una opción *decoy* con la opción *target* se determinan a partir de la posición relativa de ambas. El efecto que genera la opción *decoy* en el conjunto de opciones está ligado a esta relación.

1.2.1.1 *Efecto atracción por dominación parcial*

El *decoy* es superior en una de las dimensiones a la opción *target*, pero de manera tan sutil que el usuario percibe una dominancia casi absoluta del *target* sobre el *decoy* ya que la superioridad de la opción *target* en la otra dimensión es más relevante. Este tipo de *decoys* pueden ser clasificados en dos tipos dependiendo de su posición relativa a la opción *target*. Cuando la opción *decoy* extiende el rango de valores del atributo en el que la opción *target* presenta unos valores más pobres dentro del conjunto de opciones se denomina opción *decoy* parcialmente dominada en rango. Cuando la opción *decoy* no extiende el rango de valores para ninguna de las dos dimensiones sino que incrementa la frecuencia del atributo en que la opción *target* presenta un valor más pobre dentro del conjunto de opciones la opción *decoy* se denomina *decoy* parcialmente dominado en frecuencia.

1.2.1.2 *Efecto atracción por dominación asimétrica*

El *decoy* es inferior en ambas dimensiones al *target*. Además, es susceptible de ser clasificado como range y frequency según la dimensión en que refuercen el *target*.

1.2.1.3 *Efecto phantom*

El *decoy* es una opción superior al *target* pero no está disponible por alguna razón en el momento de la compra, así que el usuario elige la más cercana o parecida, que es la opción *target*.

1.2.1.4 *Efecto compromiso*

El *decoy* hace de la opción *target* un nivel medio, una opción de compromiso en el set. Se percibe la opción *target* como la solución para evitar un proceso de decisión difícil donde los trade-offs serían obligados. Este *decoy* no aumenta el market share absoluto de la opción *target* sino que aumenta únicamente el relativo a la otra opción original.

Las relaciones entre los distintos tipos de opción *decoy* y la opción *target* están determinadas por los distintos niveles que cada una de las opciones presenta en los distintos atributos que definen el producto.

Considerar correctamente los atributos que sirven para identificar el producto en el conjunto de opciones tiene implicaciones relevantes en el diseño y en la funcionalidad de las opciones *decoy* susceptibles de ser introducidas.

Al ofrecer múltiples alternativas que están integradas por distintos atributos es importante incluir la mínima información posible ya que de este modo se maximiza el impacto de la información presente (Anderson, 1971). Además, como se ha mencionado anteriormente, el confort del individuo y el estrés cognitivo generado al evaluar las distintas alternativas y opciones presentadas deben también tenerse presentes y constituyen dos razones adicionales para minimizar la información proporcionada.

Al diseñar conjuntos de opciones en los que se introduce el producto base o principal es muy importante conocer cuáles son los atributos del producto que son más relevantes para aquel grupo de usuarios que integra el segmento de mercado concreto al que se dirige la oferta o el producto. En referencia a los billetes de avión, no hay discusión alguna sobre la importancia del precio en la intención de compra del producto. Sin embargo, no existe un segundo atributo cuya importancia se asemeje a la del atributo precio para esta categoría de productos. Este hecho se deriva de los múltiples y distintos servicios que las aerolíneas ofrecen como añadidos o complementos dentro del propio billete o como prestaciones adicionales, desde el embarque prioritario hasta la flexibilidad en la fecha del vuelo. De este modo, la disparidad que existe entre los distintos servicios adicionales que puede incorporar un billete de avión implica la necesidad de realizar un análisis previo para identificar cuáles de ellos deben integrar las distintas opciones con la finalidad de cubrir las necesidades de los distintos individuos.

Las preferencias del consumidor pueden ser obtenidas a través de datos obtenidos bien mediante preferencias reveladas (RP) o preferencias declaradas (SP). Los primeros son obtenidos a partir del comportamiento anterior del usuario, analizando patrones de compra en situaciones de mercado, donde los consumidores realizan elecciones reales. Los segundos se obtienen a través de encuestas donde los consumidores reflejan sus preferencias a través de elecciones, que usualmente tratan de reflejar el contexto real en que tendría lugar la elección o la compra. Así pues, los datos obtenidos mediante preferencias declaradas son especialmente interesantes cuando se trata de determinar las preferencias del consumidor en escenarios hipotéticos. Además, ha sido demostrado que los modelos de elección discretos elaborados en base a los datos obtenidos mediante preferencias declaradas proporcionan una descripción ajustada y una óptima predicción del comportamiento del consumidor (Verhoef and Franses, 2003).

Sin ahondar más en la importancia capital de este aspecto, se destaca el análisis conjunto como una herramienta adecuada para alcanzar este objetivo, ya que permite experimentar con distintas combinaciones de atributos que integran el billete de avión reflejando una situación real. Además, permite determinar la importancia relativa de cada uno de los atributos que forman el producto. En el análisis conjunto, los usuarios proporcionan su preferencia global en una serie de distintos perfiles presentados en conjuntos secuenciales. Los distintos perfiles hacen referencia a las distintas alternativas que se ofrecen sobre un producto y que son descritas en función de los niveles que presentan en sus distintos atributos. Estas evaluaciones son posteriormente utilizadas para determinar la importancia asociada a cada uno de los atributos (Green and Rao, 1971). Considerando que los individuos evalúan simultáneamente todos los factores que, en una decisión real, determinarían su decisión, esta aproximación puede reflejar de manera realista las preferencias del consumidor (Green and Srinivasan, 1978). El uso del análisis conjunto se ha empleado con anterioridad en investigaciones previas sobre las preferencias del consumidor (Keen et al., 2004), sobre segmentación de mercados (Green and Krieger, 1991) y también en el estudio sobre la elec-

ción de aerolíneas (Bruning, 1997) y en estudios sobre la intención y voluntad de pago del consumidor (Sichtmann et al., 2011).

1.2.2 *Opciones decoy en un contexto real: interacciones con otros efectos contextuales*

Existen factores adicionales que es necesario considerar al diseñar una opción *decoy*, además de su posición, una vez seleccionados correctamente unos atributos representativos. Estos factores adicionales afectan directamente a las percepciones del usuario, ya que, finalmente, serán estas las que determinen las relaciones definitivas que se establezcan entre las distintas alternativas.

Es importante considerar que incluso la misma opción *decoy* en el mismo conjunto de opciones, aun para la misma categoría de producto, puede dar lugar a resultados diferentes cuando los perfiles de usuarios que participan en el proceso de toma de decisiones son distintos. Así pues, es necesario determinar cuál es el perfil mayoritario del usuario promedio a tratar en el estudio para poder ajustar las opciones *decoy* propuestas con la finalidad de maximizar el efecto y los beneficios derivados de cada una de ellas.

Complementariamente a la presentación de las características del usuario que afectan a la efectividad de las opciones *decoy* se revisan otros parámetros que, si bien no forman parte del perfil del usuario, merecen ser tomados en consideración ya que pueden afectar a, al menos, uno de los tipos de *decoy* descritos anteriormente y al efecto que produce sobre el consumidor.

Los efectos y las interacciones presentadas, así como las implicaciones derivadas en el diseño experimental no cubren todas las posibles interacciones existentes entre los distintos tipos de *decoy* y cada efecto contextual o característica particular, ya sea del usuario o intrínseca al proceso de compra. Las consideraciones realizadas para cada efecto y los distintos tipos de opción *decoy* presentada dependen del número de investigaciones previas que hayan tratado la interacción entre ellas. El objetivo es realizar una adaptación y recopilación de los distintos efectos contextuales que afectan al comportamiento de distintas opciones *decoy* para posteriormente llevar a cabo una adaptación a las características concretas del proceso de compra de billetes en aviación comercial.

1.2.2.1 *Conocimiento del usuario sobre el producto*

El conocimiento que el usuario tiene sobre el producto ofertado es un factor importante a considerar en cuanto al diseño de ofertas con *decoys*, ya que afecta directamente a su efectividad.

Los dos aspectos principales del conocimiento del producto por parte del usuario en procesos de toma de decisiones son la información que el propio usuario posee sobre el producto y el conocimiento previo que posee el individuo acerca de esa categoría de productos (Bettman and Park, 1980).

En las ofertas que incorporan *decoys*, la información que se proporciona de cada uno de los productos ofertados es idéntica, discretizada en, normalmente, dos atributos que se consideran relevantes del producto. Por lo tanto, no se producen desequilibrios en la información que cada usuario recibe de las distintas opciones. Es en el otro aspecto, en el conocimiento previo que cada usuario tiene sobre el tipo de productos ofertados y de su segmento de mercado, donde se producen asimetrías entre usuarios expertos y usuarios noveles.

Existen diferencias entre usuarios con distinto grado de conocimiento previo del producto en cuanto a su predilección por atributos concretos para determinar la calidad del producto; concretamente, para los usuarios con niveles altos de conocimiento sobre el producto (expertos) y los usuarios con niveles bajos de conocimiento (noveles) el atributo precio suele ser más relevante para determinar la calidad del producto que para aquellos usuarios con un conocimiento intermedio del producto (Rao and Monroe, 1988).

A pesar de que podría parecer que un usuario con un alto nivel de conocimiento sobre el producto es menos susceptible a los efectos contextuales inmediatos del proceso de decisión, la realidad es que el conocimiento del usuario modera el efecto de los efectos contextuales generados por la inclusión de opciones *decoy* dependiendo del modo en que las diferentes dimensiones del conocimiento interaccionan con las características de un proceso de toma de decisiones concreto (Herr, 1989; Hecht and Proffitt, 1995; Sen, 1998).

En relación a estas características concretas del contexto en el que se produce la toma de decisiones, el conocimiento del usuario interactúa directamente con el modo de información en que son presentados los atributos.

Se define el modo de información como elemento integrante y esencial dentro de un proceso de compra, ya que hace referencia a la manera cómo se presentan los atributos. Puede ser tipo verbal o tipo numérico, aunque puede haber otras. Para la numérica existen dos variantes principales: numérica puntual y numérica de rango (e.g., calidad entre 3-3.5 que pueda derivarse de la opinión del consumidor u otros ratings).

Este, actúa como variable que determina la dirección de la moderación. Concretamente, en una investigación realizada con estudiantes acerca de sus preferencias por distintos restaurantes, se determinó que un alto grado de conocimiento atenúa los beneficios del efecto de atracción generado por la opción *decoy* siempre y cuando la información acerca de los atributos de los restaurantes fuera presentada de modo numérico. En cambio, cuando la información acerca de los productos era presentada de forma verbal, es decir, de manera cualitativa, el efecto moderador del modo de información cambiaba de dirección. Para este caso, niveles bajos de conocimiento atenuaban la intensidad del efecto de atracción generado por la opción *decoy* (Sen, 1998).

Es importante resaltar, sin embargo, que estos resultados pueden no ser generalizables para otros modos de información numéricos que puedan usarse en estudios alternativos sobre efectos de atracción. Sin embargo, es necesario destacar la influencia que las características concretas del proceso de toma de decisiones tienen sobre el nivel de efectividad

que puede mostrar una opción *decoy* y, siempre que la población objetivo sea muy amplia y puedan encontrarse diferencias relevantes entre grupos de usuarios, como por ejemplo, en el nivel de conocimiento previo que tienen sobre el producto estas diferencias deben ser consideradas de modo que puedan evitarse atenuaciones del efecto de atracción para grupos concretos.

Existe una última implicación del conocimiento del usuario en relación a la efectividad de los distintos tipos de efectos que puede generar un *decoy*. Dejando a un lado las particularidades que los distintos niveles de conocimiento puedan tener sobre las características concretas de un proceso de toma de decisiones, es posible decir que los usuarios con un alto nivel de conocimiento son más capaces de realizar trade-offs, ya que tienen mucho más claras las preferencias y los distintos pesos que otorgan a los distintos atributos de un producto (Park and Lessig, 1981). Esto conlleva que opciones *decoy* compromiso sean más susceptibles de producir mejor resultado en aquellos usuarios que no tienen tan claras sus preferencias entre los distintos atributos del producto. Se entiende que el usuario opta por escoger la opción con niveles medios en sus atributos debido a la falta de preferencia por uno de ellos en concreto y a la voluntad de evitar posibles errores y pérdidas escogiendo una opción con niveles altos en un atributo y bajos en el otro.

1.2.2.2 *Elección forzada*

En la mayoría de experimentos realizados con opciones *decoy*, ya sean con la finalidad de generar efecto atracción, efecto compromiso o efecto *phantom*, no se proporciona a los usuarios la opción de no escoger ninguna opción o, lo que en la vida real sería no comprar. Sin embargo, en una situación de toma de decisiones en una compra real, el usuario no se encuentra obligado a adquirir uno de los productos ofertados dentro de la gama que se le presenta, pudiendo no comprar, comprar luego o simplemente comprar en otro sitio. Esta situación aparece cuando el usuario no puede justificar de manera sencilla el atractivo de una alternativa sobre las demás (Dhar, 1997).

Únicamente se realiza la compra cuando existe una preferencia clara por uno de los productos o cuando el coste del retraso o la no realización de la compra es alto o el producto se necesita urgentemente (Dhar and Simonson, 2003).

El hecho de que el usuario escoja no escoger es directamente proporcional a la dificultad del proceso de toma de decisiones, normalmente ligado a la incertidumbre y a la duda debido a que ninguna alternativa es suficientemente relevante o atractiva para el consumidor. Esta situación deriva en estrés emocional (Luce, 1998) ya que implica que los atributos atractivos de las alternativas no seleccionadas, deben perderse al realizar la elección de una de ellas. Del mismo modo que las opciones *decoy* violan el principio de independencia de las alternativas irrelevantes, también lo hace la opción de no escoger. Es decir, esta opción tiende a competir y restar *share* a un tipo de opciones determinado. La opción de no escoger daña de manera clara a aquellas opciones que representan una solución de compromiso o que presentan valores medios en todos los atributos que configuran las opciones del conjunto (Dhar and Simonson, 2003).

En aquellos estudios donde se fuerza a que el usuario elija una de las opciones posibles, aquellos usuarios que experimentan incertidumbre o duda respecto qué opción elegir, serán susceptibles de escoger aquella opción que presente un nivel "medio" en sus atributos. En el caso de proporcionar esta opción, el usuario deriva su elección hacia la posibilidad de no escoger para evitar el alto coste cognitivo que implicaría elegir entre dos alternativas similares.

Introducir esta opción tiene implicaciones relevantes sobre el funcionamiento de las opciones *decoy* que generan efecto compromiso, ya que la mayoría de usuarios que seleccionan la opción *target* o, en estas condiciones, de compromiso, lo hacen en base a la posición media que presenta en el conjunto de opciones (Simonson, 1989). Respecto a su interacción con opciones *decoy* que generan efecto atracción, parece que la opción no escoger refuerza aún más la posición de la opción *target* en presencia de la opción *decoy*, aumentando la intensidad del efecto (Dhar and Simonson, 2003).

Es importante destacar que la inclusión de la opción de no escoger dependerá profundamente de la naturaleza del producto. En el caso de productos considerados como de baja implicación (huevos, café, pan...) no tiene sentido incluir esta opción, ya que normalmente el coste para el consumidor de no adquirir esos productos en el momento de la compra es demasiado alto como para que la opción de no escoger pueda tener un papel relevante. En cambio, en productos que presentan una alta implicación y que son más susceptibles de producir un proceso de procrastinación en el usuario (cámaras de vídeo, viajes...) es necesario incluir esta opción para evitar que el estudio sobre estime el valor de aquellas opciones que representan la "posición media" dentro del conjunto.

La interacción entre la inclusión, o no, de la opción de no escoger y el conocimiento del usuario sobre el segmento de mercado de los productos ofertados es directa. Un usuario con un alto conocimiento sobre los productos es más susceptible de realizar una evaluación exhaustiva de los atributos del producto, de realizar *trade-offs* y de preferir de manera sólida un atributo frente a otro. Con todo esto, es menos probable que este usuario se encuentre en una situación de indecisión que le haga escoger la opción media o de compromiso o que, si fuera posible, escogiera la opción de no escoger. Del mismo modo, usuarios con conocimientos limitados sobre el segmento de mercado o producto en cuestión serán más susceptibles de escoger la opción de no escoger o opciones con niveles medios en la mayoría de sus atributos. Así pues, es importante considerar también el conocimiento del usuario objetivo del estudio cuando se trate de determinar si se incorpora la opción de no escoger al conjunto de opciones.

Por todo lo mencionado anteriormente, podemos concluir que la inclusión de la opción "no escoger" debe ser incluida en toda investigación que pretenda estudiar la viabilidad de la inclusión de opciones *decoy* en el ámbito de la aviación comercial por dos razones: la naturaleza del propio producto, considerado como de alta implicación, y la necesidad de evitar sesgos en los resultados obtenidos para aquellas opciones *decoy* compromiso introducidas. Además, la inclusión de esta opción ejercerá de refuerzo para la opción *target* del conjunto de alternativas para aquellos casos en que se incorporen opciones *decoy* al conjunto.

1.2.2.3 *Implicación del usuario*

La implicación del usuario hace referencia a de qué modo el usuario se encuentra involucrado con el producto (*involvement*). En la literatura existente pueden encontrarse distintas definiciones sobre la implicación del usuario como: la implicación es un nivel de interés general en un objeto o la centralidad de dicho objeto en la estructura del ego de esa persona (Day, 1970) o también se ha definido como la relevancia percibida del objeto en base a necesidades inherentes, valores e intereses (Zaichkowsky, 1985).

La implicación del usuario en/con un determinado producto también se define como la capacidad de reconocer que ciertos tipos o clases de productos son más (menos) centrales en la vida de un individuo y más (menos) importantes en las relaciones que establecen con el exterior (Traylor, 1984). La implicación es específica de cada categoría de productos (Howard and Seth, 1969) y hace referencia al nivel de implicación que, bajo circunstancias normales, un determinado usuario tiene con el producto concreto (Zaichkowsky, 1985). Aunque la implicación del usuario es dependiente del propio usuario y de la importancia o centralidad que él otorga a este producto en su vida (Houston and Rothschild, 1978), se espera que sea razonablemente uniforme en grupos de población relativamente homogéneos (Clarke and Belk, 1979).

Principalmente, los productos pueden ser clasificados según el usuario tenga una alta o una baja implicación en ellos. Los factores de los que depende el nivel de implicación son diversos (e.g., precio, importancia para el individuo nivel de riesgo que implica la compra).

Puede decirse que los individuos se encuentran más involucrados en aquellos productos que presentan un precio elevado, riesgo asociado a la compra y características concretas a través de las cuales el usuario puede expresarse. Los consumidores dedicarán más energía y esfuerzo a evaluar aquellos productos con los que se encuentren altamente involucrados ya sea por su importancia o por el alto riesgo percibido en caso de elegir el producto o la opción inadecuada (Richins and Bloch, 1986; Houston and Rothschild, 1978).

La importancia del riesgo percibido. Los productos con los que el usuario se encuentra altamente involucrado debido a que llevan asociado un riesgo más elevado de compra requieren de una atención mayor durante el proceso de compra (Vaughn, 1980). Laurent y Kapferer (1985) así como Jain y Sharma (2002) relacionan directamente el riesgo percibido en la compra de un producto con el nivel de implicación que el usuario tiene en el producto en cuestión. Investigaciones más recientes han establecido que el riesgo es un antecedente del nivel de implicación del usuario para aquellos productos innovadores en los que el nivel de involucración del usuario es elevado (Hynes and Lo, 2006).

Evans (1993) determinó que el tiempo entre compra y recompra del producto aumenta cuando la implicación del usuario con el producto es mayor, así como lo hace el tiempo de reemplazo del producto, que también aumenta al aumentar la implicación del usuario con el producto (Sridhar, 2007).

En el momento de evaluar las distintas alternativas durante el proceso de compra, cuanto mayor es la implicación del usuario con este producto más susceptible es de dedicar un

mayor esfuerzo a examinar las distintas opciones y a detectar diferencias entre ellas (Andrews et al., 1990; Mittal and Lee, 1989). Además, cuando el usuario percibe diferencias relevantes entre las distintas opciones, más atención, tiempo y esfuerzo dedica al análisis y evaluación de las distintas alternativas (Laurent and Kapferer, 1985). En resumen, puede decirse que el usuario se encuentra más motivado y se encuentra más dispuesto a realizar una evaluación exhaustiva de las distintas alternativas cuando su implicación con el producto a adquirir es elevada. Además, el consumidor suele involucrarse más con el producto cuando mayor es el riesgo percibido que asocia a un proceso de compra determinado. Esta evaluación exhaustiva de las distintas alternativas puede generar estrés cognitivo e indecisión, factores que aumentan la eficacia de las opciones *decoy* compromiso debido a la incertidumbre del usuario.

En cambio, cuando el usuario no se encuentra involucrado con el producto en el proceso de compra, el esfuerzo que está dispuesto a dedicar a la evaluación de las distintas alternativas es menor y busca vías alternativas que faciliten la decisión, disminuyendo en lo posible la carga cognitiva del proceso de toma de decisiones. Como uno de los principios de funcionamiento de las opciones *decoy*, en general, es facilitar al consumidor la decisión mediante el aumento de la capacidad de justificación de elección de una alternativa frente a otra, puede decirse que para productos en los que el usuario se encuentre involucrado de manera débil o no se encuentre involucrado, la eficiencia de las opciones *decoy* aumentará.

En relación a los niveles de implicación asociados al uso de opciones *decoy* para generar efecto *phantom*, puede decirse que la implicación asociada al producto aumenta en el momento en que el usuario selecciona la opción *decoy* que no estará disponible en el momento de la compra. Esto es debido a que el individuo ya ha seleccionado la opción y, por lo tanto, ya ha realizado una inversión y ya ha generado expectativas acerca de la compra. Además, cualquier coste asociado a la realización de esa compra (e.g., costes de transporte si la compra no se realiza por internet, tiempo invertido) aumentarán la implicación del usuario, no solo en esa categoría de productos concreta, sino también, y de manera momentánea, en ese proceso de compra concreto.

1.2.2.4 *Preferencias del grupo social*

De la revisión de investigaciones previas sobre el efecto *decoy* se concluye que es más fácil atraer a los consumidores mediante opciones *decoy* hacia alternativas que presentan o representan una calidad superior frente a la opción *competitor*. Se ha demostrado que los descuentos, ofertas y promociones mueven los consumidores hacia productos de calidad superior más de lo que lo hacen hacia productos de calidad inferior (Blattberg and Wisniewski, 1989; Kamakura and Russell, 1989). Además, la aversión a las pérdidas, la tendencia a magnificar las posibles pérdidas frente a las posibles ganancias, es más pronunciada cuando la pérdida hace referencia a calidad que cuando hace referencia al precio (Hardie et al., 1993). Sin embargo, esta desviación entre el comportamiento frente a *decoys* que sirven opciones de alta o baja calidad, tiene una fuerte dependencia de las prioridades del grupo de usuarios a los que se presenta la oferta.

La mayoría de estudios contemplan poblaciones que son más sensibles a considerar muy atractiva la calidad y por esta razón se produce esta desviación hacia los productos de calidad superior (Heath and Chatterjee, 1995) Sin embargo, las prioridades del grupo de usuarios son un factor importante a considerar cuando se trata de diseñar opciones *decoy* que sirvan a los productos escogidos. Para grupos de usuarios cuyas preferencias contemplen predilección de la calidad frente a precio, las opciones *decoy* serán más efectivas cuando la opción *target* sea el producto que presenta niveles más elevados de calidad dentro del conjunto. Del mismo modo, para grupos de usuarios cuyas preferencias contemplen predilección del precio frente a calidad, la opción *decoy* será más efectiva cuando la opción *target* sea aquella que presenta un precio más atractivo dentro del conjunto.

En esta línea, las compañías deben realizar un esfuerzo en agrupar los distintos grupos de usuarios a los que quieren llegar mediante sus distintas ofertas y diseñar los conjuntos con opciones *decoy* en consecuencia.

1.2.2.5 *Interacción con las marcas*

En la mayoría de investigaciones sobre opciones *decoy* no se considera la inclusión de la marca de los productos ofertados y las posibles interacciones que podrían derivarse de su interacción. Es importante incluir este efecto contextual dentro de aquellas investigaciones cuyo objetivo sea estudiar la posible viabilidad de incluir opciones *decoy* en aplicaciones reales, ya que en la mayoría de los casos el usuario tiene información sobre la marca del producto que también se considera en el momento y proceso de toma de decisiones.

De manera general puede decirse que la introducción de la variable marca dentro del conjunto de opciones reduce la eficacia del *decoy*. En particular existen dos visiones acerca de cómo se produce esta reducción en la eficacia del *decoy* debido a la inclusión del efecto marca (Kim et al., 2006).

Averaging process view

Esta visión se basa en la teoría de la integración de la información (Anderson, 1971, 1981) que asume que el proceso de evaluación de una alternativa u opción se basa en la información que cada elemento que está presente en el conjunto aporta sobre esa opción. Como la efectividad del *decoy* está directamente relacionada con el impacto que éste produzca sobre el usuario, al introducir nueva información, el poder de impacto de la información existente queda reducido y, por tanto, también la eficacia del *decoy*.

Category-process view

En este caso (Meyers-Levy and Tybout, 1989; Rao and Monroe, 1988; Sujan, 1985; Sujan and Dekleva, 1987) se considera que la incorporación de la variable marca puede servir para "etiquetar" al producto en una determinada categoría que servirá como base para los procesos de evaluación siguientes (Maheswaran et al., 1992). Los usuarios intentan categorizar el producto en base a la información disponible que pueda indicar adscripción del producto a una determinada categoría social.

Una vez llevado a cabo este proceso de categorización, el análisis y la evaluación de producto suelen llevarse a cabo sin considerar excesivamente en detalle información adicional sobre el producto. Y, en el caso de que esta información sea considerada de forma extensiva, el proceso forma parte de una segunda etapa confirmatoria dónde suele confirmarse la categorización inicial del producto (Fisk and Neuberg, 1990). De este modo, el efecto de la información adicional, el *decoy* y los atributos del producto, desempeñan un papel relevante siempre y cuando el conocimiento de la marca no sea lo suficientemente robusto como para que el proceso de categorización modere su efecto. Se ha demostrado que los procesos de categorización son más plausibles de suceder cuando los estereotipos son fuertes en la memoria del usuario (Fiske et al., 1982). De este modo, considerando conjuntos de opciones con *decoy* y marca, el efecto del *decoy* se reducirá cuando se incorpore al conjunto la variable marca para los productos. Esta reducción en la eficacia del *decoy* es más susceptible de suceder cuando el usuario tiene un alto grado de conocimiento sobre la marca (Kim et al., 2006). Ente ambas visiones, la de *average-processing* y *category-based*, es la última la que ha obtenido más respaldo en investigación empírica en relación al uso de *decoys* (Kim et al., 2006). Este estudio aporta valiosa información sobre la interacción entre el efecto marca y la efectividad de opciones *decoy* para aquellas marcas o categorías de productos cuyo impacto no tienen demasiada relevancia dentro de la vida del consumidor (e.g., neveras).

Sin embargo, en el mercado aeronáutico entre otros, donde el posicionamiento de la marca y la transmisión de su valor e imagen como compañía ocupan una posición central dentro de las campañas de marketing, es necesario un paso más. La realización de estudios que integren los atributos de la marca como una variable con capacidad para condicionar la eficiencia de opciones *decoy* fruto de su interacción con los atributos seleccionados del producto aportaría valiosa información.

Para aquellas marcas cuya imagen posea unos valores o atributos en línea con los atributos seleccionados para el producto ofertado podría esperarse un comportamiento sinérgico entre el efecto de marca que reforzaría un atributo concreto del producto y el efecto *decoy*. Imaginemos un producto cuyos atributos son calidad de sonido y diseño, donde ambos están valorados en función de distintos parámetros cuantificables reflejados en escalas continuas independientes. Al introducir una marca cuya imagen sea asociada a productos con una alta calidad de sonido, es de esperar que dentro de su gama de productos, aquel que posea una calidad de sonido superior vea incrementado su atractivo, siempre que la relación con el resto de atributos permanezca constante, debido a que la marca intrínsecamente refuerza ese atributo. El comportamiento de opciones *decoy* que sean introducidas bajo este contexto y que refuercen una opción *target* cuyo atributo dominante (e.g., calidad de sonido) esté en línea con la imagen de marca podría no reducirse al existir sinergia entre la dirección del efecto marca debido a sus atributos y la opción *decoy*.

No solo la interacción entre los efectos *decoy* y marca debería ser considerada, sino también ambos efectos de manera independiente, pues evaluar la aportación de cada uno de

ellos por separado puede destapar interacciones que realmente sean ficticias; en el caso en que uno de los dos efectos contextuales sea mucho más intenso que el otro.

1.2.2.6 *Orientación del consumidor: foco regulatorio*

Los objetivos del consumidor en el momento de la compra pueden conceptualizarse en términos de la teoría del *regulatory focus* (Higgins, 1997). Pueden clasificarse en dos grupos: los ideales y las obligaciones.

El *promotion focus* es un estado u orientación asociado a comportamientos y actitudes que valoran las ganancias, los ideales y los éxitos. Lo dirige una necesidad de crecimiento y desarrollo y se caracteriza por perseguir un objetivo concreto.

El *prevention focus* se asocia a las obligaciones, a las pérdidas y a la propia necesidad de protegerse a uno mismo del daño psicológico asociado al fracaso y al error. Esta necesidad se persigue a través de decisiones que minimizan las consecuencias adversas fruto de una acción determinada.

Es posible examinar el *regulatory focus* como una variable que se asocia a la personalidad del usuario, *chronic regulatory focus* (Wallace and Chen, 2006; Higgins, 1997, 1998), o bien como una variable temporal que puede ser inducida por una situación en concreto, *situational regulatory focus* (Friedman and Forster, 2001; Liberman et al., 1999). Es decir, distintas situaciones pueden potenciar de una manera más o menos intensa una determinada orientación.

Ambas orientaciones deben ser interpretadas como variables independientes. Es decir, un usuario puede presentar niveles elevados en ambas orientaciones, en una, o en ninguna de las dos. Delante de una posible situación de toma de decisiones, ambas orientaciones no son excluyentes entre sí.

Los consumidores con altos niveles en una de las orientaciones y débiles en la otra presentan distinta susceptibilidad a los efectos contextuales generados por opciones *decoy*. Los usuarios con una orientación predominantemente *prevention*, que siguen estrategias cuyo objetivo es reducir el riesgo y evitar los fallos, son más susceptibles de evitar opciones extremas. Considerando que las opciones extremas son aquellas que presentan unos niveles muy atractivos en uno de los atributos del producto y unos niveles muy pobres en el otro, la posibilidad de cometer un error al escoger una de estas opciones es más elevada. Por lo tanto, los consumidores con orientación predominantemente *prevention* tenderán a escoger opciones con niveles medios en sus atributos y a optar por la opción compromiso si esta se encuentra presente en el conjunto (Mourali et al., 2007). Así pues, la efectividad del efecto compromiso será mayor en aquellos usuarios que en el momento de la compra presenten una orientación *prevention* dominante. Del mismo modo, la efectividad del efecto atracción será mayor en aquellos usuarios que en el momento de la compra presenten una orientación *promotion* dominante ya que la opción *decoy* tiende a favorecer y a resaltar un atributo en concreto en el que la opción *target* presenta un valor extremo en el rango de valores de ese atributo dentro del conjunto de opciones.

La teoría del *regulatory fit* (RFT) sugiere que cuando las propias motivaciones se ajustan a las características de una tarea específica, como puede ser la compra de un producto, la emoción asociada que experimenta el usuario es de "aprobación" (Aaker and Lee, 2001). Cuando la propia motivación auto-regulatoria del usuario es consistente con los resultados o consecuencias de una acción, esta es mejor considerada por el usuario que aquella cuyo resultado o consecuencia sea inconsistente con su motivación auto-regulatoria (Chernev, 2004; Higgins, 1998). Además, se ha demostrado que un nivel de autopercepción independiente está relacionado con metas de éxito y logros (orientación *promotion*) mientras que un nivel autopercepción interdependiente se relaciona con metas de obligaciones y responsabilidad (*prevention oriented*). Del mismo modo, aquellos usuarios en que el nivel de autopercepción independiente se encuentra activo son más susceptibles de ser persuadidos por mensajes relacionados con orientación *promotion* (e.g., el zumo de uva incrementa tu energía) mientras que los usuarios cuya autopercepción interdependiente se encuentre activa serán más susceptibles de ser persuadidos por mensajes relacionados con orientación *prevention* (e.g., el zumo de uva reduce el riesgo de padecer enfermedades coronarias).

Efecto del tipo de producto. Dentro de la influencia del *regulatory focus* en los efectos contextuales generados por opciones *decoy* puede sugerirse que el tipo de producto es un condicionante del tipo de orientación que presenta el usuario en el momento de la compra (Mishra et al., 2010). Es decir, aquellos productos que pueden asociarse a comportamientos asociados a la orientación *prevention* serán percibidos de manera más atractiva cuando se presenten dentro de un conjunto de opciones donde se incluyen opciones *decoy* compromiso. En cambio, aquellos productos que se asocien con orientaciones *promotion* serán percibidos de manera más atractiva cuando se presenten dentro de un conjunto de opciones acompañados de opciones *decoy* atracción (Mourali et al., 2007).

Interacción entre los atributos del producto y orientación. Del mismo modo que existen productos que pueden asociarse a una orientación determinada, también pueden existir interacciones entre las características de los atributos del producto ofertado y el atractivo que un usuario con una determinada orientación percibe de ellos. Es decir, un usuario con orientación *prevention* puede percibir de manera muy atractiva un producto acompañado por una opción *decoy* atracción siempre y cuando uno de los atributos del producto incluya alguna referencia a seguridad o minimización de errores (Mourali et al., 2007). Es decir, si se oferta un billete de avión uno de los atributos del cual hace referencia a las garantías que el usuario obtiene en caso de cancelación de su vuelo, un usuario con una orientación *prevention* podría preferir la opción extrema que asegurará las mejores garantías en caso de cancelación, ya que esa opción es la que se reduce en mayor medida el riesgo asociado a una compra errónea.

Inducción de orientaciones

Del mismo modo que factores externos como el cobro de la nómina pueden aumentar las ventas de aquellos productos con orientación *promotion* (Mishra et al., 2010) futuras investi-

gaciones deberán determinar si, para el caso de una compañía aérea, que únicamente ofrece un producto fijo que, además, no está directamente vinculado a una orientación en particular, es posible dotar al producto de una u otra orientación para beneficiarse de las diferentes fluctuaciones en las preferencias del consumidor a lo largo del mes. Otro campo que sería de interés en cualquier mercado, y en el aeronáutico en particular, es las orientación del usuario puede condicionarse mediante efectos contextuales externos al proceso de compra, ya sean estímulos auditivos, visuales u de otro tipo que puedan presentarse en el momento de la compra. Estos resultados, sumados a las ya mencionadas implicaciones del estudio de las motivaciones del consumidor, podrían determinar si existen posibilidades de generar sinergias entre los distintos elementos que integran un proceso de compra, desde la marca, pasando por el producto y sus atributos, la publicidad, los tiempos de promoción y otros que puedan ser específicos de una oferta concreta.

Distancia psicológica en el proceso de compra

Según la teoría de niveles constructuales (Trope and Liberman, 2003) los individuos procesan y forman distintas representaciones mentales sobre el mismo estímulo dependiendo de la distancia psicológica que separa al propio individuo y al suceso que provoca el estímulo. La distancia psicológica entre ambos se incrementa cuando el suceso se encuentra fuera de la experiencia habitual de propio individuo, ya sea porque sucede en un futuro lejano (i.e., distancia temporal; Liberman et al. (2002)), en un lugar remoto (i.e., distancia espacial; Tversky (2003)) o porque cuando sucede a individuos con los que no nos encontramos identificados (i.e., distancia social; Nisbett et al. (1973)). Cuando la distancia psicológica aumenta, el estímulo queda representado a nivel superficial, de manera descontextualizada y simple. Lo contrario sucede cuando decrece, situación en la cual es usuario representa el estímulo a un nivel más interno, con una descripción rica y detallada de este (Khan et al., 2011).

La manera en que estos estímulos se desarrollan, ya sea a un nivel superficial o interno, afecta al modo en que el usuario decide los trade-offs de su decisión. Puede decirse que los estímulos construidos a nivel superficial alejan al usuario de realizar evaluaciones de los distintos atributos de una opción y ejercer trade-offs en consecuencia. Esta implicación, discutida y analizada por Khan et al. (2011) tiene consecuencias en el uso de opciones *decoy* de compromiso y de atracción. Respecto a la opción *decoy* compromiso, el usuario no puede identificar una opción cuya combinación de atributos sea suficientemente atractiva respecto a las demás. Como el efecto de esta opción *decoy* emana de la excesiva atención que el usuario presta a los detalles en los distintos niveles de los atributos, su eficacia será mayor cuando el estímulo se produzca a nivel interno que cuando se produzca a nivel superficial.

Lo contrario sucede cuando se incorpora una opción *decoy* atracción al conjunto, ya que aquellos usuarios que construyan el estímulo a un nivel superficial, es decir, que eviten realizar *trade-offs* en función de los atributos y alternativas, ya que una alternativa aparece altamente reforzada, serán más susceptibles de verse afectados por el efecto de atracción basándose en la relación de dominancia que se establece entre las opciones.

La interpretación de estos niveles constructuales de estímulos debe realizarse y adaptarse de manera adecuada al mercado de la aviación comercial para adaptar la opción *decoy* ofertada con la finalidad de maximizar su eficiencia.

Es destacable la influencia que la implicación del usuario en el producto pueda tener en la distancia psicológica que este experimenta en un proceso de compra con unas características concretas. Debido a que la implicación del usuario con un producto específico está muy ligada a la identificación del usuario con este producto y a la importancia y centralidad del mismo en su vida, podría vincularse una alta implicación del usuario en el producto con una disminución en la distancia psicológica en un proceso de compra aleatorio, para ese producto. De este modo, los mecanismos que regulan el funcionamiento de las opciones *decoy* en función de estos dos efectos contextuales, tendrían un efecto similar ya que, tanto un aumento de la implicación del usuario con el producto como una disminución de la distancia psicológica en un proceso de compra, tiende a generar condiciones favorables para opciones *decoy* con finalidad compromiso.

Existen diferencias entre distintas orientaciones de un mismo producto en función de la distancia psicológica que existe entre el proceso de compra, el mismo producto y el usuario. En consecuencia, las hipotéticas situaciones simuladas para evaluar los efectos de distintos tipos de *decoy* sobre un producto concreto, deben considerar que el contexto en el que se sitúa al individuo posee las mismas características que las que el usuario encontraría en un proceso de compra de billetes real. Es directo deducir que el estudio debe presentar la máxima similitud con la situación real pero, además, lo que introduce el considerar la distancia psicológica como elemento importante en el diseño que opciones *decoy* es la contemplación de elementos que van más allá de la forma del experimento, sobre todo pero no exclusivamente, en relación a la selección de la muestra objeto de estudio.

Es importante considerar si la experiencia del usuario sobre el tipo de vuelos de cuyo proceso de compra se desea obtener información es relevante y cumple las características necesarias para que el comportamiento del usuario se asemeje al que tendría en una situación real.

1.3 FUTURAS LÍNEAS DE INVESTIGACIÓN Y PROPOSICIONES

Analizando los factores que han sido revisados con un poco de distancia y perspectiva, nos podemos dar cuenta de que únicamente se conoce la influencia del *decoy* en determinadas situaciones, para un solo tipo o en grupos de usuarios concretos y, desde luego, sin la posibilidad de obtener conclusiones sobre las posibles interacciones que podrían darse entre dos o más factores y los efectos sobre el funcionamiento de opciones *decoy* que estas combinaciones podrían comportar.

Se identifican dos campos principales en las que es posible agrupar los distintos factores que afectan al funcionamiento de opciones *decoy* en un conjunto de opciones según sean características del consumidor o del informante, o características del diseño experimental.

Las características del consumidor pueden clasificarse como no controlables, a pesar de que puedan ser filtradas a grandes rasgos a través de segmentación, analizada más adelante para cada elemento concreto que es susceptible de poder ser controlado. Del mismo modo, es posible clasificar las características de diseño experimental, o del proceso de compra, como controlables o como variables de decisión que pueden adaptarse a cada situación de compra y categoría específica de productos.

Como características del informante se presentan: el conocimiento previo que posee sobre el producto, la implicación con el producto y la distancia psicológica; íntimamente relacionadas, el grupo social del usuario y, a grandes rasgos, sus preferencias, y su foco regulatorio.

La particularización de cada uno de los elementos anteriores para cada categoría de producto y grupo de usuarios es capital para maximizar los beneficios que pudieran obtenerse de la implementación de opciones *decoy* dentro de sus procesos de venta. Se ha mencionado la segmentación como útil para acotar el rango de usuarios en función de características que pueden ser determinadas por el tipo de producto (i.e., productos de alta gama restringirán el público objetivo a grupos sociales de características concretas) o bien, cuando el producto no sea restrictivo de segmentos de mercado concretos, directamente a través de la orientación de las estrategias de venta a un grupo de usuarios específico.

En el caso del foco regulatorio, a pesar de ser una característica intrínseca al usuario en forma de orientación crónica, es posible abordarlo de dos modos. El primero, en el que el producto determina la orientación predominante de aquellos usuarios que lo adquirirán debido a que sus características específicas se asocian a una orientación concreta. En este modo es posible determinar, a grandes rasgos, el foco regulatorio del usuario medio a través del estudio de las características del producto ofertado. El segundo modo hace relación a la componente de la orientación del usuario que no posee una vertiente crónica sino temporal. Futuras investigaciones deberán evaluar hasta qué punto es posible influenciar la orientación temporal del consumidor mediante estímulos externos de modo que pueda ser condicionada para maximizar los beneficios obtenidos de las características de diseño de un proceso de compra.

Como características del diseño experimental o del proceso de compra se presentan: la introducción, o no, de la opción de no-escoger, el modo de información en el que se presentan los atributos del producto y la presencia de marca y de sus efectos derivados.

Estos factores no deberían ser interpretados como variables destinadas a controlar la eficiencia de opciones *decoy*, sino como requisitos del problema que deben considerarse al plantear una solución. Por ejemplo, al hablar de la presencia de marca, es difícil concebir fuera del ámbito de la investigación un caso real donde pueda considerarse que este factor es una variable y no una imposición del mercado. Sin embargo, para propósitos experimentales cuyo objetivo no sea medir la eficacia de una opción *decoy*, ya sea sobre un caso real o no, sino evaluar y aislar el efecto de otro elemento contextual concreto, la no presencia de marca podría considerarse; aunque siempre deberá ser incluida en etapas posteriores. Lo

mismo sucede con el modo de información o con la presencia de la opción de no-escoger dentro del conjunto de opciones, que normalmente vendrán determinadas por el tipo de características del producto que se oferta y, en general, por la naturaleza del proceso de compra de ese bien determinado. No podría existir un proceso de compra de un ordenador con un modo de información que no fuera puramente numérico para referirse a sus especificaciones, del mismo modo que sería difícil entender el diseño de un estudio intentando reflejar el proceso de compra de una barra de pan con la opción no-escoger como una alternativa válida más.

En relación a los avances y propuestas de investigación que podrían ser considerados en este campo, se encuentran todas las interacciones entre efectos contextuales y los distintos tipos de opciones *decoy* que son aún una incógnita. Sin embargo, las propuestas que se presentan a continuación pretenden introducir nuevos conceptos que se consideran de utilidad en el futuro de los procesos de ventas secuenciales y que, además, introducen nuevos retos para la teoría existente que intenta explicar el funcionamiento de opciones *decoy* en distintos escenarios.

En este contexto se presentan dos propuestas concretas de investigación, las hipótesis y resultados esperados en cada caso, y las implicaciones que podrían derivarse de ellos.

1.4 LA EFECTIVIDAD DE OPCIONES DECOY EN FUNCIÓN DEL NIVEL DE FATIGA COGNITIVA DEL USUARIO

El nivel de fatiga cognitiva está intrínsecamente relacionado con el esfuerzo cognitivo. Este se define como la cantidad de recursos cognitivos, sobre el total, necesaria para completar una determinada tarea (Russo and Dosher, 1983). El número de opciones presentes en un determinado conjunto y el número de comparaciones necesarias para evaluarlas, así como la dificultad a la hora de hacerlo, son factores que incrementan la dificultad cognitiva que entraña una elección determinada.

Cuando los usuarios se enfrentan a una elección, tienden a adoptar aquella estrategia que implica minimizar el coste cognitivo de la tarea (Bettman, 1988; Bettman et al., 1990). En este punto, el usuario tiende a buscar incrementar al máximo su nivel de satisfacción con su elección, minimizando el sentimiento de arrepentimiento, intentando minimizar a su vez la cantidad de recursos cognitivos implicados en esa evaluación de alternativas.

Según la teoría de la utilidad multiatributo (MAUT) introducida anteriormente, la utilidad de una opción puede obtenerse a través de la adición de dos términos muy diferenciados. El término correspondiente al valor añadido percibido en una opción se entiende como una contribución principalmente cualitativa, en términos de ganancias y pérdidas, como medio de justificación. En cambio, el término correspondiente a las distintas importancias y niveles de los atributos de una determinada opción requiere de un esfuerzo cognitivo superior, ya que implica comparaciones a un nivel cuantitativo y de detalle.

Suponiendo que los niveles de fatiga cognitiva de un usuario son elevados en una determinada etapa del proceso de compra donde se enfrenta a un conjunto de opciones donde un *decoy* de atracción está presente. Es posible que el efecto que la opción *decoy* genere sobre las percepciones del usuario actúe como una válvula de escape, incrementando la importancia que el componente de justificación posee en esa elección concreta. El usuario posee altos niveles de fatiga cognitiva derivados de la evaluación de alternativas en conjuntos de opciones anteriores, de realizar *trade-offs* y evaluaciones exhaustivas. En este caso, el usuario será más susceptible de adoptar una estrategia de elección basada en una justificación cualitativa que implique poco coste cognitivo.

De este modo, el efecto de la fatiga cognitiva sobre opciones *decoy* presentes en procesos de venta secuenciales será función del nivel de esfuerzo cognitivo que el usuario haya realizado previamente. En el punto en que el usuario presenta niveles elevados de fatiga cognitiva, es más propenso a buscar estrategias que minimicen el coste cognitivo de sus decisiones. Es posible que en esta situación el componente asociado al valor añadido de la MAUT vea incrementado su peso dentro del conjunto de factores implicados en el funcionamiento de la opción *decoy*.

De la anterior exposición se derivan dos hipótesis realizadas acerca de la influencia de altos niveles de fatiga cognitiva en la eficacia de opciones *decoy*.

- **H1:** A medida que la fatiga cognitiva del usuario aumenta, el proceso de valor añadido asociado a una opción mediante la opción *decoy* de atracción aumenta.
- **H2:** La eficacia de una opción *decoy* de atracción aumenta a medida que aumenta la fatiga cognitiva del usuario.

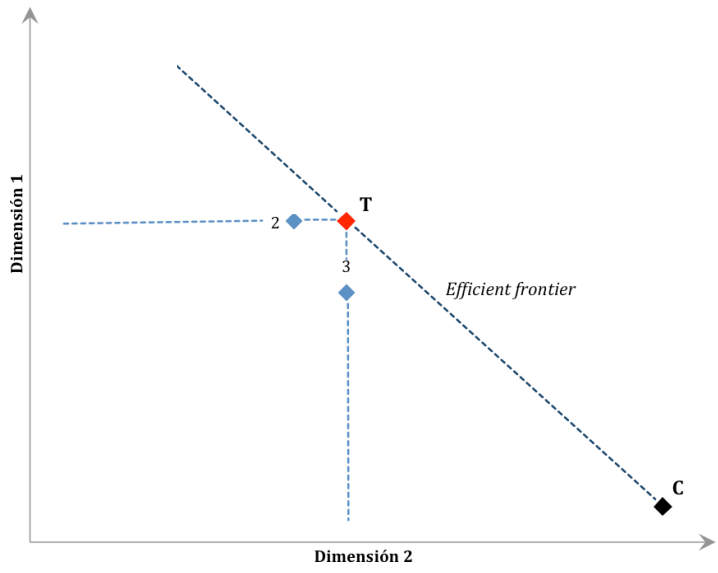
Los resultados de esta investigación contribuirán a enriquecer la literatura sobre procesos de decisión que incorporan opciones *decoy*. Incorporando la fatiga cognitiva como variable de control dentro de la investigación, y conociendo las interacciones que existen entre esta y los distintos componentes de la MAUT, es posible determinar cuáles de sus componentes son más activos dentro de la evaluación de opciones en conjuntos de opciones con *decoys*.

1.5 LA EFECTIVIDAD DEL DOBLE DECOY: DOS OPCIONES DECOY EN UN MISMO CONJUNTO DE OPCIONES

El efecto de la adición de una opción *decoy* adicional a un conjunto de opciones que ya posee una opción *decoy* es un efecto que no ha sido tratado aún. Esta interacción entre dos opciones *decoy* aportaría datos acerca de qué teoría explicativa sustenta mejor los efectos contextuales que se producen para el correcto funcionamiento de una opción *decoy*.

Los distintos estudios realizados hasta la fecha, proponen distintos modelos que explican el funcionamiento de distintos tipos de opciones *decoy*: el modelo de la variación de pesos, el modelo de la variación de valor y el modelo de valor añadido. Las tres se encuentran

Figure 1.2: Esquema de las opciones *decoy* integrantes del *decoy* doble, como propuesta de investigación



reflejadas en los distintos términos y coeficientes de la MAUT. La respuesta de estos modelos sobre un doble *decoy* podría aportar a la teoría de su funcionamiento nuevos datos que considerar siempre que las hipótesis que se formulan, en base a cada unos de los modelos y sus distintas explicaciones, no coincidan con los resultados obtenidos.

El modelo de doble *decoy* propuesto contempla la inclusión de un *decoy* parcialmente dominado en rango acompañado de un *decoy* parcialmente dominado en frecuencia. La razón para esta combinación es que los distintos modelos y teorías proponen mecanismos de acción diferentes para estos tipos de *decoy* por separado. La situación que se propone queda reflejada en Figure 1.2.

Es importante destacar que en la representación de la figura, la dimensión 1, representa un atributo cuyo valor para el usuario es inversamente proporcional al valor del propio atributo. El precio es un atributo que responde a esta definición y, siendo un elemento tan relevante dentro de la configuración de las alternativas de cualquier conjunto de opciones genérico, se considera relevante incluirlo en la representación de la situación presentada.

Combinando las distintas hipótesis sugeridas a través del análisis de las distintas teorías que rigen el comportamiento de ambos tipos de *decoys* por separado, se proponen las siguientes hipótesis:

Para el modelo de la variación de pesos las hipótesis contempladas para el *decoy* doble son:

- **H1:** El peso relativo de la dimensión 2 será mayor en el conjunto de opciones con *decoy* doble que en el conjunto de opciones original.

Para las distintas teorías existentes del modelo de la variación de valor, las hipótesis para el funcionamiento del *decoy* doble son:

Según la teoría de rango-frecuencia:

- **H2:** El atractivo percibido de la dimensión 1 para la opción *target* será mayor en el conjunto de opciones con *decoy* doble que en el conjunto de opciones original.
- **H3:** El atractivo percibido de la dimensión 2 para la opción *target* permanecerá constante en el conjunto de opciones con *decoy* doble respecto al conjunto de opciones original.

Según el principio de la densidad:

- **H4:** El atractivo total percibido de la opción *target* en el conjunto de opciones que incorpore *decoy* doble, se mantendrá constante respecto al conjunto de opciones original.
- **H5:** El valor del atractivo de la alternativa Competitor en el atributo 1 será superior en el conjunto de opciones que incorpore *decoy* doble respecto al conjunto de opciones original.
- **H6:** El valor del atractivo de la alternativa Competitor en el atributo 2 será inferior en el conjunto de opciones que incorpore *decoy* doble respecto al conjunto de opciones original.

Contrastar las distintas hipótesis con los resultados obtenidos aportará valor añadido a la literatura actual en este campo; pues la combinación de los distintos efectos generados por ambas opciones *decoy* sobre una única opción *target* son una herramienta adicional que permitirá obtener información sobre los mecanismos que subyacen en los procesos de toma de decisiones en presencia de estas opciones. Además, permitirá identificar posibles inconsistencias dentro e la teoría actual, proponiendo un camino para su mejora, con el objetivo final de determinar qué procesos y elementos rigen en proceso de toma de decisiones bajo el efecto contextual de las opciones *decoy*.

1.5.1 *Implicaciones prácticas y conclusiones*

Recuperando el contexto actual de las estrategias de venta de billetes de avión tratado en la introducción y, una vez revisado cómo los efectos contextuales pueden contribuir

a aumentar la rentabilidad de estos procesos, se deduce la necesidad de comprender y aprehender qué interacciones se producen entre estos y el resto de factores implicados en el proceso de compra: el usuario y características inherentes al producto.

La investigación propuesta pretende contribuir a la literatura existente mediante dos aproximaciones diferenciadas, que pretenden complementarse: la creación de nueva teoría a través del estudio de casos particulares en la frontera del conocimiento y la aplicación y testeo práctico de estas propuestas en un entorno real simulado, que permita reflejar un proceso de compra con todas sus características propias.

En esta dirección, y abordando las dos propuestas anteriormente planteadas desde esta perspectiva, puede concluirse que la contribución principal de la primera investigación consiste en determinar cual es la respuesta que puede esperarse de un usuario con altos niveles de fatiga cognitiva en cuanto a la efectividad de opciones *decoy*.

La fatiga cognitiva es un elemento inherente a los procesos de compra secuenciales a través de internet y, las conclusiones que puedan extraerse, no serán únicamente válidas en procesos de compra de billetes de avión sino en todos aquellos procesos de venta on-line que tengan características comunes.

En relación a la segunda investigación, su contribución principal consiste en determinar qué teoría de las existentes da una mejor respuesta a la hora de explicar el comportamiento de opciones *decoy* aún inexploradas. La evaluación de esta respuesta para las distintas teorías, posibilitará el desarrollo de un análisis crítico de la teoría existente abriendo nuevas vías para comprender qué procesos subyacen bajo la toma de decisiones bajo estos efectos contextuales.

Las implicaciones prácticas derivadas de estas investigaciones se deducen a través de la propia metodología experimental, abordada siempre desde una aplicación real, con el objetivo de aumentar la rentabilidad de procesos de compra. Las conclusiones extraídas permitirán determinar en qué circunstancias es posible aumentar la rentabilidad de un proceso de compra a través de la interacción de opciones *decoy* y, si fuera posible, en qué situaciones la fatiga cognitiva del usuario podría reforzar este efecto contextual. Además, y por primera vez, los resultados contemplarán la introducción de múltiples opciones *decoy* sobre un conjunto de opciones, posibilitando su aplicación en aquellos productos que, por sus características determinadas, no pueden limitar su oferta únicamente a tres opciones.

Part II

DECOY EFFECT: DOUBLE DECOY AND NON-ISOLATED CHOICE SETS. DEVELOPMENT OF RESEARCH PROPOSALS

The analysis of multiple decoys in the same choice set as well as the evaluation of decoy effect as a non-isolated phenomena within the decision chain, highlight relevant implications which deepen extant knowledge on decoy effects and provide further insights for future research.

2

EFFECTS OF THE ADDITION OF SIMPLE AND DOUBLE DECOYS ON THE PURCHASING PROCESS OF AIRLINE TICKETS

2.1 ABSTRACT

The future purchasing scenario in air tickets is revealed to be based on sequential decision-making processes with a limited number of alternatives with clearly identified product attributes. In this scenario, decoy contextual effects could be useful in increasing the profitability of each choice set through driving the attention of the users to a particular alternative, changing their perceptions, such as the perceived attractiveness of particular options, to benefit one specific alternative.

This study validates the efficiency of the addition of decoy options in increasing the proportion of users which select the target option in a choice set and introduces, theoretically and empirically, the use of double decoys. Three distinct hypothetical choice sets are configured using two different types of decoy. The effect of the double-decoy choice set in the proportion of the no-choice option is also of interest.

2.2 INTRODUCTION

Current sale strategies, strongly influenced by the almost total emission of air tickets online, have a clearly identified component that yet will strongly increase in next years: the complete customization of the air ticket. Nowadays, huge possibilities of customization are offered to the passenger in order to meet the different needs of each individual through multiple services. Several combinations of these multiple attributes that could be chosen or added to a base product constitute the main structure of those purchasing processes, which aim to provide the appropriate ticket for any occasion.

Thus, the purchasing scenario is revealed to be based on sequential decision-making processes with a limited number of alternatives with clearly identified product attributes. Air ticket purchasing is configured as a sequential decision process, through successive screens where the user can add to the ticket the attributes offered by the airline. In this scenario, decoy contextual effects could be useful in increasing each choice set profitability through driving users' attention to a particular alternative, changing users' perceptions of the perceived attractiveness of the multiple options, to benefit one specific alternative.

This paper aims to contribute to extant research on decoy options by discussing the main theories about the cognitive processes that lead to a change in individuals' perceptions and by providing empirical data supporting the use of these techniques in the purchasing process of air tickets. Moreover, the effects of the addition of a double decoy within a choice set

are theoretically and empirically evaluated, with implications that, to our knowledge, have remained unexplored. The study has been developed taking into account the particularities of air tickets purchasing processes and their specific context in order to provide guidance on possible implementations leading to enhance air tickets purchasing process profitability.

One of the aims of the study, apart from giving an insight in the viability of implementing decoy effect strategies in air tickets purchasing processes, is to understand which mechanisms drive the hypothetical benefits that stem from the introduction of decoy options in the choice set. Therefore, different theories are referenced in order to evaluate its accuracy in explaining the observed effects of the following studies for this particular product category.

2.3 THEORETICAL BACKGROUND ON DECOY OPTIONS

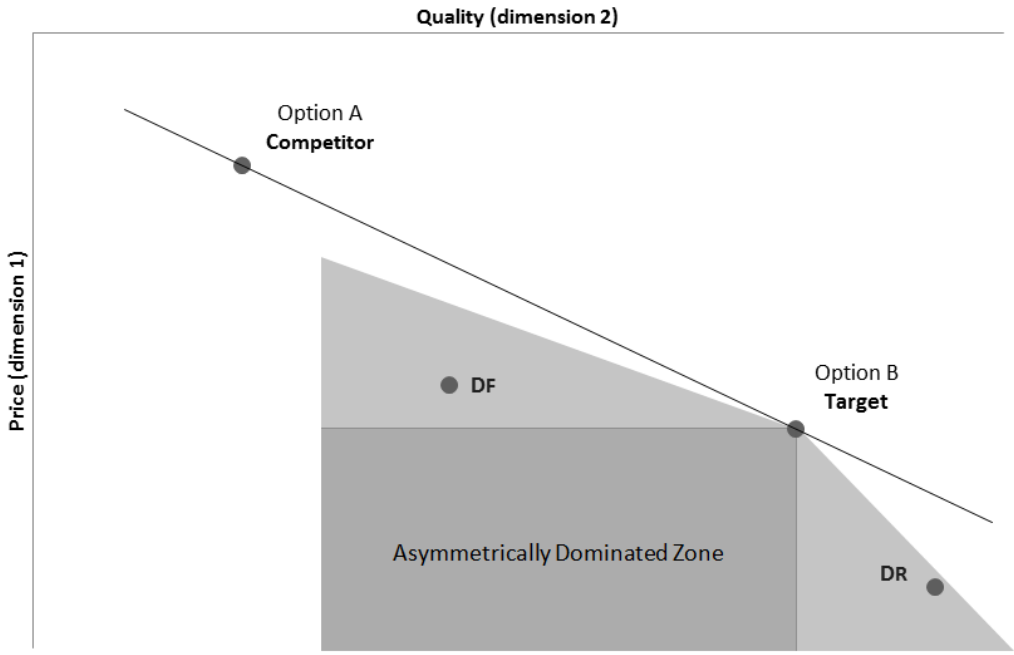
Within a set of alternatives, it is called a decoy option those alternative which is only added to the choice set with the only purpose of increasing the perceived attractiveness of one of the original options. This effect is referred as asymmetric dominance and was first introduced by Huber, Payne & Puto (1982). The decoy option does not stand as a valid alternative in the set because in most cases this option is completely dominated by one of the original options in the set, from now referred as the Target option. However, its utility lies in the capacity this alternative has of modifying consumer preferences and perceived attractiveness on, one of the options in the original set.

In Figure 2.1 a particular situation is presented. For air tickets product category two attributes are considered: price and quality. There are two original options named as competitor (option A) and target (option B). While the competitor presents higher levels on attribute price, (note that price is perceived as more attractive as it decreases), target presents higher levels on attribute quality. Therefore, in the binary choice set integrated by the option target and competitor, the dominant dimension for a particular alternative is defined as those in which that alternative presents the higher levels of the original choice set.

In Figure 2.1, two alternative decoys are introduced in order to increase the attractiveness of the target option. The DF decoy presents slightly a better price than the target option but quite a reduced level of quality, while the DR, presents a slightly better value than target in quality but quite a higher price. Both options are expected to produce decoy contextual effects when presented in the choice set. Note that these decoys are out of the asymmetrically dominated zone, so they are defined as nearly dominated decoys. In this study nearly dominated decoys are used instead of the traditional asymmetrically dominated. The reason is to prevent any bias derived from the presence of illogical alternatives, which, for example, could provide more quality at the same price. More implications about nearly dominated decoys would be further discussed.

It is important to note that despite the effects of decoy options have been studied in terms of performance, defined as the capacity of a decoy option to increase the proportion of users who choose the targeted alternative, no interaction between different decoy options in the

Figure 2.1: Nearly dominated decoys in two attribute space. Asymmetrically Dominated Zone and partial dominated zones are represented



Note: DR, nearly dominated range decoy; DF, nearly dominated frequency decoy; DD, double decoy (DR+DF in the same choice set); Core, core set

same choice set has been yet reported (Gonzalez-Prieto and Lordan, 2013) The result of this interaction could be either positive (the presence of an extra decoy would reinforce the yet reinforced attractiveness of the target) or negative (the extra decoy interacts with the other negatively canceling the overall effect of reinforcing target attractiveness).

Apart from the interaction effects related to cognitive processes uniquely associated to decoy options, the fact of increasing the number of options should also be considered. It could be logically assumed that the more options available the more possibilities of being successful when searching for a particular product. However, the introduction of an additional option in the choice set as a decoy does not strictly increase the number of useful and valid options within the choice set. The increase of available alternatives can increase the complexity of evaluations since the complexity of the choice task increases. Complexity can stem from two main facts: trade-offs and number of comparisons. As the attractiveness of alternatives rises, individuals experience conflict because of the cognitive stress associated to making trade-offs between options. When this happens, the attractiveness of choosing the default option or simply not choosing can increase (Dhar, 1997). Consumer research suggests that as both the number of options and the information about options increases, people tend to consider fewer choices and to process a smaller fraction of the overall information available regarding their choices (Hauser and Wernerfelt, 1990).

Multiple researchers have tried to explain which cognitive processes lay under decoy contextual effects (Ariely and Wallsten, 1995; Dhar and Glazer, 1996; Pettibone and Wedell, 2000; Simonson and Tversky, 1992). These studies describe different processes that occur when adding decoy options in a set: weight change, value shift and value added (Pettibone and Wedell, 2007). The weight change model refers to variations in the importance assigned to the presented attributes of the options when a decoy is introduced. The value shift implies a change in the perceived attractiveness of the attributes in either the target or the competitor option because of the addition of a decoy option in the choice set (Park and Kim, 2005; Pettibone and Wedell, 2000). Value added processes are related with the need of providing justification, external or internal, for choosing a particular option of the set. Adding a decoy option, that provides justification for choosing the target over the competitor, also benefits the target by making it appear the less risky option in the choice set.

These processes are explained by different theories aiming to accurately predict those shifts occurring when adding a decoy. It is important to note that there are two models which can provide explanation for shifts in perceptions when adding decoy options in a choice set: the weight-change model assumes that when adding a decoy option within the decoy set the relative weight of the attributes changes. On the other hand, the value shift model postulates that relative weights assigned to attributes remain constant but the subjective values, or perceived attractiveness, of each attribute shift because of the presence of the decoy (Wedell, 1991). Moreover, the later has obtained more empirical support (Pechtl, 2009).

Nevertheless, a more general approach is required in this case in order to account for both effects due to the specific nature of these experiments as well as considering the

value added processes that may occur. The general multiattribute utility (MAUT) framework (Von Winterfeldt et al., 1986) includes both effects, as it considers that choice depends on a comparison of overall attractiveness values for alternatives that result from weighted additive integration of dimensional values (Wedell, 1991). Moreover, an additional component is included in order to account for value-added effects. It is represented as follows:

$$AT_i = \sum_m W_m \cdot V_{mi} + K_i \tag{2}$$

Where AT_i represents the overall attractiveness value of one particular alternative, W_m is the context dependent weighting of attribute m and V_{mi} represents the context dependent perceived attractiveness of attribute m of the alternative i and K_i represents the value added to one particular alternative i in a particular context. This equation incorporates the three above mentioned effects accounting for the weight change effects, the value shift in the attributes' perceived attractiveness and the value added due to the relational properties of one particular alternative i.

2.3.1 *Hypothesis*

2.3.1.1 *Weight-change*

Changes in dimensions' weights are considered through a preference vector whose slope is the weight of dimension 2 (quality) divided by the weight on dimension 1 (price). It is important to note that when aiming to favor the targeted alternative the weight of its weakest attribute should decrease in order to enhance the weight of its strongest attribute or dimension (Wedell, 1991). When adding a decoy alternative, an altered weighting scheme is presented resulting in an increase in target's likelihood of being chosen. In Figure 2.1 focusing on option target, one could difference between the strong dimension or dominant dimension and the weak dimension for this option. Dimension 2 is stronger than dimension 1 for the target because of its higher relative value. Regarding the interaction between the two decoy options, as the altered weighted scheme for each decoy choice set favors the target by decreasing the relative weight of its weak dimension, it could be assumed that by addition of effects, the same would happen in the double-decoy choice set.

- **H1:** The relative weight of dimension 2 is higher in either the decoy set with DR or DF than in the original choice set. This effect is maintained when the two decoy options are included in the same choice set.

2.3.1.2 *Value shift*

When accounting for the change in the perceived attractiveness or value for the different attributes there are three different theories providing explanation regarding the options presented in Figure 2.1: The range-frequency theory, the assimilation theory and the distance-density theory (see Pechtl, 2009 for a complete review). However, only two of them are

considered: the range-frequency theory because of its importance and widespread use in designing and analyzing decoy options, and the later, just considering the density principle, because of its good adjustment to empirical results (Park and Kim, 2005; Pechtl, 2009)

2.3.1.3 *Range-Frequency theory*

This theory, first introduced by Parducci (1995) proposes that attribute values are a function of their corresponding range and frequency values. When it is applied to the choice set in Figure 2.1, the DR decoy option extends the range of dimension 1 levels when compared with the core set, where only the original options T and C are presented. This fact leads to an increase in the range value under DR presence because the target does not occupy the last position in the set for this attribute. When referring to dimension 2, as the range in this attribute is also extended, Target's range values for this attribute are lower in the decoy set with DR than in the original set. However, as the decoy is nearly dominated and the increase in dimension 2 is very reduced compared with the increase in dimension 1, Target option is not losing its strong position for dimension 2, but sharing it. This theory does not predict any changes in competitor attributes perceived attractiveness.

- **H2:** The perceived attractiveness of dimension 1 for Target is higher in the decoy set with DR than in the original choice set.
- **H3:** The perceived attractiveness of dimension 2 for Target is lower in the decoy set with DR than in the original choice set.
- **H4:** The increase in the perceived attractiveness of dimension 1 is significantly higher than the decrease in the perceived attractiveness for dimension 2 in the decoy set with DR than in the original choice set.

Regarding the inclusion of the DF option, assuming an analogous argumentation to that developed for the DR choice, where behavior of a nearly dominated decoy was assimilated to an asymmetrically dominated decoy, the following assumptions result:

- **H5:** The perceived attractiveness of dimension 2 for Target option is higher in the decoy set with DF than in the original choice set.
- **H6:** The perceived attractiveness of dimension 1 for Target option does not change when adding a DF decoy to the original choice set.

Concerning the choice set where both decoys are included, the properties of each of them are supposed to be additive. Focusing on dimension 1, the inclusion of the DF decoy option maintains Target's perceived attractiveness for dimension 1 unchanged, as it is still the worst in the choice set. However, when DR is also included in the choice set, the range of this dimension is increased. In this new context, target option loses the worst position in this dimension and therefore its range value for this dimension increases. Referring to dimension 2, DF presence leads to a higher perceived attractiveness for the Target option. On the

other hand, DR represents slightly a better value than Target's value for dimension 2. This fact, leads to a decrease in the range value for this attribute, which compensates the prior increase produced by the presence of DF. Following these assumptions, two hypotheses are presented:

- **H7:** The perceived attractiveness of dimension 1 for Target is higher in the decoy set with DF and DR than in the original choice set.
- **H8:** The perceived attractiveness of dimension 2 for Target remains constant respect to the original choice set.

Note that there is no need for a hypothesis concerning an overall balance of the changes in attribute values produced by this type of decoy because its effect favoring the target is directly deducted.

2.3.1.4 *Density principle*

The density principle derived from the distance-density theory has been applied in previous decoy research (Glazer et al., 1991; Pechtl, 2009). It postulates that two objects in a space region are perceived as less similar when a new third object appears, located next to one of the original options. In this new context, there is a denser region formed by this pair of objects, which is perceived as a standard region in terms of attribute values. This standard constitutes a new subjective reference point from which evaluation of the isolated alternative is made. In this case, the changes in perceived attractiveness of particular dimensions are only evaluated for the competitor option. When adapting this principle to the proposed scenarios in Figure 2.1:

- **H9:** The overall perceived attractiveness of the Target remains unchanged for both types of decoy.
- **H10:** The perceived attractiveness of dimension 1 for Competitor is higher in either the decoy set with DR or DF than in the original choice set.
- **H11:** The perceived attractiveness of dimension 2 for Competitor is lower in either the decoy set with DR or DF than in the original choice set.

Regarding the double decoy choice set, the standard region formed by the DR, the DF and the target is denser than in the previous cases. This situation leads to stronger effects than in the situation where only single decoy is included in the choice set.

- **H12:** The overall perceived attractiveness of the target remains unchanged for the double decoy choice set.
- **H13:** The perceived attractiveness of dimension 1 for competitor in presence of both DF and DR in the same choice set is higher than in either the decoy set with DR or DF or the original choice set.

- **H14:** The perceived attractiveness of dimension 2 for competitor in presence of both DF and DR in the same choice set is lower than in either the decoy set with DR or DF or the original choice set.

2.4 CHOICE SET DESIGN IN AIR TICKETS

The particular characteristics of the air ticket as a product or service to be considered regarding the design of decoy options are the following: first, a strong inclination of the user for the price. There is an imbalance between the importance of the primary attribute, the price, and the rest of attributes that could characterize the product. Moreover, one could have great difficulty in identifying a representative and relevant second attribute, which could be associated with air tickets due to the variety of additional attributes in the form of add-on or extra services presented by different airlines.

Usually, in these studies, the product is represented by two separate attributes. They must represent a continuous variable or at least have sufficient levels so they can be understood as such. Given the importance of price in airline tickets, this would be one of air ticket attributes. Regarding the second attribute, a quality continuous measure in a hundred points scale has been considered. In the survey, quality is referred as a continuous measure reported by some of the company's frequent customers in which customer satisfaction is represented with different on board services and features such as quantity and quality of meals, pitch between seats, general comfort and personal attention. This fact lets customer to focus not just in one specific attribute but in a general idea of service improvement due to a higher price, leaving away multiple customer particular preferences that could vary across different groups of population which could bias the experiment.

Incorporating this information in Equation 2 the final approach model is obtained as follows:

$$AT_i = Wp \cdot Vp_i + Wq \cdot Vq_i + K_i \tag{3}$$

Where AT_i represents the overall attractiveness value of one particular alternative, Wp is the context dependent weighting of attribute *price* and Vp_i represents the context dependent perceived attractiveness of this attribute for alternative i, either the target or the competitor. The same reasoning applies to the second term of the equation for the attribute quality. K_i represents the value added of each of these alternatives.

2.4.1 *Justification for a no-choice option*

In most experiments with this type of decoy options, intended to generate attraction effect, informants cannot opt for not to choose any option, what in real life would be not to buy. However, in a situation of decision making in a real purchase, the user is not required to purchase one of the products offered within the range that is presented and they just cannot

buy or just buy the product elsewhere. This situation may occur when the user is not able to easily justify the reason of choosing one alternative over the other (Dhar, 1997).

The purchase is made only when there is a clear preference for a product or when the cost of delay or failure to complete the purchase is high or the product is urgently needed (Dhar and Simonson, 2003). The probability that the user chooses not to choose is directly proportional to the difficulty of decision-making process, usually linked to uncertainty and doubt because no alternative is sufficiently relevant or attractive to the consumer. This situation leads to emotional stress (Luce, 1998) because when the choice is made it implies the attractive attributes of the alternatives not selected to be missed.

The inclusion of the option of not to choose depends deeply on the nature of the product. In the case of products considered as low involvement products (e.g., eggs, coffee, bread) it makes no sense to include this option in the experiment as the cost to the consumer when not purchasing these products at the time of purchase would be too high for the option not to choose to be considered. In contrast, products with high involvement are more likely to produce a process of procrastination on the user decision (e.g., video cameras, travel). The following studies, due to the nature of the product as well as the purchasing process, include a no choice option in order to prevent any bias that could result from forced choice.

In the three option set either including DR or DF, the presence of the nearly asymmetrically dominated option is likely to enhance consumers' confidence that the target alternative is a good choice (Huber and Klein, 1991; Simonson and Tversky, 1992). In the original choice set, uncertainty and cognitive stress due to the fact that each option has advantage on one dimension and disadvantage in the other, would probably led to an increased popularity of the no-choice option (Dhar and Simonson, 2003) Therefore, one could expect the share of the no-choice option to be reduced when either DR or DF is included in the original choice set.

Notwithstanding, the complexity of the choice process when both decoys are at the same time introduced could lead to cognitive stress as prior mentioned. Comparisons between an increased number of options could attenuate the attraction effect generated by these decoys in terms of reducing the proportion of the no-choice option. Therefore, in the double decoy choice set, the increased complexity of the choice task could have no effect in the proportion of respondents who choose the no-choice option.

- **H15:** the inclusion of a decoy option within the choice set leads to a reduction in the share of the no-choice option.
- **H16:** The inclusion of the double-decoy within the choice set has no effect in the share of the no-choice option.

2.5 METHODOLOGY

2.5.1 *Overall description of the experiment*

Participants were a mixed sample of 466 graduates and undergraduates from different universities (average age: 26.92, std: 11.83). This experiment has decoy type, DR, DF, or DD (double decoy) as the basic design variable, which was manipulated between informants. A choice set was randomly assigned to each of the informants. Three different choice sets were constructed for the same product category, air tickets covering the round trip between Barcelona-New York. DR decoy was constructed by using a slightly better value than the target alternative on its dominant dimension and a poorer value than the target in its weak dimension. DF decoy was constructed by using a slightly better value than the target in its weak dimension and a poorer value than the target in its strong dimension. Nearly dominated decoys are introduced in order to prevent customers from over-analyzing the choice set because of the presence of an illogical option which could be, for example, offering the same quality at lower prices. Any bias because of this is eliminated in order to enhance experiment reliability, specially when considering that the product category in which the experiment is developed has suffered from consumer distrust toward the, sometimes, confusing purchasing process with hidden charges or extra fares.

Prices offered result from an early stage of the study in which a group of 20 undergraduates with international flight experience elaborated a most-common prices range for this route. These ranges were reduced by a 1.5 factor in order to avoid extreme values. Decoy options were designed to fit this common-prices range. All materials and instruction were presented as a survey in paper format aiming to understand consumer preferences in international flights. Each choice set was presented as a 3x2 matrix with rows corresponding to the alternatives and columns corresponding to attribute values. Participants were asked to make their choice in the first page with no more information than the alternatives and the instructions. Once the choice was made, they were told to proceed turning the page in which attribute importance and attractiveness ratings for each dimension and every alternative have to be rated in a 7-point Likert scales with 1 representing the lower value of attractiveness. The use of 7-point Likert scales, instead of the more traditional 5-point scales or a good / neutral / bad options, allows to enhance statistical power since reduces scale coarseness. Coarseness appears when a construct that is continuous in nature is measured using items such that different true scores are collapsed into the same category (Aguinis et al., 2009). All the experiment was conducted in Spanish.

2.6 RESULTS

2.6.1 *Presentation and structure*

The results are presented in two sections. The first examines the performance of the different decoy options through two key points: the increase in the proportion of users who finally chose the target option and the variation in the proportion of users deciding not to buy. This later point is represented by those choosing the no-choice option. Next section examines the results of ANOVAs conducted separately for variations in dimensions' weights as well as variations in attractiveness ratings and in overall attractiveness inferred from Equation (2). These studies were conducted for both target and competitor options. Differences existing in the relative weight between attributes as a function of decoy presence are also examined.

2.6.2 *Decoy performance*

Results from separate chi-square analysis seeking performance differences are reported in Table 2.1 for both the target and the no choice option across groups. For each type of decoy the analysis is conducted for evaluating the change in choice proportion as well as the change in the percentage of users who choose not to buy.

Table 2.1: Choice proportions and chi-square analysis for the target and the no-choice option in the three hypothetical choice sets.
Note. DR, nearly dominated range decoy; DF, nearly dominated frequency decoy; DD, double decoy (DR+DF in the same choice set); Core, core set

	Target option		No-choice option	
	Choice proportion	Chi-square	Choice proportion	Chi-square
Core	0.29	-	0.10	-
DR	0.65	25.58[a]	0.01	4.07 [c]
DF	0.44	4.49[c]	0.01	6.01[c]
DD	0.48	7.12[b]	0.04	2.43

[a] $p < 0.001$; [b] $p < 0.01$; [c] $p < 0.05$; [d] $p < 0.1$

The decoy effect should be reflected in a significant effect of the presence of either DR or DF in the choice set on the proportion of users who choose the target option. For the DR decoy, the predicted bias is obtained as the variation in the proportion of users who choose the target significantly varies across groups. It is important to note that under DR, share distribution hugely varies from a situation in which choice proportion is, approximately, 0.3 for target and 0.7 for the competitor in the core set, to a 0.65 for the target and 0.35 for the competitor. Proportions are nearly inverted under DR. The proportion of users

which choose the decoy option in every situation is assumed to be negligible. Referring the inclusion of DF in the choice set the effect is also significant regarding changes in target's choice proportions. Concerning changes in the selection of the no-choice option, both decoys are found to have a significant effect as expected in H15.

Regarding the double-decoy choice set, it could be observed that it also increases the proportion of users who select option Target. Nevertheless, this increase is lower than in the choice set which only includes DR as the decoy option and very similar to the effect observed in the choice set which only includes DF as decoy option. Therefore, both decoys interact and the addition of DF diminishes the overall effect of DR regarding variation of target's choice proportion. It is interesting to note that referring the choice proportion of the no-choice option, no significant variation is observed in the choice set including both decoys compared with the core set as stated in H16. The reason behind this phenomenon could be the prior referred cognitive stress or saturation which generates uncertainty in the user and, even when both decoy options are reinforcing the target in different ways, some users tend to derive their decision to the no choice-option.

2.6.3 *Shift in perceptions*

Two main shifts are evaluated and presented in Table 2.2. Mean ratings for the perceived quality of the different dimensions for both the target and competitor alternative are presented in the first four columns. The mean for dimensional weight for both price and quality attributes are also included in the table. The final two columns present the mean value of overall attractiveness for each option computed trough Equation (2) not considering the inclusion of value added at this point but the result of computing the interaction between dimensional weights and particular attractiveness rating for each attribute for both the target and competitor. Results from ANOVAs conducted on the full sample are reported in Table 2.2.

2.6.3.1 *Range-Frequency theory*

For the DR decoy, the predicted pattern by the range-frequency theory in H2 regarding the shift in attribute values of the target is confirmed as an increase in the attribute value of target's weak dimension is observed. When a more expensive option is added, the perceived attribute value of price for the rest of options increases. Concerning its strong dimension, quality, a decrease in the perceived attractiveness is observed, thus confirming H3. Nevertheless, the increase in the attractiveness of its weak attribute is higher than the decrease in the dominant one as predicted in H4. For the DF decoy, an increase in the perceived quality of the target is observed. The results confirm the logical assumption that when an alternative with less quality is introduced it reinforces that alternative with higher levels in this attribute. No significant change in the perceived attractiveness of price is observed under DF presence. These facts confirm H5 and H6. No changes in competitor attributes' perceived attractiveness is predicted by the range-frequency theory, significant variations

Table 2.2: Mean and ANOVAs analysis for shifts in attribute values for every alternative and each dimension. Moreover, dimensional weight is also analyzed and total attractiveness for each alternative is computed.
Note. DR, nearly dominated range decoy; DF, nearly dominated frequency decoy; DD, double decoy (DR+DF in the same choice set); Core, core set

	Mean of perceived price attractiveness. Vp_i		Mean of perceived quality attractiveness. Vq_i		Mean of dimensional weights. W_i		Mean of total attractiveness. AT_i	
	Target	Competitor	Target	Competitor	Price	Quality	Target	Competitor
Core	3.19	5.25	5.27	3.09	5.95	4.36	41.90	44.76
DR	4.19	5.56	4.93	2.21	5.32	3.88	41.28	37.68
	[30.56]^a	[2.81]^d	[2.98]^d	[27.43]^a	[16.20]^a	[4.39]^c	[0.09]	[19.01]^a
DF	3.04	5.45	5.95	2.44	5.09	4.13	39.36	38.09
	[0.63]	[1.16]	[11.83]^a	[14.41]^a	[26.21]^a	[1.00]	[1.52]	[15.71]^a
DD	4.00	5.61	5.23	2.28	5.70	3.63	42.28	40.11
	[19.15]^a	[24.78]^a	[0.04]	[3.51]^d	[2.40]	[9.49]^b	[0.03]	[7.62]^b

In brackets: *F* value
$^a p < 0.001$; $^b p < 0.01$; $^c p < 0.05$; $^d p < 0.1$

are found across groups, tough. Either DR or DF decoy affect competitor attribute values in the same direction: they increase competitor's perceived attractiveness in price and decrease its perceived attractiveness in quality. Both decoys have a higher price than competitor; fact that reinforces its position in this dimension. The opposite happens regarding quality, as the inclusion of decoy options makes competitor attribute values in this dimension appear even much lower than in the core set. This theory assumes no changes in dimensional weight they are significant, tough.

Regarding the double-decoy choice set, an increase in the perceived attractiveness for the weak dimension of option target is observed, confirming H7. Moreover, as hypothesized in H8 the interaction between DR and DF among dimension 2 implies that the perceived attractiveness for this dimension remains unchanged.

2.6.3.2 *Density principle*

The space denser region is formed by the pair target-decoy/s in both three-option choice sets. As this region is taken as a reference point for judgment and alternative attractiveness valuation, competitor attributes' perceived attractiveness would change. Referring quality, a decrease in its perceived attractiveness is observed, as stated in H11. Moreover, H10 is also confirmed as price perceived attractiveness for competitor increases when a decoy option is included in the choice set. No changes are assumed for the target overall perceived attractiveness, as this theory considers no change in dimensional weights or changes in target attribute perceived attractiveness. H9 is confirmed because the overall attractiveness remains unchanged for this option but as prior mentioned assumptions are not fulfilled one could not validate this hypothesis but just consider it a mathematical coincidence rather than theory accuracy.

Concerning the double-decoy choice set, as the space region in which most of alternatives are located is denser than in single decoy sets, an increase in the above mentioned effect is assumed. For dimension 1, a higher increase in competitor's attractiveness is observed as expected in H13. Nevertheless, referring dimension 2, despite significant variation is found, H14 is not confirmed as this variation is not greater than the found for the single decoy choice sets. The double decoy choice set also involves no change in the overall perceived attractiveness of the target, as stated in H12. However a decrease in the overall perceived attractiveness for the competitor is found, as previously reported for either DR or DF choice sets.

It is important to note that value shift processes in attribute values occur when either DF or DR decoys are included in the choice set. Nevertheless, none of the above theories can fully account for the effects observed. Concerning the total attractiveness of an option, a decrease in competitor attractiveness is observed rather than an increase in target overall attractiveness. Therefore, value shift processes tend to modify and damage competitor's perception as the target perceived overall attractiveness remains unchanged. In the next section the weight-change model is examined considering the ratings of importance for each dimension presented in Table 2.2.

2.6.3.3 *Weight-change*

When either a DF or DR decoy is included in the choice set the relative weight of the strong dimension over the weak dimension is likely to increase because of the reinforcement that the decoy option introduces for target's dominant attribute. The relative weight between both dimensions is presented in Table 2.3, obtained from direct importance ratings for each attribute. Results from ANOVAs conducted across different choice sets are reported.

Table 2.3: ANOVAs analysis for relative dimensional weight for every choice set. Differences in the overall attractiveness between target and competitor are also presented. Moreover, differences in each attribute value between both alternatives are also reported.
Note. DR, nearly dominated range decoy; DF, nearly dominated frequency decoy; DD, double decoy (DR+DF in the same choice set); Core, core set

		Relative differences		
	Relative weight. $W_{price}/W_{quality}$	Total perceived attractiveness difference between target and competitor. AT_t - AT_c	Difference in perceived attractiveness in price between target and competitor. Vp_t - Vp_c	Difference in perceived attractiveness in quality between target and competitor. Vq_t - Vq_c
Core	1.73	-2.86	-2.06	2.18
DR	1.61 [0.46]	3.60 [11.02]^a	-1.37 [9.24]^b	2.72 [3.29]^d
DF	1.40 [3.39]^d	1.27 [3.84]^d	-2.42 [2.04]	3.51 [18.25]^a
DD	1.96 [1.38]	2.18 [5.88]^c	-1.61 [3.41]^d	2.95 [6.71]^b

In brackets: *F* value
$^a p < 0.001$; $^b p < 0.01$; $^c p < 0.05$; $^d p < 0.1$

Significance in attributes' relative weight change is only found for the inclusion of DF in the choice set. Nevertheless, no significance is found for the DR decoy and the double decoy. The direction of this relative weight change is favoring target's dominant dimension as predicted by the theory in the case of DF. Hypothesis H1 is confirmed for DF and rejected for DR and DD. Despite this change in attribute weights for the inclusion of DF, p-value is relatively high, therefore it is possible to conclude that weight change processes do not always occur for every type of nearly dominated decoys nor the double decoy and, for this particular conditions and experiment, the effect of weight change is, in spite of being significant for a single case, reduced.

2.7 DISCUSSION OF THE RESULTS

As reported in the results, the efficiency of decoy options in increasing the proportion of users choosing target option is completely proven. Moreover, the inclusion of both options contributes to the decrease of the proportion of users who choose not to choose any available option being DR the option, which generates the strongest effect.

One of the aims of the study is to exhaustively evaluate the processes which provide explanation for decoy effects for the specific product category of air tickets, and further obtain empirical data about the interactions occurring among these two types of decoy. These results may not be generalizable for different product categories even when presenting similarities either in purchasing processes or product structure. Although two theories have been adapted in this study to explain value shift, none of them is able to predict the observed changes in perceived attributes completely, as in previous studies (Petchl, 2009). Both theories assume no change in dimensional weight they occur, tough. The density principle seems to be the most robust explanation to evaluate changes in overall attractiveness for the different decoy options. It is important to note that both price and quality are operationalized in a metric scale. Information mode has found to be affecting the cognitive processes likely to be produced by the addition of decoy options in the choice set (Sen, 1998). This fact should be considered when including other dimensions instead of a metric quality scale to account for other particular services or singular add-ons.

The empirical results obtained show that shifts processes affect the overall attractiveness of the competitor, reducing it, rather than increasing the target's. These results are in line with other studies, which also found shifts in perceptions for the competitor when introducing decoys in the choice set (Moran and Meyer, 2006; Pechtl, 2009).

Regarding the interactions between both decoys when included in the same choice set, it is interesting to highlight possible explanations for observed differences in the results of the prior studies. First, the non-decrease in the proportion of the no-choice option under the presence of the double decoy could be explained by the cognitive stress due to the addition of more options rather than for trade-offs. One could assume that the no-choice proportion in the core set stems from uncertainty and stress derived from trade-offs. As one of the main effects of decoy options is to diminish the proportion of respondent uncertainty when comparing options' overall attractiveness, cognitive stress due to trade-offs between possible choice are assumed not to be present for the double decoy choice set.

2.8 CONCLUSIONS

Although decoy effects have been reported as a stable and robust phenomenon in the literature in multiple products, the particular singularities of air tickets as a product category required empirical validation for evaluating its compatibility with the use of this technique. The choice sets included in the experiment fit the current situation of commercial aviation market in which every day more passengers tend to buy the cheaper option (Mason, 2000).

The contribution of this study has two main elements. First, results concerning the empirical validation of both the range-frequency theory and the density principle highlight the need of developing a more robust theory, which can account for changes in the perceived attractiveness of the attributes for the Target and at the same time provide explanation about how the Competitor is damaged by the inclusion of the decoy option more than enhance the perception of the Target.

Moreover, new lines of research are opened as interaction between different types of decoys is introduced. The aim of this study is not to provide a robust report of double decoy effect but to explore it in order to provide alternative solutions for commercial aviation purchasing processes. The study and development of synergistic decoy choice sets, in which the presence of extra decoys reinforce the yet reinforced target, would surely provide new lines of research, open new questions and enrich the theory.

Managerial implications are huge, specially for this product category in the prior mentioned market conditions. Airline marketing and revenue departments would increase the profitability of the sequential decisions of their purchasing processes as they implement decoy options in order to drive users' attention to those targeted alternative. This could be implemented without restriction either for the basic air tickets purchasing processes or those for extra services or add-ons airlines could offer. Moreover, the addition of decoy options reduces the proportion of users who finally decide to defer their decision so, even when they are not purchasing the targeted option, they are actually buying something, fact that definitely is a better situation than the no-choice option.

1

3 DECOY EFFECT PERFORMANCE UNDER COGNITIVE EFFORT

3.1 ABSTRACT

When considering the integration of decoy options within most of the common purchasing process one key question arises: Is it possible to assume that decoy performance would remain unaltered, not-biased and unaffected by the previous experiences of the individuals? This study addresses this question, focussing on the effect of fatigue driven by high cognitive effort on decoy performance. Five different groups of individuals are faced with sequential decoy options after being exposed to different levels of cognitive effort.. The results validate the assumption that higher levels of cognitive effort increase the performance of decoy options and provide valuable insight for considering practical implementation. Further lines of research based on the experiment results are also discussed.

3.2 INTRODUCTION

Product sequential configuration is an inherent part of many web-based purchasing processes in which, once a base product has been selected, either its components or additional features are to be configured or included along sequential decision processes. This structure is built-in on multiple choice sets representing the different product attributes to be presented containing a restricted number of possible alternatives that account for each category level available.

Focusing on the choice set as the principal structural element integrating the purchasing process, understanding it as the field where the decision process occurs, contextual effects have been found to influence choice decisions contradicting standard assumptions of rational decision making. Extensive literature on the use of decoy options, which were first introduced by Huber et al. (1982), has contributed in creating a theoretical framework to understand the cognitive processes underlying the influence of decoy options in choice as well as examining the robustness of these effects across different situations.

The introduction of an additional available option into a choice set can induce different contextual effects depending on the relative position of this alternative to the rest of options in the choice set. These are the similarity-substitution effect, the compromise effect and the attraction effect (Pechtl, 2009; Pettibone and Wedell, 2007). Moreover, when manipulating the availability of the decoy option at the moment of purchase it is possible to generate an additional contextual effect called the phantom effect (Pratkanis and Farquhar, 1992) Of these contextual effects, the attraction effect, induced by asymmetrically or partially dominated decoy options, has received considerable attention in the literature through its

theoretical analysis combined with empirical applications in decision processes. Among the later, the effectiveness of decoy options willing to generate attraction effect has been found to be influenced by its interactions with other elements, specific of choice set configuration and design as well as by individuals demographic and cognitive characteristics (Sen, 1998; Kim et al., 2006). However, this body of research has limited its focus to the interactions occurring within a specific choice-set, isolated from the sequential decision chain occurring in product configuration web-based purchasing processes.

In this paper, the effectiveness of dominated decoy options willing to generate attraction effect is examined considering the whole sequential choice process as part of the individuals' cognitive frame (Tversky and Kahneman, 1981) when facing the decoy choice set. Hence, we propose an experimental design to test if the presence of previously encountered choice sets, which include, or not, decoy options, would affect the effectiveness of subsequent decoy options in later choice sets.

Research concerning order effects in purchasing processes has been developed for isolated choice sets, focusing on the effects of ordering its options (Carney and Banaji, 2012). The importance of choice set order in the effectiveness of contextual effects generated by decoy options has, to our knowledge, remained unexplored.

To account for this order effects in the effectiveness of the attraction effect we next introduce the theoretical framework describing the cognitive processes generated by the attraction effect and propose an extension to include the order effects based on the minimization of cognitive effort through justifiability of own decisions. Our hypotheses will be tested through two experiments.

3.3 THEORETICAL BACKGROUND

The general multiattribute utility (MAUT) framework (Von Winterfeldt et al., 1986) provides quantification for relational aspects among alternatives in a specific choice-set. Classical stochastic full information model for consumer decision state that an individual's choice is driven by an utility maximization principle based on the information available about the product, its attributes, and other related information that may cause an impact in consumer behavior. Understanding utility of an option as consumers' total perceived attractiveness for this option, it is possible to separate it in two aggregate terms. The first term is related to the evaluation of the assigned importance or weight of each of the attributes presented by every alternative in the choice set. It also references the perceived attractiveness of each alternative for every attribute based on the levels presented in each of them. The second term is related with external factors, elements or cognitive processes that could affect the attractiveness of an option which could not be evaluated in terms of weights of the attributes or perceived attractiveness of the levels of those attributes for each alternative. These external factors are mostly present when decision makers face a choice in which one alternative is superior to another for a specific attribute but it offers lower levels than the former for, at least, another attribute. In this situation the individual will probably bring additional criteria into the

decision making evaluation process (Pettibone and Wedell, 2007). Justifiability of choice for oneself or others is one possible criterion as stated by (Dhar and Simonson, 2003). When individuals face choices among equally attractive alternatives they tend to choose those which they can justify more easily (Pechtl, 2009).

Adding a third option acting as a decoy into a choice-set leads to alterations in the previous introduced values of attribute weight through the weight-change model and in the perceived attractiveness for each alternative for every attribute through the value-shift model (Pettibone and Wedell, 2007). Their interaction correspond to the first term of the MAUT mentioned earlier. Moreover, it could act as a source of justifiability for the decision maker, because the target option is now seen as an alternative with no disadvantages respecting the decoy as it presents the same or slightly lower levels in one attribute but higher levels in the other. This process is known as the value-added process which acts as a cognitive resource in decision making (Pechtl, 2009).

For isolated choice sets containing decoy options, the above mentioned processes have been identified changing the total perceived attractiveness of the options integrating the choice set with the decoy option with respect to the original set. This pattern of processes of shifts and value addition through justifiability may not maintain the same structure when sequential choice sets either containing decoys or not are presented to the costumer. When consumers are engaged in routines or habitual choices they could adopt a simplification decision heuristic or a cost minimization strategy following a choice pattern that previously drove them to a satisfying choice (Howard and Seth, 1969; Adamowicz and Swait, 2013). An important point would be to identify what a satisfying choice is and which cognitive processes this identification involve. From the prospect theory (Kahneman and Miller, 1986; Kahneman and Tversky, 1979) it is suggested that people will tend to choose those alternatives whose perceived gains are higher than their perceived losses to a reference point. Based on this assumption and extending it to a choice set within a decoy option, the target alternative will always represent the justifiable choice in terms of gains and losses analysis because, when taking the decoy option as a reference point, the fact of choosing the target option involves no losses but gains. However, choosing the other option, the competitor alternative, will lead to an increase in gains but also to an increase in losses value. As losses are more valued than gains, the perceived attractiveness of the target option remains higher than the competitor. (Pratkanis and Farquhar, 1992).

The cost-benefit trade-off theory (Payne et al., 1993) defines choice as a result of a compromise between the desire to make a correct decision and the desire to minimize effort. According to it, individuals initially examine the available alternatives to determine whether they can make a satisfactory decision expending minimal cognitive effort. They only engage in exhaustive analysis on the relation between the alternatives if, because of the choice set configuration, the preliminary evaluation could not result in a satisfactory choice.

Moreover, Wansink and Sobal (2007) suggested that for certain categories consumers make decisions without conscious consideration of the options. Hence, it is unlikely that

they will invest significant effort into the evaluation or comparison of alternatives under certain conditions, like routine or repetitive choices.

To sum up, in addition to decreasing the cognitive costs of choosing an alternative, consumers also seek to increase the ease with which a choice can be justified and reduce the experienced negative emotion (Bettman, 1988). Thus, as decoy options increase the justifiability of choosing the option target, it seems it could be understood as an "easy choice" for the customer, not willing to spend too many cognitive resources in alternative evaluation.

As introduced earlier, the decoy becomes a reference point from which the target option presents the higher ratio of gains versus losses, always considering that losses are more valued than gains. Thus, as consumers try to maximize satisfaction and to avoid negative emotions associated to the perceived losses derived from the choice, associated with regret (Tsiros and Mittal, 2000), the experience of choosing the targeted alternative would mostly fulfill this inherent expectations. Moreover, this does not happen exclusively through processes of value added but also because shifts in either the perceptions about the relative importance of the attributes, which change is explained by the weight-change model; or the perceived attractiveness of each alternative along each dimension, which change is referred as value shift and is explained by several theories. When these processes are evaluated in isolated choice sets, independently from the question of occurring simultaneously or not, they reflect the mechanisms of influence in perceptions of decoy options only based on the specific conditions and context of this choice set configuration. How are these mechanisms altered when facing a sequence of choice sets before making the decision and how are the effectiveness of decoy options influenced by this fact are questions yet unaddressed.

For the purpose of this article we will leave aside the discussion about how this processes interact with each other or whether they occur simultaneously or not. Instead, a cognitive-focussed perspective considering cognitive-effort and cognitive-momentum is adopted to evaluate each term of the MAUT in order to account for the influence of sequential choices in the effectiveness of the attraction effect. Theoretically, both are not mutually exclusive as the cognitive-effort approach accounts for changes in decoy effectiveness due to the accumulated fatigue in the previous choice sets and the natural predisposition of the individuals to minimize the resources involved when making a decision, and the cognitive-momentum approach is focussed on how an individual is prone to repeat the previous cognitive strategies and patterns that lead him to satisfiable choice, outcome usually reinforced by the decoy option when choosing the target.

From eq. (1) (MAUT) two different terms are differentiated. The first accounts for the interaction between the given attribute weight and the perceived attractiveness of the levels of the alternative in this attribute, while the second stands for the contribution of the value added, driven by justifiability, to the overall attractiveness of the alternative.

3.3.1 *Cognitive-effort*

Cognitive effort has been the focus of numerous studies in psychology (e.g., Fiske and Taylor (1984)), decision theory (Tversky and Kahneman (1993)), and economics (e.g., Conlisk (1996); Herrnstein and Prelec (1991)). A consistent finding is that humans have limited cognitive resources and allocate them judiciously (Payne, 1982; Russo and Dosher, 1983). Cognitive effort or thinking has been seen as costly and humans have been described as "cognitive misers" expending only the effort necessary to make a satisfactory, rather than an optimal, decision (Garbarino and Edell, 1997).

There are situations where it is not possible to know or accurately predict how much effort will be required before the effort is expended (Kleinmuntz and Schkade, 1993). For example, in a study of choices among loan applicants, Fennema and Kleinmuntz (1995) found that the correlation between the effort respondents anticipated putting into the choice and the actual effort expended was quite low (r =.16).

Furthermore, the ability to accurately estimate the effort required did not improve over 24 choices, even with explicit feedback. It appears that decision makers do not accurately estimate their own cognitive effort even in highly structured tasks with explicit feedback and multiple opportunities to learn. Because they are unable to forecast the necessary cognitive effort, there may be many situations in which consumers expend more processing effort than they would like.

Russo and Dosher (1983) defined cognitive effort as the total amount of cognitive resources needed to complete a task. It is widely assumed that when making decisions or evaluating options individuals tend to minimize the cognitive effort involved in the task (Bettman, 1988; Bettman et al., 1990). A reason for this could be the widely assumed premise that assessing the utility of an option requires spending limited mental resources (Levav et al., 2010; Ortoleva, 2013). The number of options involved in a specific choice task does also play an important role in determining how levels of cognitive effort would be affected along the purchasing process, as the cost of evaluating options could be assumed to be convex, that is, evaluating the next option within the choice set requires more resources than were required for the previous alternative (Levav et al., 2010). This aspects are taken into consideration when conjecturing about how higher levels of cognitive effort generated by previous decisions affect the performance of decoy options in subsequent choice sets as well as in considering the manipulation of cognitive effort in the conducted study.

Regarding the cognitive effort involved in generating and quantifying each term of the MAUT by the individual, the value added term is understood as a mostly qualitative interpretation of gains and losses, as a source for justifiability. In this process few quantitative processing is involved, only that required to identify the targeted alternative as the one involving no losses, taking the decoy option as a reference point; which is much less than the cognitive effort required to quantify the first term of the MAUT, where an exhaustive evaluation in terms of attribute importance and perceived attractiveness of the attributes for each alternative in the choice set is needed.

As individuals tend to search choice-satisfaction or no-regret, trying to minimize the cognitive effort spent in choice set evaluation, considering that cognitive-effort is not specific of an isolated choice set but cumulative through the whole purchasing sequence, the attraction effect induced by a decoy option would act as an exhaust valve, increasing the influence of justifiability over the individual and reinforcing the effectiveness of the decoy. This exhaust-valve effect would be greater the more cognitive effort has been accumulated along the previous choice tasks. As the individual faces choice tasks that involve cognitive effort derived either from trade-off evaluation and comparison of equally attractive alternatives or from large numbers of alternatives, he is accumulating fatigue so he would be more prone to adopt the value added through justifiability strategy or simply give more importance to it when evaluating the choice set containing the decoy option rather than engaging in exhaustive evaluation and comparison of the different alternatives. Hence, the main influence of sequential purchasing processes over the effectiveness of decoy options inducing attraction effect due to the cognitive effort involved in the previous choice sets, would be driven by changes in the perceived justifiability of an option rather than by changes in the weights of the attributes or by shifts in its perceived values. As available mental resources decrease because of previous effortful choices, the difficulty of evaluating the different options, and find any above the minimum utility threshold of the individual, increases (Levav et al., 2010). This fact prompt them to prefer those options which are easier and simpler to process.

At this point, the introduction of decoy options enhance the processing of the targeted option by placing them in a prominent position in the choice set, letting individuals to identify a satisfiable option without spending many resources in the evaluation process.

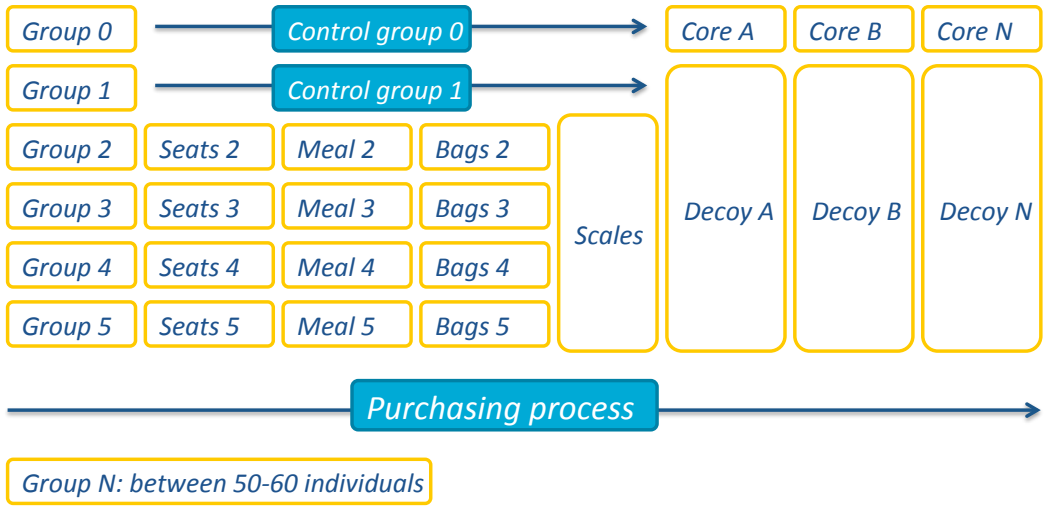
One more choice-set specific perspective is suitable to conjecture about this interaction. It has been reported in previous research about how cognitive effort affects choice processes (Garbarino and Edell, 1997). They reported a positive interaction between the cognitive resources spent in evaluating an alternative and the generation of negative affection towards it. Thus, even when both the target and competitor had equal valuation in terms of attribute levels, as target's evaluation is easier because of the presence of decoy, negative affection generated towards competitor would also damage its perceived attractiveness.

- **H1:** Decoy effectiveness increases as the fatigue driven by cognitive effort made in previously encountered choice sets increases.

3.4 EXPERIMENT

In this study we manipulate the cognitive effort required for evaluating the alternatives within a choice set across sequential choice sets in order to evaluate how the levels of fatigue derived from previous cognitive effort interact with the effectiveness of the attraction effect. Six different types of purchase sequences are configured. Each sequence is randomly assigned to every unique participant conforming up to six different groups of them.

Figure 3.1: Experimental design. Overview



Every version of the survey has three main parts, without considering the experiment briefing and the collection of demographic characteristics. First part comprises choice sequences which objective is to manipulate the levels of cognitive fatigue of the individuals. The second part comprises the scales, measuring different aspects related to satisfaction that will be presented in detail later. This part presents no difference between sequences. Finally, the third part presents the individuals with different choice sets, containing, or not, decoy options, in order to measure how this previously manipulated cognitive effort affects the performance of this decoy options.

The visual schema for all the survey versions is presented in Figure 3.1.

The first two versions are configured without including the manipulation of the cognitive effort in the first part, so as to obtain a reference of the attraction effect performance for the proposed choice design. For group (0), Individuals directly face a sequence of core choice sets, containing only two options, standing for Target and competitor. A total of 5 choice sets are answered by this participants. For group (1), the configuration is the same with the exception of the decoy option included in the previous core sets. As previously mentioned, these two groups stand for control purposes, with no cognitive effort manipulation.

The structure for the rest of the groups include the addition of different manipulated choice sets, introduced before the scales and decoy parts. The provided information about the alternatives remains equal for the whole purchase sequence no matter its type. Sequence one and third account for bias effects derived from the inclusion of the manipulated choice set.

3.5 METHOD

3.5.1 *Procedure*

The study represents a real airline ticket booking process and was conducted individually through a website specially designed for this purpose. The participants were provided with a link to the website. Each of them were randomly assigned to a unique version of the questionnaire. The respondents were told to be in a real purchasing process of booking an international flight air ticket roundtrip from Barcelona to New York. They were informed that the dates of their flight had been already selected considering a date requirement related with the aim of the travel. The study adopts a real design for the experimental purchasing process in order to extract data and results, obtained under conditions very similar to reality. Individuals are firstly faced with a short briefing in which the collection of demographic and socioeconomic data was also included. Concerning this briefing, it was integrated by three separate pages, linked by a «continue» button. In the first page the participants were welcomed and presented with the experiment and its conditions, informing them about the situation they are facing as customers. In the second page they were asked about different socioeconomic and demographic parameters before continuing to the last and third page of the briefing which consisted on the presentation of the fictitious airline in which website they are booking the ticket: Aernova. Different aspects about the airline were presented in this page covering aspects such as the aim of the company, the routes in which the company is currently operating, and their fleet characteristics among others.

After finishing this last briefing page, which was inserted in order to contextualize the customer in the situation and also to make them more familiar with the fictitious company, the purchasing process itself starts. The website design and the distribution of its main elements are presented in Figure 3.1.

The distribution of the elements were made considering usual designs currently implemented in different real airline websites in order to enhance individuals' immersion. The main elements are the price column, situated on the left, in which the customer could see the base price and those features she selected, the central display of sequential configuration including the air ticket features and the calendar. The price of optional services is added to the base price so the customer is always aware of the final price she is paying by looking at the left down corner of the website. In the center frame of the page, different features of the air ticket are sequentially presented. The respondent could not see the next proposed feature unless she has already made choice for the current one. Every option included in the choice set has two types of information without considering its name: a short description of the option characteristics when necessary (i.e. different luggage options) and the price. The price is detailed for all the options included in the choice set except for those options which are already included in the base price, which appear labeled as «included». In the right upper corner of the page the respondent could see the typical calendar that appears

in most real airline websites. This prices were static and common to all the respondents, independent from the assigned survey type.

3.5.2 *Experimental design*

In this study, the different survey versions account for manipulations in cognitive effort as well as for the introduction or not of the decoy options in specific choice sets. The sequential configuration process, through which cognitive effort is manipulated, consists on 3 features, always presented in the same order for all versions of the survey in order to avoid order effects.

Cognitive psychology studies suggest that those items located at the beginning of a group would attract more attention (Hogarth and Einhorn, 1992). Moreover, they establish a cognitive framework from which subsequent alternatives are evaluated, serving as an anchoring point that would diminish full consideration of the other options (Krosnick and Alwin, 1987).

In this study, feature configuration order was decided after examining sequential configuration processes of real airlines. Most of them follow the logic of placing the most important features, such as seat or bag selection, at the beginning of the configuration process. Gabaix et al. (2006) predicted that consumers usually do not manage their cognitive resources appropriately along the whole choice sequence. They focus on the current decision behaving as it is practically their last (Levav et al., 2010). Considering this, placing the most important and common features of the product at the beginning of the configuration sequence would assure that individuals would engage in alternative evaluation, spending their mental resource in the process. For this reason, the manipulation of cognitive effort were made on the three first choice sets comprising seats, meal and baggage selection so as to assure the respondent would spend their cognitive resources at this early stage of the purchasing process so bias derived from this cognitive fatigue could be appreciated in the subsequent stages. Most important features were selected for this manipulation because an individual would only spend cognitive resources in evaluating the different options and considering their trade-offs, just once she had decided she would like to include this features in her final product. Since most important and basic features are more prone to be included in the final product, the manipulation is introduced at this point. Introducing them associated to less common features, such as VIP services could lead the individual not to engage in evaluation of the different options just because she has already decided she does not want to include the feature in the product, fact that would not led to an increase in her levels of cognitive effort and fatigue.

The manipulation consisted in increasing the complexity of this three choice tasks by two different mechanisms: increasing the number of options which leads to a higher number of evaluations and comparison made for the choice set and, independently, increasing the difficulty of the task by increasing the quantity of information associated to each option.

Regarding seat selection, the manipulation was done increasing not only the types of available seats but also presenting a complete aircraft seat distribution in which the respondent, after evaluating which type of seat would fit their needs, would select exactly a particular seat in the aircraft among the available options. In this scheme the occupied seats were also included. Each type of seat were identified by a unique color. Concerning the manipulation on the meal selection choice set, it was also introduced by increasing the number of available options. In this case the information of the options was not altered. This manipulation does only affect this three first choice sets, introducing the cognitive effort of individuals as between-subjects factor.

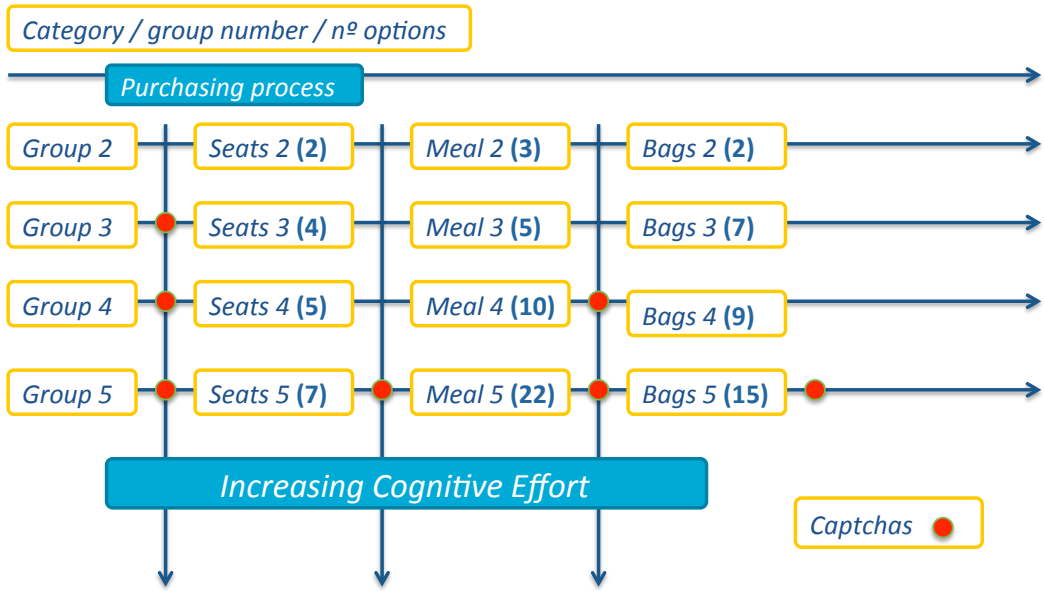
The second manipulation introduced in this study is the addition of decoy options to some of the choice sets presenting configuration features. This decoy options are added in those choice sets which are not affected by the prior introduced manipulation for cognitive effort in order to avoid their interaction in the same choice set. Hence, the first two choice sets introduced the manipulation of cognitive effort and the following five are added an extra decoy option within their available options. Cognitive effort manipulation is placed before the introduction of any decoy option in order to observe its influence over the performance of the later. Decoy options are added to the choice set without replacing any of the original options. Regarding the design of decoy options for the different choice sets, partially dominated decoys in range are used since they have been proved to be those performing best in generating attraction effect (Pechtl, 2009).

The targeted options for all choice sets including decoy options were those presenting a higher price. Thus, the decoy option for every choice set presented a considerable worse level than the target option for the price attribute, that is a higher price, and slightly a better level for those attribute in which the options for that feature presented a more attractive. Figure 3.2 presents the experiment schema for all the groups, including the number of options of each choice set. Captchas were also used in the screen transition process for those groups where higher cognitive fatigue is desired.

3.5.3 *Respondents*

The study was conducted on 330 individuals (69,8% male - 30,2% female / 27,2 avg. years old) through an external crowdsourcing platform. Previously, a control group of 30 individuals had evaluated the choice designs (price ranges, usability and range of options provided) to provide a first outlook on user-experience. Based on this first feedback, some minor changes and adjustments were made regarding usability and communication (web texts) before launching the final version of the experiment. There were 14 participants which did not complete the full questionnaire and were excluded from the results, so the final sample consists of 316 valid observations. All individuals which satisfactorily completed their respective experimental purchasing processes received a compensation for participating in the study.

Figure 3.2: Purchasing process. Detail



3.5.4 *Measures*

The measures collected in this study for each respondent were: the version of the survey the individual was assigned to, in which each manipulation was coded as a zero or one using a binary variable; demographic and socioeconomic data including travel habits; choices for each of the seven features configured; time of completion through two different measures: the time used in evaluating those choice sets manipulated to increase cognitive effort and the total time of completion; overall satisfaction with the purchasing process through seven point Likert scales anchored by completely disagree (1) and completely agree (7). The questionnaire evaluated three different dimensions regarding website usability and overall satisfaction: process efficiency, online satisfaction and online loyalty (Yang, 2007).

All choice sets were presented to participants on a forced choice basis (i.e., they cannot leave the choice answer blank). Previous findings in the field provide evidence that increasing the number of prior decisions to a particular decision leads to an increase in choosing the no-choice option (Augenblick et al., 2012) or the status-quo or default option (Levav et al., 2010). As the purpose of these experiment is to evaluate how increasing the number of previous decisions and thus the fatigue at the moment of choosing from the choice set containing the decoy option affects the performance of the attraction effect, a forced choice perspective is adopted in order to avoid no-choice bias due to fatigue. Moreover, the previous choice sets are designed for no single alternative having clear advantage over the other

so as not to increase the preference for a no-choice option (Dhar, 1997) what would be a possible strategy adopted by an individual to avoid spending resources in alternative evaluation. Regarding the interaction between the attraction effect and the no-choice option, two considerations are to be made. First, the no-choice option is prone to directly affect the share of those options within the choice set presenting average levels of the attributes (Dhar, 1997; Dhar and Simonson, 2003) , which is not the case for the target option in this experiment so, from this perspective, no bias is expected. In addition, when forced choice is presented, the effect of the attraction effect could be overestimated because those individuals who would have chosen not to choose if possible are instead choosing the alternative more easy to justify represented by the target option, under the influence of the decoy. This point could lead to misleading results in which previous cognitive effort would be considered as a variable increasing the effectiveness of attraction effect when what is really happening is that the forced choice context is introducing decision bias and attraction effect overestimation. This issue is easily solved introducing a control decoy choice set which already accounts for this overestimation. Far from the theoretical justification of the forced choice context for the experimental design regarding its interactions with cognitive effort or attraction effect, many real sequential purchase or product customization sequences involve a forced choice environment, since there are product features that could not be excluded from the final package either for company policies or inherent characteristics of the product, such as color, materials or main parts. Hence, the design does not only respond to specific characteristics that enable measuring the influence of previous cognitive effort over the effectiveness of the attraction effect but also represents real situations in which this information could be highly valuable.

3.6 RESULTS

The main purpose of the experiment is testing decoy effectiveness across different groups of individuals which have previously been exposed to different levels of cognitive effort. Time of completion is one of the introduced variables that is used to assess the difficulty of completion of the different versions of the purchasing process. As previously defined, 6 different groups of individuals were exposed to a series of increasingly difficult choices before facing the different choice sets used to test the performance of decoy options.

Time of completion for each group is presented in Table 3.1 along with the results of the different perception scales presented to the individuals. Cronbach's alpha is also calculated for each scale and for each group of subjects. The number of participants for each group is also included in the table.

The evaluation of the differences for each scale across groups is conducted through a one-way ANOVA analysis. Results are presented in Table 3.2.

After cognitive effort manipulation, participants faced five different choices. For each of the five choices, the control group (group 0) was only faced with two options while the rest of the groups were faced with the same choice sets plus an additional option (decoy).

Table 3.1: Sample detail - Cronbach's alpha by group

		Scale - Cronbach's Alpha			
Group	N (individuals)	SAT	EFF	LOY	Avg. time of completion (seconds)
0	54	-	-	-	76
1	56	-	-	-	73
2	53	0.923	0.82	0.901	282
3	51	0.926	0.88	0.868	392
4	52	0.876	0.862	0.803	662
5	50	0.926	0.895	0.872	877

Table 3.2: Sample detail - Average values and std. deviation for each dimension, by group

	SAT		EFF		LOY	
Group	Mean	Std. dev	Mean	Std. dev	Mean	Std. dev
0	-	-	-	-	-	-
1	-	-	-	-	-	-
2	5.13	1.64	5	1.85	5.43	1.64
3	4.98	1.84	4.85	1.87	5.16	1.73
4	4.6	1.55	4.54	1.61	4.73	1.56
5	4.1	1.66	4.24	1.91	4.43	1.73
Significance	F (3.80) ; p = 0.011		F (1.78) ; p = 0.154		F (3.67) ; p = 0.013	

Table 3.3: Results - t-test (p value). Users choosing option target vs. control choice set, by group

Significance	Group					
Choice	0 - control	1	2	3	4	5
1	-	p = (0.043)	p = (0.004)	p = (0.032)	p = (0.009)	p = (0.002)
2	-	p = (0.088)	p = (0.051)	p = (0.051)	p = (0.009)	p = (0.009)
3	-	p = (0.064)	p = (0.033)	p = (0.049)	p = (0.040)	p = (0.008)
4	-	p = (0.093)	p = (0.074)	p = (0.047)	p = (0.039)	p = (0.005)
5	-	p = (0.771)	p = (0.386)	p = (0.957)	p = (0.721)	p = (0.272)

For every group, the share of the target option is presented in Table 3.4 along with the results of the conducted t-tests for evaluating the differences between the control group versus the rest, presented in Table 3.3. A binary variable was created indicating whether the participant selected option target (=1) or did not (=0). The mean of this variable is the relative share of the option target for every choice and each group of users.

Table 3.4: Decoy performance - relative share of the option target for each choice, by group

Target share	Group					
Choice	0 - control	1	2	3	4	5
1	0.4	0.57	0.66	0.58	0.63	0.68
2	0.38	0.51	0.54	0.54	0.61	0.62
3	0.42	0.57	0.6	0.58	0.59	0.66
4	0.44	0.57	0.58	0.6	0.61	0.6
5	0.5	0.42	0.52	0.33	0.44	0.56

In Figure 3.3 the share of the target option is plotted against the group of user for each of the five decoy choice sets users are facing. There exists a clear trend: for groups with higher induced cognitive fatigue (due to increased difficulty and higher number of options in the previous stages of the experiment), higher relative share of the option target is observed. This is consistent for every tested choice set, except choice 5.

Finally, the dependence of the value of the scales for each group is tested for two different categories, those who ended up choosing the target option in the choice sets, and those who did not. Results are presented in Table 3.5. The evaluation has been conducted using a one-way ANOVA by each scale for each of the five choice sets, as presented in Table 3.6.

Table 3.5: Results - Average value for each dimension and choice output (target option or not), by group

	SAT		EFF		LOY	
	Target selection		Target selection		Target selection	
Choice	0	1	0	1	0	1
1	5.04	4.53	5.03	4.46	5.05	4.88
2	5.16	4.39	4.99	4.93	5.41	4.61
3	5.19	4.41	5.06	4.41	5.28	4.73
4	5.34	4.29	5.14	4.35	5.27	4.73
5	4.59	4.85	4.38	4.99	4.84	5.06

Figure 3.3: Share of the option target for each choice set, by group

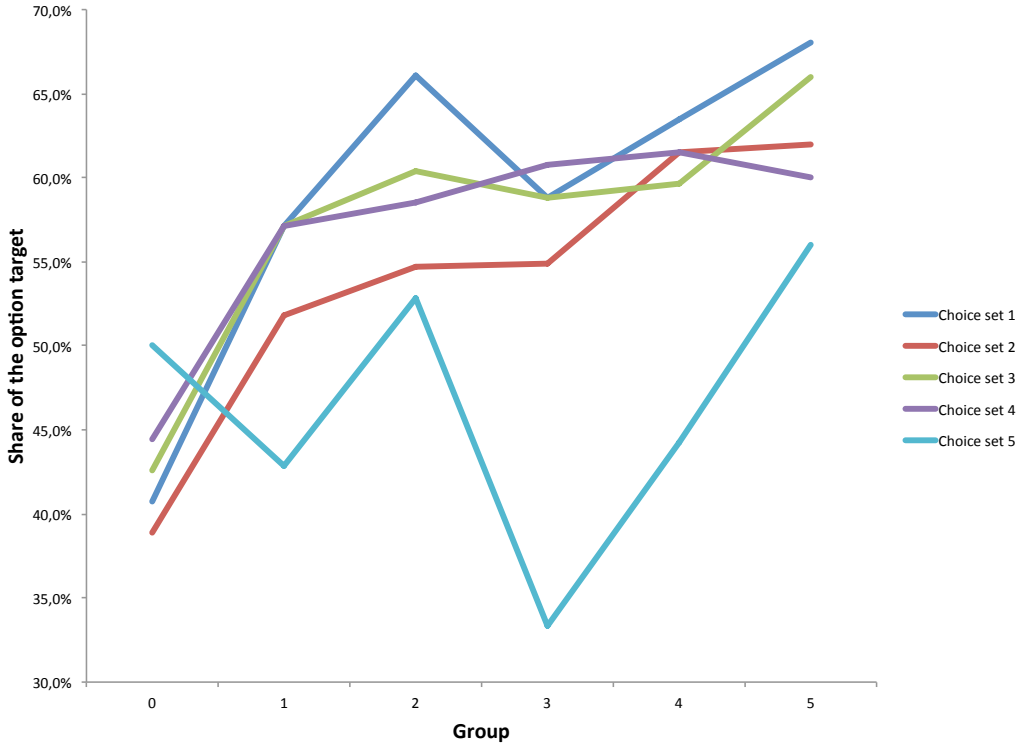


Table 3.6: Results - ANOVA (p value). Users choosing option target vs. rest, for each dimension

	SAT		EFF		LOY	
	Target selection		Target selection		Target selection	
Choice	NO	YES	NO	YES	NO	YES
1	$p = (0.038)$		$p = (0.031)$		$p = (0.487)$	
2	$p = (0.001)$		$p = (0.031)$		$p = (0.009)$	
3	$p = (0.001)$		$p = (0.011)$		$p = (0.024)$	
4	$p = (0.000)$		$p = (0.002)$		$p = (0.025)$	
5	$p = (0.289)$		$p = (0.016)$		$p = (0.369)$	

3.7 DISCUSSION OF THE RESULTS

The purpose of the study was to manipulate the cognitive effort of multiple groups of subjects up to different levels in order to test whether decoy effect performance is influenced by this previous background during their experience within the purchasing process. Table 3.2 shows the result of these manipulation through a decreasing value in the mean of the scales related to their experience along the process. It can be seen how the mean trend decreases for all three indicators. SAT and LOY value trend are accepted ($p<0,05$) while EFF is not ($p>0,1$) although it seems to follow the same trend than the formers. We can conclude than these indicators are showing an increasing dissatisfaction and discomfort as the group number increases and so the complexity and the number of options in each previous and compulsory task before facing the choice sets. The reliability of this scales is above the minimum accepted standard of Cronbach's alpha (>0,7) as shown in Table 3.1.

Regarding decoy performance evaluation, Table 3.3 shows how each of the groups perform against control group for every choice. It is important to note that choice 5 is not accepted as valid since decoy effect is not influencing choice in the control decoy group. For the rest of choices, there is a visible and clear trend: the share of the target option is increasing with the control group, which is linking an increasing decoy performance with higher levels of cognitive load at the moment of choice. For the same choice, individuals with lower levels of comfort and satisfaction tend to be more affected by the presence of the decoy option leading to an increasing relative share in the choice of the option target.

Without considering group categorization and focussing on the results of each choice, we can separate individuals in two groups: those who chose the targeted option and those who did not. Analyzing the values of SAT, EFF and LOY scales between these two groups, we can confirm a generalized decrease in their values for those subjects who chose the targeted option in front of the others. There are though three cases in which this relation is not proved to be significant: SAT - choice 5, LOY - choice 1 and LOY - choice 5.

3.8 CONCLUSIONS AND FUTURE LINES OF RESEARCH

The aim of the article was to provide insight on how decoy effects that are non-isolated could be affected by the previous experience of the individual. Previous cognitive effort has been proved to affect default options performance resulting in a higher impact. Levav et al. (2010) conducted a similar research where default options increased their relative share as the individual facing the choice set was presented with previous choices containing high numbers of alternatives. This results represent additional support towards how previous background affect the actual outcome of subsequent choices.

Assuming what has been exposed in the experiment formulation and the hypothesis regarding how quantification strategies require more cognitive resources than justifiability ones, one could say that value shift gains more importance in the overall equation with

higher mental loads. This implies that, without considering or not the presence of value shift in the effect explanation, when facing a decoy option there exists a mental process that allows decoy effect to highlight option target that is happening at a very basic cognitive level. With low mental resources, decoy effect seems to be able to trigger a quick reasoning process that is not costly neither very elaborate allowing the individual to achieve a reasonable satisfaction.

Managerial implications are very relevant. With the rise of Big Data and real time pricing through dynamic web sites that are able to change the product order or the number of products offered (among many other variables) understanding how the user previous background is affecting their subsequent choices and decisions could be a future cornerstone in designing A/B testing strategies and designing layouts and product sequential configurations. This results have been achieved in purchasing processes completed in time ranges that exceed the duration of a real on-line purchasing process, specially for groups 4 and 5, those with higher loads of cognitive effort and thus with more complexity in previous manipulation. It is important to note though, that in real purchasing processes individual is not isolated from their context. Identifying those variables affecting user behavior across every specific industry and translating it into basic statements such as: "night-time buyers generally experience higher levels of previous fatigue" could completely open a new field to explore adding even more variables in the overall equation that will finally translating the information in tangible content for the user.

Part III

CONCLUSIONS

4

CONCLUSIONS

When analyzing which are the key contextual effects that could influence the outcome of any purchasing process, the necessity of a much deeper understanding of these same effects and the interactions occurring between them, becomes very relevant. In this always-connected world, information is transparent, fast and more reliable than ever. People simply have much more choices, in every aspect of their lives, than they ever had. Moreover, on-line transactions are increasing year after year at extraordinary high rates. Far from their beginnings, when only specific sectors were permeable to this change, such as travel, the range of online possibilities offered to the customer nowadays covers almost every industry, product and service that is sold. Being these very widespread ideas, we are still far from completely profit this new scenario in which decisions happen, basically because a lack of understanding of all contextual effects influencing that particular choice. Not many years ahead, the combined use of big data and machine learning will leverage this knowledge, allowing dynamic purchasing processes to adjust themselves based on historic data, real time user behavior and profit maximization algorithms. Being able to ask the right questions to this huge amounts of data will be one the big challenges of e- commerce in the next decade. In this line, Chapter 1 of the thesis contributes on analyzing certain aspects of this contextual environment, focusing its attention on those factors affecting decoy effect performance.

The revision of the extant literature leads to the identification of two types of factors: those related to the user and those related to certain product characteristics or inherent attributes. User related characteristics should be understood as non-controlled variables except when targeted audience is highly segmented and homogeneous across significant variables. On the other hand, it is possible to classify product related factors as controlled, or at least as a pool of information much more predictable and defined than user's profile, as one has the control over the experience the purchasing process provides to the customer.

Particularizing each of the variables or factors presented in Chapter 1 for every product category and targeted group of users is crucial to maximize the profit aimed to be produced due to decoy options introduced in a specific purchasing process. Many of those described variables could be easily determined when analyzing targeted population.

Regarding regulatory focus, despite user's profile has heavy weight in influencing it, it is important to note there is specific and previously known information that moderates this variable which is the nature of the same product; as it will determine through its characteristics the predominant orientation of most of the users acquiring it.

Concerning those specific characteristics of the purchasing process we listed the existence of a no-choice option, the information mode and the existence of brand effect and its derived

interactions. Those are hardly manipulable outside research environments, so they must be understood as restrictions either imposed by the market or the product, rather than variables.

Also, it is important to highlight the vast possibilities for future research, as interactions at every level of all the variables and factors presented in Chapter 1 do occur in real purchasing processes every day. Thus, besides pure research interest, the applicability of these concepts in a real environments is, with no doubt, of high relevance.

In Chapter 2 we developed the first of the two proposed lines of research previously specified in Chapter 1: The interaction of two simultaneous decoy options within the same choice set.

In this experiment we tested two types of decoys: decoy in range (DR) and decoy in frequency (DF) in both situations, together and separately in different choice sets. As reported in Table 2.1, the effect of introducing these options in the choice set, separately, directly increases the proportion of users choosing the target option. Moreover, we observed a decrease on the percentage of user who chose not to choose. Thus, not only the introduction of decoy options leads to a higher share of the targeted option, but also reduces the uncertainty the user experiences when deciding.

Another of the aims of the study is to exhaustively evaluate the processes which provide explanation for decoy effects for the specific product category of air tickets. These results may not be generalizable for different product categories even when presenting similarities either in purchasing process or product structure. Although two theories have been adapted in this study to explain value shift, none of them is able to predict the observed changes in perceived attributes completely, as in previous studies (Pechtl, 2009). Both theories assume no change in the dimensional weights they occur, though. The density principle seems to be the most robust explanation to evaluate changes in overall attractiveness for the different decoy options. It is important to note that both price and quality are operationalized in a metric scale. Information mode has found to be affecting the cognitive processes likely to be produced by the addition of decoy options in the choice set (Sen, 1998). This fact should be considered when including other dimensions instead of a metric quality scale to account for other particular services or singular add-ons.

The empirical results obtained show that shift processes affect the overall attractiveness of the competitor, reducing it, rather than increasing the target's. These results are in line with other studies, which also found shifts in perceptions for the competitor when introducing decoys in the choice set (Moran and Meyer, 2006; Pechtl, 2009).

Regarding the interactions between both decoys when included in the same choice set, it is interesting to highlight possible explanations for observed differences in the results of the prior studies. First, the non-decrease in the proportion of the no-choice option under the presence of the double decoy could be explained by the cognitive stress due to the addition of more options rather than for trade-offs. One could assume that the no-choice proportion in the core set stems from uncertainty and stress derived from trade-offs. As one

of the main effects of decoy options is to diminish the proportion of respondent uncertainty when comparing options overall attractiveness, cognitive stress due to trade-offs between possible choice are assumed not to be present for the double decoy choice set. The study and development of synergistic decoy choice sets, in which the presence of extra decoys reinforce the yet reinforced target, would surely provide new lines of research, open new questions and enrich the theory.

Managerial implications of this study are huge, specially for this product category in the prior mentioned market conditions. Airline marketing and revenue departments would increase the profitability of the sequential decisions of their purchasing processes as they implement decoy options in order to drive users' attention to those targeted alternative. This could be implemented without restriction either for the basic air tickets purchasing processes or those for extra services or add-ons airlines could offer. Moreover, the addition of decoy options reduces the proportion of users who finally decide to defer their decision so, even when they are not purchasing the targeted option, they are actually buying something, fact that definitely is a better situation than the no-choice option.

The study presented in Chapter 3 is the next natural step in the process of understanding decoy effects when integrated in multi-stage purchasing processes. The experiment highlights the one of the possible interactions that could appear and affect decoy effect performance: how cognitive fatigue and scarcity of mental resources influences users' behavior when deciding under decoy effect.

The experiment was built on a website simulating a real airline purchasing process in which 6 different groups of individuals were differentiated based on the survey group they have been assigned to. Cognitive fatigue and dissatisfaction was manipulated across different groups increasing the number of options presented in each choice set and also increasing the difficulty in evaluating them, introducing more complex indicators and attributes. The evaluation of customers' perceptions between groups is presented in Table 3.2 showing a consistent and significant decrease on the levels of each dimension regarding website usability, online satisfaction and online loyalty.

Each unique individual in manipulated groups was shown 5 different choice sets containing a decoy option. Figure 3.3 shows how the percentage of users deciding to choose the option target increases as cognitive fatigue and discomfort increases.

As previously stated, this implies decoy options are an effective resource in allowing the individual achieve a reasonable level of satisfaction without requiring significative mental resources. Moreover, this effect is reinforced as the necessity of spending limited resources arises, as decoy effect is reinforced when presented to groups of users with less available mental resources.

To sum up, the humble contribution of this thesis to the extant theory is built around three main points: first, presenting a general overview on those contextual effects that are prone to affect decoy effect performance. Second, analyzing a yet unaddressed type of interaction occurring when presenting two different decoy options within the same choice set; and

third, experimenting with non-isolated choice sets containing decoy options and analyzing how the immediate and short-term previous experience of the consumer is affecting their performance.

Understanding what drives a specific human being to a particular decision has been one the the "big questions" we have yet to answer. Being proved that, in most cases, merely a small percentage of the elements affecting our decisions is of rational nature, understanding the impact of contextual effects and the influence of our environment and circumstance on these decisions becomes crucial. Beyond the small grain of sand this work represents, future research should determine the impact of further interactions that directly stem from these studies, reducing in doing so the uncertainty region, enlightening just one more of the infinite corners of the vast and fascinating universe of decision making.

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