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Sandra Laporte

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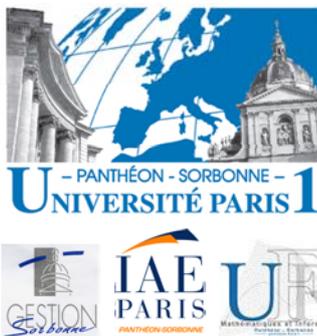
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**ECOLE DOCTORALE N°
Sciences de Management**



**Gestion – Organisation
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ECOLE DES HAUTES ETUDES COMMERCIALES DE PARIS

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**« ESSAYS ON CONSUMER JUDGMENT AND DECISION
MAKING UNDER UNCERTAINTY »**

THESE
présentée et soutenue publiquement le 8 juillet 2010
en vue de l'obtention du
DOCTORAT EN SCIENCES DE GESTION
par

Sandra LAPORTE

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RESUME

INTRODUCTION

Ma thèse étudie comment les consommateurs forment des jugements de probabilité et prennent des décisions quand ils sont confrontés à l'incertitude. Le terme incertitude est souvent employé dans le langage courant pour décrire une situation indéterminée, imprévisible ou indéfinie. Je me réfère dans cette thèse à la stricte conceptualisation utilisée en Science de la Décision et en Economie. Knight (1921) définit le premier l'incertitude en la différenciant du risque : le risque peut être mesuré, alors que l'incertitude est non mesurable et non calculable. Plus spécifiquement, le risque renvoie à des situations dans lesquelles les probabilités sont connues, ou connaissables dans la mesure où elles peuvent être estimées à partir de données passées, ou calculées à partir des lois de probabilités. L'incertitude renvoie en revanche à des situations dans lesquelles les probabilités ne sont ni connues ni ne peuvent être déduites, calculées ou estimées de manière objective (Gilboa et al. 2008). Ainsi définie, l'incertitude caractérise un grand nombre de situations quotidiennes qui peuvent rarement être réduite à un jeu décrit par un arbre de décision complet où une probabilité est associée à chaque résultat possible d'une décision.

La recherche sur les consommateurs offre relativement peu de résultats sur la manière dont les individus réagissent à ces situations d'incertitude : Quelle stratégie suivent-ils ? Quels types de facteurs entrent en jeu ? Ma thèse se concentre sur la formation des estimations de probabilité ou probabilités subjectives et sur les conditions dans lesquelles ces estimations influent sur les décisions. Trois essais examinent indépendamment différents facteurs déterminant les jugements et décisions en situation d'incertitude.

Les deux premiers essais s'intéressent aux loteries d'Etat et loteries promotionnelles dont les gagnants sont désignés aléatoirement. La plupart mentionnent le type et le nombre de prix qui peuvent être gagnés mais fournissent peu d'informations sur le nombre potentiel de participants : les consommateurs ignorent donc leur probabilité de gagner et ne peuvent pas l'estimer objectivement. Ces deux essais adoptent une approche théorique et méthodologique fortement influencée par les travaux de Daniel Kahneman et Amos Tversky sur différents types de jugements se rapportant à des événements incertains, incluant des prédictions numériques et des évaluations de probabilités d'hypothèses. Ces auteurs se sont concentrés sur des jugements gouvernés par l'intuition, dans lesquels les gens s'appuient sur des heuristiques pour ramener l'évaluation des probabilités et la prédiction de valeurs à des opérations mentales plus simples. Ces heuristiques sont généralement des raccourcis utiles mais elles peuvent parfois induire des erreurs (systématiques) ou biais. Ces erreurs ne sont pas seulement intéressantes en elles-mêmes mais peuvent également révéler les mécanismes cognitifs sous-jacents au processus d'estimation (Tversky et Kahneman 1974).

La décision de participer à une loterie d'Etat ou promotionnelle est rapide. Les tickets pour les loteries d'Etat sont relativement bon marché. Quant aux loteries promotionnelles, il est interdit dans beaucoup de pays de rendre la participation conditionnelle à toute forme de paiement. Ainsi la participation à ce type de jeux promotionnels nécessite seulement de la part des participants de passer du temps à remplir un formulaire de participation. La décision de prendre part à ces loteries a donc de fortes chances d'être peu impliquante et dominée par l'intuition plutôt que par un raisonnement approfondi.

La méthodologie adoptée dans la thèse est également inspirée du courant de recherche sur les heuristiques et les biais. Les expérimentations s'efforcent de reproduire un environnement de décision réaliste en montrant aux participants des publicités pour des loteries dans un design inter-sujets. Il est en effet nécessaire d'observer comment les gens

forment des estimations et développent des stratégies de décision en fonction des éléments disponibles au moment de la décision. Kahneman (2002) souligne en effet que les expérimentations inter-sujets et intra-sujets, et plus particulièrement l'évaluation des stimuli séparément ou de manière conjointe, rendent accessibles des aspects différents des problèmes. L'accessibilité renvoie à la facilité avec laquelle certains contenus mentaux viennent à l'esprit (Higgins 1996). Kahneman recommande par conséquent d'employer des plans expérimentaux où chaque sujet ne reçoit qu'une condition. En suivant cette ligne méthodologique, mes études montrent que le nombre de prix en jeu dans une loterie n'influence pas l'estimation de la probabilité subjective de gagner, tandis que la similarité avec le gagnant précédent est une évaluation naturelle que les consommateurs utilisent pour estimer leurs chances de gagner. Le fait que la similarité l'emporte sur les éléments probabilistes est d'autant plus surprenant que la dimension aléatoire et probabiliste est relativement plus saillante dans une loterie que dans d'autres contextes.

Alors que les deux premiers articles explorent la manière dont l'accessibilité d'éléments contextuels peut avoir une influence sur les jugements sous incertitude, le troisième essai étudie l'impact d'une émotion spécifique, le regret, sur la formation de probabilités subjectives. Par ailleurs, cette dernière partie de la thèse s'intéresse aux estimations du risque pour des événements négatifs par opposition à la probabilité d'un tirage chanceux dans une loterie. Le cadre conceptuel est également différent, bien que le rôle des émotions ait été abordé dans le paradigme des heuristiques et des biais. De nombreuses recherches ont démontré que les motivations peuvent influencer les processus cognitifs. Dans le troisième essai, je propose que la motivation de diminuer le regret ressenti peut biaiser les estimations de probabilité.

Les deux contextes abordés dans la thèse – les loteries et les décisions engendrant le regret – sont pertinents pour la recherche sur les consommateurs. Les jeux promotionnels ont été insuffisamment explorés par la recherche sur les promotions des ventes. Cette thèse contribue tout d’abord à combler ce déficit de connaissance. Les loteries promotionnelles sont devenues un moyen fréquent pour créer du trafic online et offline ou construire des bases de données : les entreprises devaient dépenser 1,86 millions de dollars dans les jeux, les concours et les sweepstakes en 2008 selon un rapport de Promo Magazine (Industry Trend Report 2008). Malgré l’importance croissante des jeux promotionnels, peu de résultats existent sur l’impact des caractéristiques du design de ces jeux sur l’intention de participer des consommateurs. Les enjeux économiques des loteries d’Etat sont également de plus en plus importants. Elles sont une source croissante de revenus pour les gouvernements depuis dix ans et cherchent constamment les moyens d’augmenter leurs ventes de tickets. Selon une étude de l’Institut Rockefeller en 2008, les revenus globaux des états provenant des loteries ont augmenté de 45% pendant la dernière décennie pour atteindre 17,4 milliards de dollars. Ces revenus sont souvent consacrés par la loi à des programmes d’éducation ou de transport, ce qui rend crucial le recrutement du plus grand nombre possible de participants. Par ailleurs, le regret s’est avéré une émotion d’un intérêt tout particulier pour la recherche sur le consommateur car c’est l’une des émotions négatives les plus répandues et elle est étroitement liée à la prise de décision. Eviter ou diminuer le sentiment de regret est une source de motivation importante pour les individus et les stratégies de régulation qu’ils mettent en œuvre ont une influence forte sur leurs jugements, décisions et comportements.

ESSAI 1 :

LA DECISION DE PARTICIPER A UNE LOTERIE PROMOTIONNELLE : LE NOMBRE DE LOTS EN JEU A T-IL UNE IMPORTANCE ?

Afin d'augmenter le nombre de participants dans une loterie promotionnelle, il semble raisonnable de penser qu'il est efficace d'accroître le nombre de gagnants potentiels. Il est ainsi courant que des loteries offrent plusieurs prix de la même nature, comme trois voitures du même modèle, ou dix voyages identiques. Cet essai vise à tester cette intuition : les participants potentiels sont-ils vraiment sensibles au nombre de prix identiques mis en jeu, toutes choses égales par ailleurs ?

La recherche sur les jeux promotionnels semble impliquer que la structure des dotations et la probabilité perçue de gagner ont un impact sur le succès d'une campagne (par exemple, Ward et Hill 1991, Shapira et Venezia 1992, Kalra et Shi 2009). Néanmoins ces conclusions ne reposent pas sur des méthodologies où les répondants prendraient leur décision de participer dans un contexte réaliste, c'est-à-dire en considérant un jeu isolément, décrit par une publicité donnant seulement des informations partielles sur la probabilité de gagner. Dans ce type de situation, je propose que deux mécanismes s'additionnent pour empêcher le nombre de prix d'avoir un effet sur la participation : l'insensibilité à la magnitude et la prise de décision sans estimation de probabilité.

Hsee et ses collègues (2005) montrent que dans certaines conditions, la valeur subjective que nous attribuons à un stimulus ne suit pas une fonction linéaire croissante de la magnitude ou du niveau objectif du stimulus. Dans le cas des loteries, cela signifie que les participants potentiels n'évalueront pas un jeu offrant dix lots comme plus attractif qu'un jeu semblable offrant seulement un lot. L'une des raisons qui mènent à l'insensibilité à la magnitude d'un stimulus est son manque « d'évaluabilité ». Un stimulus est évaluable si nous

pouvons juger n'importe lequel de ses niveaux comme bon ou mauvais, même quand ce niveau est jugé isolément. Cela est possible quand l'étendue des valeurs, la valeur moyenne ou tout autre point de référence peut venir à l'esprit lors du jugement. Ainsi, deux touristes qui évaluent séparément une pierre en jade de 10 carats et une pierre en jade de 15 carats peuvent donner le même prix pour les deux bijoux s'ils ne connaissent rien aux bijoux de jade (poids habituel, quel poids est considéré comme léger ou lourd). Au contraire, s'ils possèdent une certaine expertise, ils valoriseront certainement le bijou de 15 carats à un prix supérieur à celui de 10 carats. Ceci impliquerait que les prospects ne sont pas capables de prendre en compte la différence entre un et dix prix dans leur décision de participer car ils ne peuvent pas juger si ce sont des nombres attractifs quand ils les jugent isolément.

Imaginons maintenant que le consommateur dispose des informations nécessaires pour juger le nombre de lots en jeu et que son estimation de ses chances de gagner augmente avec ce nombre. Il n'est alors pas certain que cette augmentation soit reflétée par une plus grande intention de participer. Rottenstreich et Kivetz (2006) soulignent en effet que certaines situations peuvent déclencher un état d'esprit probabiliste conduisant à intégrer des probabilités dans une décision tandis que d'autres conduisent à un état d'esprit non probabiliste où la décision ne tient aucun compte d'un raisonnement probabiliste. Le fait que les publicités pour les jeux promotionnels mettent en avant l'attractivité des prix plutôt que la probabilité associée de les gagner, que les participants n'aient par définition aucun contrôle sur le jeu de par sa nature aléatoire, et la difficulté d'évaluer ses chances de gagner devraient concourir à un état d'esprit non probabiliste. Les consommateurs n'intégreront pas leur probabilité de gagner dans leur décision de participer, à moins qu'ils y soient encouragés.

Les trois études expérimentales dans lesquelles le nombre de prix est manipulé entre les sujets (en cohérence avec les conditions réelles dans lesquelles un consommateur juge une loterie isolément) confirment ces hypothèses en montrant que les gens ne sont pas toujours

plus enclins à participer à une loterie qui récompense plus de gagnants. Les résultats sont également cohérents avec les deux explications avancées, l'insensibilité à la magnitude et la prise de décision sans jugement de probabilité. Dans les études 1 et 2, l'insensibilité des estimations de probabilités pour des variations modérées du nombre de prix disparaît quand le nombre de prix est rendu évaluable grâce à la présentation d'un nombre correspondant d'images ou à la disponibilité d'informations sur les caractéristiques distributionnelles du nombre de gagnants pour des jeux promotionnels similaires. Cependant, ces manipulations n'améliorent pas la sensibilité de l'intention de participer, qui n'est pas influencée par les chances perçues de gagner. L'étude 3 montre que l'estimation de la probabilité de gagner n'est sensible qu'à de larges variations du nombre de prix, et que les inférences sur le nombre de participants ne peuvent pas expliquer ce résultat. Par ailleurs, des variations importantes du nombre de prix n'ont une influence indirecte sur l'intention de participer (à travers les chances perçues de gagner) que si les participants sont encouragés à penser de manière probabiliste.

Cet essai montre ainsi que les participants potentiels à une loterie ne valorisent pas le nombre de lots en jeu dans les conditions d'évaluation par défaut (c'est-à-dire sans exemples d'autres loteries en tête, sans multiplication des images des lots et sans être particulièrement encouragés à penser de manière probabiliste). Si les organisateurs veulent valoriser le nombre de prix, il doivent capitaliser sur sa mise en avant visuelle, cibler des consommateurs avec une bonne expertise de ce type d'offres promotionnelles qui seront à même de juger l'attrait du nombre de lot, ou mettre en jeu un nombre de cadeau vraiment important. Par ailleurs, il peut s'avérer nécessaire d'amener les prospects à s'interroger sur leurs chances de gagner.

ESSAI 2 :

LE BIAIS DE « HOT HAND » INTERPERSONELLE : COMMENT LA SIMILARITE AVEC LE GAGNANT PRECEDENT AUGMENTE LA PROBABILITE SUBJECTIVE DE GAGNER

Les organisateurs de loteries promotionnelles ou d'Etat présentent souvent dans leurs publicités un gagnant récent, décrit par une photographie et des informations personnelles. Cet essai s'intéresse à un biais des consommateurs qui peut expliquer cette pratique: les participants potentiels à une loterie estiment que leurs chances de gagner le prochain tirage sont plus élevées quand les gagnants précédents leur sont similaires plutôt que dissimilaires, ce qui entraîne une intention de participer plus importante. J'appelle cet effet le biais de Hot Hand interpersonnelle en référence au biais de Hot Hand (Gilovich, Vallone et Tversky 1985) selon lequel les fans de basketball pensent qu'un joueur a plus de chances de réussir le prochain panier après avoir réussi le panier précédent plutôt qu'après l'avoir manqué. Cette croyance est biaisée par rapport aux résultats des analyses statistiques qui montrent que les séries de paniers réussis et manqués par un joueur peuvent en fait être modélisées par une variable aléatoire binomiale avec un taux de réussite constant. Cela signifie que le résultat d'une tentative est indépendant du résultat précédent. Le biais de Hot Hand a été mis en évidence dans d'autres domaines que le basketball comme les jeux de casino ou dans des expérimentations contrôlées en laboratoire. Le biais opposé, l'erreur du joueur (« Gambler's Fallacy ») a aussi été observé: dans ce cas, les personnes observant une succession d'événements binaires s'attendent à ce que le prochain événement soit différent du précédent plutôt qu'à la répétition du dernier événement.

Dans le cas interpersonnel où le gagnant précédent est une personne similaire ou dissimilaire, les deux erreurs de jugement pourraient s'appliquer: un participant potentiel

pourrait évaluer ses chances de gagner comme supérieures s'il est similaire au précédent gagnant (« Hot Hand » interpersonnelle) ou au contraire s'il est dissimilaire (« Gambler's Fallacy » interpersonnelle). Des recherches ont montré que l'un ou l'autre biais se produit selon le type d'attribution que les personnes font sur le processus à l'origine de la séquence d'événements. Quand la séquence est attribuée à une cause humaine, les gens prédisent la répétition du dernier résultat alors qu'ils prédisent une alternance quand la séquence est attribuée à une cause inanimée (Ayton et Fischer 2004; Burns et Corpus 2004, Roney et Trick 2009, Oskarsson et collègues 2009). Gagner à une loterie peut être expliqué par le hasard, défini comme quelque chose d'extérieur et d'incontrôlable, ou par la chance, définie comme un attribut personnel stable et source de contrôle perçu (Wagenaar et Keren 1988, Darke et Freedman 1997). Je fais l'hypothèse que le fait de montrer dans le matériel promotionnel des gagnants précédents avec des photos et des détails personnels met l'accent sur une cause humaine alors que l'aspect aléatoire et inanimé reste en retrait. Par conséquent, cette pratique conduit les participants potentiels à attribuer le fait de gagner à la chance personnelle et à évaluer leurs propres chances de gagner comme supérieures quand ils sont similaires au gagnant précédent.

Il est en effet hautement probable que les prospects d'un jeu promotionnel emploient une heuristique pour prendre leur décision de participer, étant donné la nature peu impliquante de la décision. La similarité avec le gagnant précédent est un attribut très accessible sur lequel fonder ce jugement intuitif. De nombreux travaux ont en effet montré que la similarité avec autrui est un élément particulièrement utile dans des situations où l'information est incomplète. La similarité interpersonnelle peut par conséquent affecter les attitudes, les croyances et les comportements (cf par exemple Cialdini and Goldstein 2004, Festinger 1954, Suls, Martin and Wheller 2000). Par ailleurs, le type d'informations sociodémographiques sur les gagnants précédents communiquées par les publicités pour les loteries peut facilement

servir de base pour catégoriser les gagnants comme similaires ou dissimilaires (Brewer and Harasty-Feinstein 1999; Fiske, Lin, and Neuberg 1999).

Dans un souci de robustesse des résultats, l'effet de Hot Hand Interpersonnelle est testé avec différentes manipulations de la similarité. Ces manipulations (l'âge, le sexe et le type d'études) sont comparables aux informations employées dans la vie réelle par les organisateurs de loteries. Dans l'étude 1, je montre l'impact de la similarité d'âge avec le gagnant précédent sur l'intention de participer et contraste cet effet avec celui du nombre de prix à gagner déjà exploré dans l'Essai 1. Les études 2A et 2B révèlent l'impact de la similarité sur l'estimation des chances de gagner, en utilisant respectivement le sexe et le type d'études comme manipulations de la similarité. Ces deux études permettent également d'écarter une explication fondée sur la facilité à s'imaginer comme gagnant (heuristique de simulation), ainsi que le possible effet de la similarité sur l'attractivité des lots. Dans l'étude 3, je montre que la probabilité estimée de gagner est un médiateur de l'effet de la similarité sur l'intention de participer, ce qui n'est pas le cas de l'attitude à l'égard de l'entreprise organisatrice. Par ailleurs, l'effet de la similarité s'avère particulièrement efficace pour les individus qui ont habituellement une faible propension à participer à des jeux promotionnels. L'étude 4 offre davantage d'éléments sur le mécanisme en montrant que la similarité n'influence plus l'intention de participer quand la publicité fournit des informations objectives sur la probabilité de gagner sous la forme du nombre potentiel de participants. La situation n'est alors plus caractérisée par l'incertitude puisque la probabilité de gagner peut être calculée et les participants ne s'appuient plus sur la similarité pour juger de leurs chances de gagner. Enfin, l'étude 5 explore le processus qui lie la similarité à la probabilité subjective : lorsque l'on empêche les participants d'attribuer l'acte de gagner à la chance personnelle en les exposant à des mots évoquant l'aléatoire, l'effet de la similarité sur la probabilité de gagner disparaît.

Ces résultats montrent que la similarité peut également influencer les chances perçues de bénéficier d'un événement positif comme le gain à une loterie. Les pistes de recherches futures sont nombreuses. Je m'intéresse notamment au rôle modérateur du nombre de gagnants similaires ou dissimilaires présentés (c'est-à-dire à la longueur de la séquence précédente observée) sur le biais de Hot Hand interpersonnel. Il serait également intéressant de tester d'autres manipulations de la similarité reposant par exemple sur les choix et comportements des participants : façon d'entrer dans le tirage au sort, utilisation des lots gagnés.

ESSAI 3 :

LA VIE EN ROSE : COMMENT LE REGRET D'UNE DECISION CONDUIT A ETRE OPTIMISTE SUR SES CONSEQUENCES

Le regret a été défini comme une émotion que l'on ressent quand on réalise ou imagine que sa situation actuelle aurait pu être meilleure si on avait pris une décision différente (Zeelenberg et Pieters 2007). De manière surprenante, cette définition semble indiquer que le regret est lié à un raisonnement contrefactuel portant exclusivement sur les conséquences d'une décision. Or nous sommes tous familiers avec des situations où l'on regrette une décision avant même d'en connaître les conséquences. Bien que la plupart des recherches sur le regret aient été consacrées aux cas où l'émotion négative est causée par un résultat décevant, le regret peut également être lié au processus d'une décision indépendamment de son résultat (Pieters et Zeelenberg 2005). Dans une étude longitudinale sur les comportements de vote, les auteurs montrent que les électeurs qui ont été incohérents parce qu'ils prévoyaient de voter et ne l'ont finalement pas fait, éprouvent plus de regret que les électeurs qui ont suivi leurs intentions premières de voter ou de ne pas voter. De la même manière, les participants à

l'enquête qui ont voté pour un parti différent que celui qu'ils avaient d'abord choisi, rapportent ressentir plus de regret que les autres individus. Il est ici important de noter que ces résultats restent vrais quel que soit le résultat des élections, c'est-à-dire que le parti pour lequel ils ont voté ait gagné ou pas. Ce genre de regret découle plus généralement d'un processus de décision qui n'est pas jugé raisonnable et sage, c'est-à-dire qui n'est pas justifiable, comme ne pas avoir assez préparé un examen. Je fais donc l'hypothèse qu'il est possible d'éprouver du regret au sujet d'une décision avant même d'en connaître les conséquences quand celles-ci sont différées.

Des recherches ont déjà étudié les stratégies que les individus mettent en place pour gérer leur regret mais peu d'éléments sont connus sur les processus de régulation du regret ressenti avant que ses conséquences soient dévoilées. Ce projet se propose de combler ce manque en se concentrant sur une stratégie cognitive qui pourrait aider les gens à gérer leur regret pré-résultat. Comme ils sont encore incertains des conséquences de leurs actes mais qu'ils ne peuvent plus changer leur décision, ils peuvent être amenés à minimiser la probabilité d'occurrence de conséquences négatives afin d'alléger leur conscience. Certains travaux ont déjà montré que le déni défensif peut être à l'origine de biais optimistes. Ainsi Taylor et ses collègues (1994) ont mis en évidence que parmi des hommes homosexuels à risque pour le virus du SIDA, ceux qui sont séropositifs se montrent plus optimistes sur le fait qu'ils puissent éviter le virus du SIDA dans le futur que ceux séronégatifs pour le VIH. Je propose que l'optimisme peut également constituer une stratégie de gestion du regret lié à une décision. La motivation d'éviter le blâme personnel déforme les jugements en situation d'incertitude par rapport aux situations où aucun regret n'est ressenti. Conformément à la littérature sur les antécédents du regret, une telle émotion est ressentie seulement quand on se sent responsable de la décision et quand celle-ci n'est pas facilement justifiable.

Je propose également que l'importance personnelle des conséquences de la décision est une condition d'existence de cet optimisme. Il a en effet déjà été mis en évidence que les individus ne sont pas optimistes de manière aveugle et indifférenciée mais qu'ils effectuent un arbitrage entre le besoin de se sentir mieux et le besoin d'exactitude ou de réalisme. Les implications personnelles d'une décision sont un des facteurs qui augmentent le besoin d'exactitude et diminuent les biais optimistes. Si la décision implique des conséquences mesurées, les personnes éprouvant du regret peuvent se permettre d'être optimistes de manière irréaliste en gardant un écart gérable avec la réalité, alors que cette attitude n'est pas soutenable quand les répercussions en jeu sont plus sérieuses. Dans ce dernier cas, afin de pouvoir apprendre de leurs erreurs, comme les travaux sur la fonctionnalité du regret le laissent entendre, elles ne devraient pas avoir des attentes différentes de celles des personnes qui ne regrettent pas leur décision.

Le regret est une émotion contrefactuelle qui découle de l'écart entre ce qui se produit réellement et ce qui aurait pu arriver si nous avions pris une décision différente. Comme cet essai porte sur le regret d'une décision avant d'en connaître les conséquences, l'émotion est ici liée à l'écart entre le résultat de la mauvaise décision qui a effectivement été prise et le résultat attendu de la bonne décision, celle qui n'aurait pas engendré de regret. Cet essai fait aussi l'hypothèse que dans le but de gérer l'émotion négative pour des conséquences limitées, le regret d'une décision peut également mener à un raisonnement contrefactuel différent de celui qui prévaut en l'absence de regret.

Dans l'étude 1, le regret de processus est manipulé dans un scénario via la justifiabilité d'une décision. Les personnes qui regrettent de ne pas avoir préparé un examen sans pouvoir correctement le justifier estiment qu'elles ont plus de chances de le réussir que celles qui peuvent justifier de ne pas avoir préparé et ne ressentent par conséquent pas de regret. Cependant, les personnes éprouvant du regret ont des attentes optimistes seulement quand les

conséquences sont limitées (c'est-à-dire quand le cours n'est pas dans leur majeure). A l'aide d'un scénario dans un domaine différent, l'étude 2 manipule le regret de processus via la responsabilité dans la mauvaise décision et montre son impact sur le raisonnement contrefactuel. Les personnes qui regrettent de ne pas s'être fait vacciner sous-estiment son efficacité contre la maladie ciblée par rapport au groupe de contrôle sans responsabilité, mais seulement quand la maladie est modérément grave. L'étude 3 réplique ces résultats pour une décision réelle : les personnes responsables de ne pas s'être entraînées avant un test académique standardisé (regret de processus élevé) sont plus optimistes sur leur performance au test que celles qui ne sont pas responsables de ne pas s'être entraînées. Les individus dans la condition de regret pensent également que l'entraînement aurait moins amélioré leur performance que ne le pense le groupe de contrôle. Cette différence est observable seulement pour les répondants dont le concept de soi n'est pas menacé par les résultats du test (importance personnelle limitée).

Ces premiers résultats semblent encourageants : le besoin de gérer le regret d'un processus de décision peut donner naissance à des prédictions optimistes. Les extensions possibles de cette recherche sont diverses. Il serait intéressant de déterminer si cette stratégie est en effet efficace pour réduire l'affect négatif qui découle d'un mauvais processus de décision. Par ailleurs, il est naturel de s'interroger sur l'impact de ce biais d'optimisme sur la réaction aux conséquences de la décision quand elles se produisent. Les individus affichant un tel optimisme pourraient d'abord avoir tendance à repousser le moment où leurs prédictions vont être confrontées aux conséquences réelles (refus de connaître un diagnostic, le résultat d'un test académique, l'évolution d'un portefeuille financier). Par ailleurs, une fois que les conséquences sont connues, les personnes optimistes ont l'opportunité d'ajuster ou non leurs estimations de probabilité pour les rendre plus conformes à la réalité. Cette probabilité post-

résultat peut servir de base pour de futures décisions similaires et déterminer si la même mauvaise décision sera réitérée ou non.

CONCLUSION

La thèse a pour objectif d'éclairer certains aspects des jugements et de la prise de décision des consommateurs en situation d'incertitude. Plus précisément, j'y étudie quelles variables individuelles et contextuelles influencent l'estimation de probabilités et les décisions qui en découlent quand les probabilités réelles des événements ne sont pas connues ni calculables de manière objective. La même approche méthodologique est adoptée dans les trois essais, à savoir des expérimentations où certaines caractéristiques de la situation ou du preneur de décision sont modifiées entre les sujets.

Les essais 1 et 2 sont complémentaires en s'intéressant à l'importance relative d'informations communiquées par les publicités pour les loteries. Les deux chapitres montrent ensemble que la décision de participer des consommateurs est davantage influencée par un facteur logiquement non pertinent comme la similarité avec les gagnants précédents que par le nombre de gagnants récompensés. A ma connaissance, ces deux premiers essais représentent une des premières tentatives de comprendre quels facteurs influencent la décision de participer à une loterie en utilisant des publicités réalistes comme stimuli.

Le troisième essai explore le mécanisme par lequel le regret peut mener à de l'optimisme. En cohérence avec la recherche sur la cognition motivée, je montre que des forces motivationnelles peuvent également influencer l'estimation de probabilités indépendamment du contenu ou de la forme du contexte. En l'occurrence, la motivation est celle de diminuer le regret ressenti à cause d'une mauvaise décision et conduit les gens à formuler des attentes optimistes quant à l'issue de cette décision.

Implications managériales

Les résultats des essais 1 et 2 peuvent offrir des recommandations managériales pour les marketeurs qui organisent des loteries promotionnelles ou d'Etat. Mettre en avant la similarité avec le gagnant précédent tout en minimisant l'aspect aléatoire du tirage pour encourager l'attribution à la chance personnelle apparaît comme une meilleure stratégie que capitaliser sur le nombre de prix en jeu. Dans cette perspective, il serait intéressant de répliquer les expériences en laboratoire avec des expérimentations sur le terrain afin d'améliorer la validé externe des résultats. Le biais de « Hot Hand » interpersonnelle et l'insensibilité au nombre de lots devraient être répliqués pour une population non composée uniquement d'étudiants et avec de réels enjeux. Je travaille actuellement en collaboration avec 1000Mercis, une entreprise européenne spécialisée dans le design de jeux promotionnels online dans le but de recueillir de telles données.

Le fait que les expérimentations montrent seulement des gagnants similaires ou seulement des gagnants dissimilaires est une autre limitation de ce travail d'un point de vue managérial. Cette stratégie peut être mise en œuvre dans des campagnes d'emailing où le contenu de l'email peut être personnalisé en fonction des caractéristiques sociodémographiques du destinataire de façon à présenter un gagnant similaire. Si une telle personnalisation n'est pas faisable, les marketeurs désirant cibler une population large avec leurs loteries peuvent présenter simultanément un ensemble de gagnants présentant des profils différents. Il serait intéressant de réaliser des expérimentations pour étudier comment les consommateurs réagissent quand ils sont exposés à la fois à des gagnants similaires et dissimilaires.

Généralisation des résultats

La généralisation des résultats à différents types de décision sous incertitude reste également une question ouverte. Le jeu en casino représente une première extension logique.

La similarité avec d'autres joueurs qui viennent juste de gagner à un certain type de jeu peut-elle affecter la décision d'autres joueurs ? Le biais de Hot Hand a déjà été étudié dans le contexte d'un casino et il serait intéressant de tester son aspect interpersonnel. Sur cette application particulière, j'aimerais souligner que mes résultats devraient être utilisés avec précaution, et dans le cadre de politiques publiques. L'utilisation de la similarité interpersonnelle pourrait faire empirer l'addiction au jeu de certaines personnes, qui croient probablement déjà fortement au rôle de la chance personnelle. A des fins de politique publique également, un axe de recherche future consiste à étudier l'estimation de la probabilité d'événements négatifs comme les risques liés à la santé, au transport ou le risque financier. Comment la similarité avec une personne qui vient juste d'expérimenter un événement négatif influence-t-elle une décision?

Stratégies de Prise de Décision en Conditions d'Incertitude

Alors que je montre que la similarité influence l'intention de participer à travers une augmentation des chances subjectives de gagner, le nombre de prix dans le prochain tirage s'avère beaucoup plus difficile à prendre en compte pour les preneurs de décision. Rendre ce nombre évaluable dans un contexte non comparatif permet de résoudre l'insensibilité à la magnitude des probabilités estimées. Cependant, cela ne transparait pas dans l'intention de participer, à moins que les gens soient incités à penser de manière probabiliste.

Ce constat ouvre une question de recherche importante : Pourquoi les consommateurs prennent-ils leur décision de participer sans jugement de probabilités dans le premier essai alors qu'ils intègrent cet estimation dans le second essai ? Les scénarii employés dans les deux essais sont très similaires, ce qui semble indiquer que la différence de stratégies de prise de décision provient de la nature des facteurs manipulés. La probabilité estimée de gagner pèse davantage dans la décision de participer quand elle dépend de la similarité avec le

gagnant précédent plutôt que du nombre de prix. Il semble qu'il y ait une interaction entre le type d'information disponible et la stratégie de décision que les gens choisissent d'adopter face à l'incertitude. Cette question représente une piste prometteuse de recherche future.

Conditions Limites d'Existence

Dans l'essai 3, l'écart d'estimation entre les groupes ressentant du regret ou non disparaît pour les décisions très importantes. Ce dernier résultat offre une opportunité de mettre les trois essais en perspective. Les biais décrits dans les deux premiers essais caractérisent des décisions faiblement impliquantes dans lesquelles peu d'argent et de temps sont investis. En d'autres termes, les erreurs de jugements s'avèrent probablement inoffensives. Cependant les résultats préliminaires de l'Essai 3 indiquent que les individus peuvent émettre des jugements mieux calibrés quand les enjeux de la situation augmentent. Ainsi, alors que le but initial de cette thèse était d'étudier comment les estimations de probabilités peuvent influencer les décisions, elle suggère également une relation inverse : l'importance de la décision peut déterminer comment les personnes forment de telles estimations et comment elles sont parfois biaisées. Le coût limité des loteries promotionnelles et d'Etat peut expliquer pourquoi les individus s'appuient sur des éléments saillants tels que la similarité avec le gagnant précédent ou la présentation visuelle des prix pour estimer leurs chances de gagner. Etudier de plus près les relations entre l'importance de la décision, le processus d'estimation de probabilités et le poids de ces estimations dans la décision finale représente également une piste pertinente de recherche future.

Une autre condition d'existence des biais affectant la probabilité subjective de gagner une loterie est liée à l'expertise du consommateur. Dans l'étude 2 de l'Essai 1, la manipulation de l'évaluabilité consiste à fournir des exemples de jeux promotionnels semblables, afin que les participants puissent avoir une idée de l'étendue des valeurs qui

peuvent être attendues pour le nombre de gagnants. On peut légitimement penser que les experts en loteries possèdent ce type d'informations stockées en mémoire. Dans l'Etude 3 de l'Essai 2, l'impact de la similarité est moindre pour les participants avec une forte propension à participer aux jeux promotionnels. Cette propension en conduisant à une participation régulière peut être vue comme un antécédent indirect de l'expertise. On peut aussi émettre l'hypothèse que les experts peuvent avoir une meilleure idée du nombre potentiel de participants dans un jeu, ce qui devrait supprimer l'effet de la similarité, comme l'étude 5 le montre.

Ces deux conditions, l'importance personnelle de la décision et l'expertise, montrent que les gens ne sont pas biaisés de manière indifférenciée. Cette dernière remarque renvoie au débat toujours animé sur les jugements humains de probabilités. Certains chercheurs ont argumenté que l'esprit humain était capable de se comporter comme un statisticien intuitif (Peterson and Beach 1967), et d'apprendre par l'expérience les proportions et les propriétés des distributions. Cette vue contraste avec l'approche des heuristiques et biais qui met en avant les limitations des jugements intuitifs, en plaçant les personnes dans des environnements de décision « discrétisés », sans possibilité de retour sur leurs décisions et donc d'apprentissage. Toutes les expérimentations réalisées dans cette thèse suivent également ce modèle et ne rectifient pas les estimations des participants après qu'ils les aient énoncées, ce qui peut clairement faciliter l'apparition de biais. Néanmoins, bien que ces clarifications soient nécessaires, elles ne doivent pas remettre en question les contributions de ces travaux : nous sommes souvent confrontés dans la réalité à des situations d'incertitude où notre expérience ne peut éclairer nos jugements.

GENERAL INTRODUCTION

“Do not expect to arrive at certainty in every subject which you pursue. There are a hundred things wherein we mortals... must be content with probability, where our best light and reasoning will reach no farther.” Isaac Watts (1674-1748), English Poet.

In my dissertation, I study how consumers form likelihood judgments and make decisions when they face uncertainty. The word “uncertainty” is very commonly used. It may refer to a person who experiences doubt and hesitancy or to a situation characterized by indeterminacy, unpredictability, or indefiniteness. However, research in Decision Science and Economics has offered strict conceptualizations for uncertainty. Knight (1921) first defined uncertainty by differentiating it from risk: risk can be measured whereas uncertainty is unmeasurable and uncomputable. Specifically, risk designates situations in which probabilities are known, or knowable in the sense that they can be estimated from past data, calculated using the laws of probability, etc. Uncertainty refers to situations in which probabilities are neither known, nor can they be deduced, calculated, or estimated in an objective way (Gilboa et al 2008). Ambiguity has also been used to denote the same conditions as a synonym of uncertainty (Ellsberg 1961, Camerer & Weber 1992). Defined as such, uncertainty characterizes most of everyday life decisions, which can rarely be reduced to perfect gamble-like decisions with a fully defined decision tree associating a probability to each outcome. Will this economic measure improve the unemployment rate? Will this treatment improve the patient’s well being?

Consumer research offers few insights on how people react to these situations of uncertainty: What decision strategy do they follow? What kinds of factors enter into play? The dissertation focuses on how people come up with probability estimates or subjective probabilities and the conditions under which these estimates inform their decisions. The three

essays independently examine different determinants of judgment and decision under uncertainty.

The two first essays deal with the uncertainty characterizing promotional or state lotteries, where winners are randomly designated. Most of them mention the type and the number of prizes to be won but provide little information about the potential number of entrants, which means that participants do not know their probability of winning and cannot estimate it objectively. This situation is consistent with the definition of ambiguity elaborated by Frisch and Baron (1988): Ambiguity is uncertainty about probability, created by missing information that is relevant and could be known. A good example of this type of uncertainty is the urn paradigm used by Ellsberg (1961): a decision maker has to choose from an unambiguous urn that contains 50 red balls and 50 black balls or from an ambiguous urn that contains 100 balls in some unknown combination of red and black. Hence, the composition of the ambiguous urn is the missing information that is relevant and could be known, but is not. In the lottery example, the number of participants who are involved in the drawing is missing and prevent people to compute their chances of winning. There is no objective way either to estimate it.

The theoretical and methodological approach adopted in the two first essays has been strongly influenced by the work of Daniel Kahneman and Amos Tversky on various types of judgment about uncertain events, including numerical predictions and assessments of the probabilities of hypotheses. They focused on judgments governed by intuition in which people rely on heuristic principles to reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations. These heuristics are generally useful shortcuts but may sometimes lead to errors, or biases. These errors are not only something interesting in and of themselves, but also reveal the underlying cognitive mechanisms (Tversky & Kahneman 1974).

The entry decision in promotional or state lottery is likely to be prone to snap judgments. State lottery tickets are relatively cheap. As for promotional lotteries, it is prohibited in many countries to condition the participation to the payment of any monetary consideration. Consequently, the entry in a sweepstake or instant win game can only require time from the participants who may for instance be asked to fill in a participation form. Besides, Monga and Saini (2008) have recently shown that people rely more on heuristics when time is at stake rather than money. Hence, the entry decision is low-involving, likely made very quickly by relying on intuition rather than reasoning. This fundamental distinction between intuition and reasoning has been strongly established by dual-process theories (Chaiken and Trope 1999; Sloman 1996), which have been applied to judgment and decision making under uncertainty as well (Kahneman & Frederick 2002; Sloman 1996, 2002; Stanovich 1999; Stanovich & West 2002, Feirrer et al. 2006). Intuition or System 1 is governed by automatic associative processes. Its operations are fast, automatic, effortless, and difficult to control or modify. Reasoning or system 2 is mostly reflective and governed by rule-based controlled processes. Its operations are slower, serial, effortful, and deliberately controlled.

System 2 is supposed to monitor system 1 but Kahneman and Frederick (2002) suggested that the monitoring is normally quite lax, and allows many intuitive judgments to be expressed, including some that are erroneous. In the same vein, our results show that under some conditions estimates of winning probability are biased compared to normative expectations, which, in turn, impact subsequent entry decisions. Together the two first essays show that consumer intention to participate in promotional lotteries is more influenced by irrelevant factors, such as similarity with previous winners or the visual presentation of prizes, than by attributes actually impacting their odds of winning, such as the number of prizes at stake.

The two essays illustrate the crucial role of accessibility in forming intuitive probability judgment (Kahneman 2002). Accessibility is defined as the ease with which particular mental contents come to mind (Higgins, 1996). Regarding the methodology, our experimental studies mimic a realistic setting for the entry decision by showing some advertisements to respondents in between-subject designs. It is indeed necessary to observe how people estimates and decision strategies depend on all the cues available at the time of the decision. Kahneman (2002) underlines that different aspects of problems are made accessible in between-subjects and in within-subject experiments, and more specifically when stimuli are evaluated jointly or separately: “Factorial designs are particularly undesirable, because they provide an unmistakable cue that every factor that is manipulated must be relevant to the judgment (Kahneman & Frederick, 2002). It is inappropriate to study intuitive judgments in conditions that are guaranteed to destroy their intuitive character.” In these conditions, my studies show that the number of winners in the lottery is not accessible enough to impact the subjective probability of winning, while the similarity with previous winners is a natural assessment that is used as a basis to estimate the chances of winning. The fact that similarity crowds out probability is all the more surprising in the lottery context where the probabilistic dimension is relatively more salient than in other contexts.

While the first two papers explore how the accessibility of contextual cues may impact judgment under uncertainty, the third essay investigates how subjective probability can also be impacted by a specific emotion such as regret. Moreover, the last part of the dissertation deals with risk estimation of a negative outcome, as opposed to the likelihood of a lucky draw in lotteries. I also adopt a different approach than in the first two parts, although the role of emotion has been demonstrated in the heuristics and biases paradigm. People’s motivations

are powerful drivers of cognitive processes. In the third essay, I claim that under uncertainty people's motivation to cope with regret may distort probability estimates.

Both contexts explored in this dissertation – lotteries and regretful decisions – are relevant for consumer research. First, studying promotional games is an opportunity to bridge the gap of knowledge on this type of promotional offers, which has been understudied by sales promotion literature. Promotional lotteries have become a frequent tool to create online or in-store traffic or build databases—companies were expected to spend \$1.86 billion on games, contests, and sweepstakes in 2008 (*Promo Magazine*, Industry Trend Report 2008). Despite the growing importance of promotional games, not much is known on how the design features may impact consumers' participation intention. The economic stakes of state lotteries are also important and increasing. They have been a growing source of government revenues over the last ten years and continually try to sell more tickets. According to a 2008 Rockefeller Institute study, overall state revenues from lotteries increased by 45% in last decade to \$17.4 billion. The revenues are often dedicated, by law, to education or transportation programs, so recruiting as many participants as possible is key. Second, regret has proved to be of special interest for consumer research because it is one of the most pervasive negative emotions and it is tightly related to decision-making. People are strongly motivated to avoid or decrease it and the regulation strategies they implement may have strong influence on their judgments, decisions and behaviors.

INTRODUCTION TO ESSAY 1

The main cues provided by advertisements for lotteries are indications on the prizes to be won. The first simple question I study in this essay is whether potential participants use the information about the number of prizes (and therefore about the number of winners) to make their entry decision. Although insufficient to compute a probability, it is the only indication on their chances of winning should they participate. Between two lotteries respectively rewarding one winner and ten winners all else being equal, people should express greater preference for the lottery offering a higher number of winners. However, following Kahneman's argument that variations are more accessible than absolute values, we investigate the following simple question: does the number of winners impact consumer response to a lottery when it is judged in isolation?

Frederick and Fischhoff (1998) reviewed numerous examples of scope neglect in studies of willingness to pay for public goods. People in Toronto are willing to pay almost as much to clean up the lakes in a small region of Ontario or to clean up all the lakes in that province (Kahneman, 1986). In a similar vein, Desvousges and colleagues (1993) found out that people were willing to contribute as much money to prevent the drowning of 2,000, 20,000, or 200,000 migratory birds, respectively \$80, \$78 and \$88. Hence, this magnitude insensitivity could also characterize the subjective probability of winning as a function of the number of winners in lotteries.

Once people have formed their subjective probability of winning, they should take it into account in their decision following the normative benchmark model, i.e. the Subjective Expected Utility model (SEU, Savage 1954). SEU combines the von Neumann and Morgenstern (1947) Expected Utility approach with de Finetti's (1937) calculus of subjective probabilities, and states that preferences can be represented by a numerical expected utility

that uses subjective probabilities of states to weight consequence utilities. People make decision under uncertainty by maximizing their utility. Consequently, they should express greater preference for the lottery offering the higher subjective probability of winning all else being equal, especially the value of the prizes. According to this approach, when objective probabilities are not known, they can be replaced by subjective ones, thus reducing problems of decision under uncertainty to decisions under risk (Gilboa 2008). This standard practice in economics when modeling situations of uncertainty assumes that people have probabilistic beliefs over any source of uncertainty, that they update these beliefs in accordance with Bayes's rule, and that they use these probabilistic beliefs in decision making, typically as a basis for expected utility maximization. However the descriptive validity of this model has been challenged by contradictory empirical evidence and alternative models (Camerer and Weber 1992). In contradiction with the 'Gamble Metaphor,' all everyday decisions cannot be described as a simple monetary gamble structure. People's reactions to highly schematic lotteries - typically specifying a particular probability of obtaining a given monetary prize - cannot be taken as the basis for general conclusions about people behavior under uncertainty. Choosing among gambles with well-defined probabilities of winning monetary prizes seems removed from many real world decision problems.

People tend to adopt different strategy depending on the context of the decision under uncertainty and these strategies do not always involve subjective probabilities (e.g. Hogarth & Kunreuther, 1995 ; Goldstein & Weber, 1995; Rettinger & Hastie, 2001). People do not always weight the utility of outcomes by their respective probability to occur: Rottenstreich and Hsee (2001) show that, if the potential outcome evokes strong positive or negative affect, its attractiveness or unattractiveness is relatively insensitive to variation in probability as great as from .99 to .01. Sunstein (2003) labels this insensitivity probability neglect, which characterizes overreaction to terrorist threats despite their low likelihood. Thus consumers

may judge a lottery without taking into account their subjective probability of winning and in that case we shouldn't observe any difference between the responses to lotteries rewarding different number of winners.

Building on this conceptual framework, the paper shows in a series of studies where the number of prizes is manipulated between-subjects (consistently with real-life conditions where consumers judge a promotional lottery in isolation) that people are NOT always more likely to enter a lottery offering more prizes. Two explanations seem to account for this effect: Magnitude insensitivity and decision-making without likelihood judgment. We show that magnitude insensitivity stems from the low evaluability (Hsee 1999) of the number of prizes when judged in isolation. The evaluability may be first increased by the visual layout of the advertisement: Reinforcing the numerical information about the number of prizes with a consistent number of pictures makes the number of prizes more evaluable. Providing consumers with knowledge about the range of values for the number of prizes before exposing them to the target lottery also improves the evaluability of the number of prizes. When the evaluability of the number of prizes increases, subjective probabilities of winning become sensitive to variations in the number of winners even when the lotteries are judged separately. However, by default, potential participants do not take into account their subjective chances of winning when making their entry decision, unless they are prompted to do so.

INTRODUCTION TO ESSAY 2

As the first essay shows that the number of winners does not impact subjective probability of winning in lotteries, the essay 2 looks at another cue made accessible in advertisements for lotteries. A common advertising practice used by organizers of promotional or state lotteries consists in featuring a recent winner in their advertisements, depicted by a photograph and some personal information.

Similarity is a natural assessment. Social perception theories have shown that in low-information context as in this type of advertisement, people tend to automatically rely on salient attributes such as gender, age, ethnicity or national origin to allocate people in social categories (Brewer & Harasty-Feinstein 1999, Fiske et al. 1999). Besides, according to self-categorization theory (Turner 1987) this categorization process is then used to distinguish similar and dissimilar others, respectively in-groups and out-groups (Liviatan et al 2008). Mussweiler (2003) also points out that category membership (e.g. gender, ethnicity) plays a prominent role in holistic similarity judgment. Hence, we can assume that people who process an ad featuring previous winners will automatically come up with a similarity judgment based, and will categorize the previous winner as similar or dissimilar to them. This categorization will be based on the selected personal information provided in the ad, most of it being conveyed by the picture, as gender, age or ethnicity. Interestingly, it has been suggested that uncertainty reduction plays a key motivational role in self-categorization and in-group identification (Reid & Hogg 2005).

Extensive research has already emphasized the specific role of similarity with others on beliefs, judgments and behaviors in contexts characterized by incomplete information. According to the similarity hypothesis (Festinger 1954), we compare ourselves with others when we are uncertain about our beliefs and opinions, and similar others are the most

preferred standard. The literature on endorsement has pointed out the better effectiveness on persuasion of similar endorsers compared to dissimilar endorsers. Feick and Higie (1992) showed that manipulating similarity with the message source in a testimonial advertising or word-of-mouth context through the educational background and occupation has an impact on the ability of the source to shape attitudes and purchase intentions for services characterized by high preference heterogeneity. More recently, Suls, Martin and Wheller (2000) reaffirmed the role of similarity on preferences assessment, i.e. to answer the question “Will I like this?”

Social influence literature has also underlined the behavioral consequences of similarity: the similarity heuristic predicts that perceived similarity with a requester may entail increased compliance, even if this similarity relies on irrational cues such as shared names, birthdays or even fingerprint types (Burger et al. 2004). Perceived similarity is a cue for potential friend- or acquaintanceship and we are used to comply with the request of people we like. As a consequence when people process heuristically a request, they tend to apply the same rule automatically and to comply more easily when they feel they like the requester (because of his perceived similarity), even if he is a perfect stranger (Cialdini and Goldstein 2004). People give more money to a non-profit entity when they are told that the previous donor who shares their identity (in this case, have the same gender) also made a large contribution and this effect is amplified if the attention is focused on others (Shang et al. 2008).

In this second essay, we show that similarity can also influence people’s estimates of the probability of benefiting from a random positive outcome in conditions of uncertainty. Similarity with the showcased previous winner constitutes a salient cue that potential participants use to estimate their own chances of winning the next random drawing. This leads to the biased belief that the chance of winning the next drawing is higher when the participant is similar to the previous winner, while the successive random drawings are

actually independent from each other. We name this effect “interpersonal hot hand” fallacy as it represents an extension of the well-documented hot hand fallacy. Interestingly, it disappears when respondents have objective information about their actual odds of winning, which supports the crucial role played by uncertainty.

After having established the effect of similarity on subjective probability of winning a lottery with different manipulations for similarity, we investigate further the mechanism underlying the interpersonal hot hand. Drawing on the literature on Hot Hand and Gambler’s fallacy, first evidence show that the link between similarity and subjective probability of winning hinges on the type of causal attribution people make about the winning event. Specifically, the Interpersonal Hot Hand effect seems to arise because showcasing previous winners lead people to attribute the winning outcome to personal luck.

INTRODUCTION TO ESSAY 3

The third essay is not related to promotional games but explores situations in which a decision has delayed outcomes. Under these conditions, people may sometimes regret their decision even before knowing its final outcome, because it is not judged as sensible and wise, or because it is inconsistent with their prior intention. We wish to demonstrate that outcome probability may be distorted to regulate process regret when no other coping strategy is available. Most research on regret has been dedicated to outcome regret, which is experienced when the outcome of a decision is worse than it could have been if we had decided differently. This essay intends to document some consequences of process regret regulation on the estimation of outcome probability.

Research has already demonstrated that emotions can also serve as bases to form intuitive judgments under uncertainty. The affective basis is an important component of the intuitive system or system 2 introduced by dual-process theories. Affective valence is a natural assessment, and therefore a candidate for substitution in the numerous responses that express attitudes (Kahneman 2002): Slovic and his colleagues (Slovic et al., 2002) explain how a basic affective reaction can be used as the heuristic attribute for a wide variety of more complex evaluations, such as the cost/benefit ratio of technologies, the safe concentration of chemicals, and even the predicted economic performance of industries. They call this heuristic the Affect Heuristic. Regarding risk assessment, risk as feeling may be distinguished from risk as analysis: risk as feeling refers to our instinctive and intuitive reaction to danger while risk as analysis relies on logic, reason and deliberation. (Loewenstein et al 2001, Slovic and Peters 2006).

The former line of research about affect and risk assessment focuses on the valence of the affective reaction triggered by a stimulus. However, the appraisal theory of emotions

(Smith and Ellsworth 1985, Lerner and Keltner 2000) proposes that specific emotions can have different cognitive consequences depending on their underlying appraisal dimension independently from their positive or negative valence. For example, experience of fear increases perceptions of risk in a subsequent situation because it is an emotion associated with the appraisal that the situation is risky. But experience of another negative emotion, anger, leads to the opposite perception because it associated with the appraisal that the situation is riskless. DeSteno and colleagues (2000) establish the same kind of differential effect of sadness and anger on likelihood estimates.

This third essay also deals with the impact of a specific emotion on judgment under uncertainty. It looks at one of the most important emotion for consumer decision making: regret. Specifically, I try to answer the following question: Does process regret experienced in a decision has an impact on subjective probabilities of the decision outcomes? However the conceptual framework I adopt does not build on the specific appraisal dimension associated with regret and regret is not manipulated as an incidental emotion able to influence cognitive responses to subsequent unrelated situations. Within a single decision with delayed consequences, we propose that people regretting the decision process may hold optimistic likelihood estimates for the decision outcome as a way to cope with the aversive negative emotion. This distorting influence of coping motives is consistent with research on motivated reasoning (Kunda 1990). It states that motivation may affect reasoning through reliance on a biased set of cognitive processes, i.e. accessing, constructing and evaluating beliefs. The motivation to arrive at particular conclusions enhances use of strategies that are considered most likely to yield the desired conclusion. More precisely, we look at cases where people are not following an accuracy motive but want to come up with optimistic conclusions that will alleviate their regret about a wrong decision. This can be viewed as a special case of “desirability bias” or “wishful thinking” (see Krizan and Windschitl 2007 for a review) where

more desirable events are perceived as more likely to occur: in the marked card paradigm (Marks 1951), in which people are asked to make dichotomous predictions about whether a marked card will be drawn from a deck, participants predict a marked card more often when the drawing of a marked card would result in a monetary gain.

Specifically, I predict that regretful people should be optimistic compared to non-regretful decision makers, as long as the self-significance of the outcome is moderate. When the consequences are limited, the motivation to diminish self-blame may lead people regretting their decision to minimize the probability of a bad outcome. Nevertheless, when the decision is more consequential, the necessity to prepare for the upcoming strong negative affect and to learn from one's mistakes should eliminate this distortion.

ESSAY 1

Consumer Entry Decision in promotional lotteries: Do the number of prizes matter?

Abstract:

In order to increase the number of participants in promotional lotteries, it seems reasonable to believe that the more potential winners the better. However, this paper shows in three studies where the number of prizes is manipulated between-subjects (in line with real-life conditions where consumers judge a promotional lottery in isolation) that people are NOT always more likely to enter a lottery rewarding more winners. Two explanations seem to account for this effect: Magnitude insensitivity and decision-making without likelihood judgment. In Study 1 and 2, the magnitude insensitivity of probability estimation for moderate variations of the number of prizes disappears when the number of prizes is made more evaluable thanks to the display of a corresponding number of pictures or the availability of information about the distributional characteristics of the number of winners for similar sweepstakes. However these manipulations do not improve the sensitivity of participation intention, which is not impacted by the perceived odds of winning. Study 3 shows that estimated probability to win is only sensitive to large variations of the number of prizes and that it cannot be explained by inferences about the number of participants. Furthermore, large variations of the number of prizes have an indirect influence on participation intention through the estimated odds of winning, only when people are probability prompted.

INTRODUCTION

Marketers spent \$1.86 billions building games, contests and sweepstakes in 2008¹. Their goals may be to highlight a product or service, to boost online or in-store traffic, to build brand image, but the top priority is capturing data for direct marketing purposes. As a consequence, organizers strive to maximize the number of participants in designing the game. This is particularly true for promotional games relying on a chance mechanism to designate winners (lotteries, sweepstakes, instant win games, etc.). In this type of offer the key element is the completion of an entry form giving the consumer the opportunity to win a prize through some form of random drawings as opposed to contests of skills. They potentially address a greater number of entrants than skill-based contests both because they do not require specific knowledge nor monetary consideration².

One of the main characteristics of these games is the number of prizes, i.e. the number of winners. Lotteries can sometimes offer prizes with different values, but I focus on cases where several identical prizes are at stakes. This piece of information is alleged to contribute significantly to the game attractiveness and is made as salient as possible in the associated advertisement (Feinman, Blashek and McCabe, 1986). However, do we know for sure that consumers are actually sensitive to the number of (identical) prizes when making their entry decision? In other words, all else being equal, does their participation likelihood increase with the number of prizes at stake? While this number directly impacts the cost of the promotion for the firm, consumer behavior research offers few insights so far on the effectiveness for marketers of investing in the number of prizes to increase participation rate.

¹ PromoMagazine Report oct. 2008

² Federal law views promotions in which the outcome is determined by chance, in which the entry requires some form of consideration (e.g., purchase), and in which the winner is awarded a prize as lotteries. With rare exceptions, lotteries are illegal (Liu et al 2007). It means that when firms want to designate winners through random drawing, they must provide a free entry path.

An interview I had with the marketing team of 1000Mercis (Munier, personal communication), a firm specialized in designing online campaigns, questions the idea that the more prizes the better. They implemented during two consecutive years a sweepstakes for the same brand with very similar mechanisms. However the number of prizes was divided by six from one year to the other, from 1200 to 200 prizes. But the game still got the same participation rate as the year before, despite the strong decrease of the number of gifts.

The number of prizes influences the actual probability of winning. There are three kinds of different promotional games based on chance: the random drawing sweepstakes, where the probability to win depends on the number of participants having filled in a participation form, the lucky number sweepstakes, where the probability of winning is decided in advance and depends on the total number of issued tickets and the number of winning numbers, the instant win games or predetermined winner sweepstakes, where the probability to win is also decided in advance and depends on the random seeding of winning game pieces (Feinman et al. 1986). In all these cases, consumers are not provided with their probability of winning. They know the number of winners but they ignore the number of participants or the proportion of winning tickets or the proportion of winning game pieces depending on the mechanism. Hence the entry decision in these lotteries is characterized by uncertainty as we defined it before: the probability of winning is neither known nor can it be deduced, calculated, or estimated in an objective way (Gilboa et al 2008). More specifically, the probability of winning is ambiguous because information that is relevant and could be known is missing (Camerer and Weber 1992, p330).

Under these conditions, we show that potential participants are insensitive to variations of the number of prizes and that they do not express greater participation intention when they actually have higher chances to win. In three studies, we show that two explanations account for this absence of effect. First, a given number of winners is not evaluable when judged in

isolation (i.e. not in comparison with another lottery rewarding a different number of winners), which entails magnitude insensitivity (Hsee et al. 2005) at least for moderate variations (e.g. from two to twelve). People estimates of their odds of winning become sensitive to such moderate variations when the number of prizes is made evaluable either by featuring a consistent number of pictures or by giving consumers distributional information about the number of winners. However even in this case, participation intention does not vary with subjective probability of winning, suggesting that people make their entry decision without likelihood judgment (Rottenstreich and Kivetz 2006). Accordingly, people express higher intention to enter a lottery offering more prizes only when they are prompted to think probabilistically.

CONCEPTUAL BACKGROUND

Existing research on promotional games design

Literature on promotional games, though limited, has contended that the number of prizes contributes to the attractiveness of games. Ward and Hill (1991) present a conceptual model of the antecedents of consumer decision to participate in games. The perceived odds of winning and the perceived value of prizes are antecedents of the extrinsic value of participation. Nevertheless no empirical study has tested these assumptions or has investigated the impact of the number of prizes at stake.

Some empirical evidence has shown consumers sensitivity to the number of prizes when they compare lotteries between them. Shapira and Venezia (1992) show the impact of the number of small prizes on preferences between lotteries. In a choice-based conjoint analysis, Teichman et al. (2005) study the impact of the different sweepstakes and contests attributes on people choice between different games. They find out that the allocation of prizes is more

influential offline than online and that a few big prizes are preferred to many small ones. However, in these two papers, the different alternatives are jointly evaluated by participants. Hence, the results about consumer preferences may not generalize to the situation where a single promotional offer is evaluated in isolation (Hsee et al 1999) as it is often the case in real life³. Kalra and Shi (2010) investigated preferences between different prizes allocations in a between-subject design (Experiment 2). Participants were asked to choose between two brands, one cheaper and the other more expensive but allowing the entry in a sweepstakes. They find that people preferring the organizing brand, choose it more when the sweepstakes offers fewer large prizes. On the other hand, people preferring the other brand choose the brand associated with the sweepstakes when it is offering multiple smaller prizes. They manipulate prize allocation, which implies a trade-off between the number of prizes and their value for a given total budget, while we are interested in people response to a variation of the number of prizes in one category. Moreover, they provided respondents with the exact probability of winning each kind of prize and therefore they make their decision under risk and not under uncertainty.

In sum, existing research on promotional games seems to imply that the dotation structure and the perceived probability of winning have an impact on the success of a campaign. However these conclusions do not rely on methodologies where respondents make their entry decision in a realistic setting, i.e. considering a sweepstakes alone, presented by an advertisement that conveys only partial information about the probability of winning.

³ Sweepstakes may be jointly evaluated when they are considered through specialized websites that pool together all sorts of promotional games organized by different brands. In this paper though, we do not investigate the entry decision under this context.

Sales promotions and Uncertainty

Some attempts have been made to study how consumers react to uncertainty in a promotional context. Dhar et al. (1995) compare the efficacy of “100% probability conventional promotions offering a precise discount” to equally costly “Lottery-like promotion with an imprecise discount level”. In the first case, the consumer knows in advance that he/she will benefit from a precise discount with certainty, while the other case refers to claims such as “80% probability to get between 15 and 25% reduction”. When the probability to get the promotion is low, they show that the second framing leads to better sales compared to conventional across-the-board promotions. The result reverses when the probability level for the lottery-like promotion is high. These findings show consumers may sometimes distort the probabilities of uncertain events even if these probabilities are explicitly stated. Goldsmith and Amir (2008) demonstrate that a promotion offering a high reward or a low reward with uncertainty can be as efficient as a promotion offering the high reward for sure. Although this paper constitutes an interesting avenue about the role of uncertainty on decision outcome in a promotional context, it differs from our interest by comparing a certain situation to an uncertain one, while we are mostly interested in comparing equally ambiguous choices (there is not more information on the probability of winning in one condition than in the other) in which the value of partial provided information (the number of winners) is varying.

I suggest that two mechanisms may add up to result in the absence of effect of the number of prizes on participation: magnitude insensitivity and decision making without likelihood judgment.

Magnitude Insensitivity

Thus literature on promotional games and lotteries offers few insights on how consumers may react to variations of the number of prizes to win. An intuitive answer to the

question would predict that the more prizes to win the more attractive the sweepstakes should be, because the chances of being rewarded are greater. However Hsee et al. (2005) show that in some conditions the subjective value that people attribute to a stimulus does not follow a linear increasing function of the stimulus magnitude. For sweepstakes, this would mean that people won't evaluate a ten-prize offer as more attractive than a one-prize offer all else being equal. In the same vein, when they are asked how much they are willing to pay to save 2 000, 20 000 or 200 000 migratory birds dying in uncovered oil ponds every year, respondents in the three different groups answer respectively \$80, \$78 and \$88 (Desvousges et al 1992, see also Fetherstonhaugh et al 1997).

Reliance on feeling, lack of evaluability or separate evaluation lead to magnitude insensitivity (Hsee et al. 2005). Fantasizing about the prizes that are vividly described may generate emotions and favor an evaluation by feelings rather than by calculation. The author show indeed that people donations to save endangered pandas increase with the number of featured pandas when they are symbolized by dots but not when pictures of pandas are shown (Hsee & Rotenstreich 2004). Moreover, we have already pointed out that, most of the time, promotional games are evaluated in isolation and not compared with each other. Regarding evaluability, a variable is evaluable if people can readily assess any given level of it as "good" or "bad" when that level is presented in isolation. Such judgments are possible when people can bring to mind the range, the average value, or other reference information for the variable. Greater evaluability engenders greater magnitude sensitivity. Thus two tourists evaluating separately a 10-carat jade and a 15-carat jade may price both jewels quite equally if they know nothing about jade jewelry (typical weight, what weight is considered as heavy or light). On the contrary, if they have some expertise about jade jewelry, they will certainly value the 15-carat stone as more expensive than the 10-carat stone even if evaluated separately.

These findings may imply that people are not able to take into account the magnitude difference between one versus ten prizes. More specifically, a greater number of winners will not translate in higher subjective odds of winning, and consequently, willingness to enter will not be affected. We propose that the subjective probability of winning is insensitive to variations of the number of winners because this piece of information lacks evaluability when judged in isolation.

Decision making without likelihood judgment

Imagine that some contextual or individual factor (e.g. the visual presentation of the number of prizes, or the consumer expertise in promotional games) makes the number of prizes more evaluable even when it is judged in isolation. In that case, consumer estimates of their chances of winning would increase with the number of prizes. However, will their participation willingness be consistent with this trend? A vast literature in psychology and economics offers various insights about how people make decision under uncertainty, and investigates particularly if, depending on conditions, decision-making strategies integrate any likelihood judgment.

On the one hand, classical models of subjective expected utility assume that the utility of one option can be obtained through the multiplication of its outcomes and their respective subjective probability (e.g. Camerer & Weber 1992, Fox & Tversky 1998, Wu & Gonzalez 1999). These theories assume that people try to estimate probabilities of outcomes to make a decision under uncertainty. Hence for promotional games, these models would predict that consumer estimation of their probability to win/lose is integrated to their entry decision.

On the other hand, some models assume that the gambling metaphor is not relevant for real-world decision and that people do not use a probabilistic thinking, that is to say that in absence of precise information about likelihood of outcomes, people do not integrate

probabilities in their decision and rely on other strategies. Rottenstreich and Kivetz (2006) highlight that some situations may trigger a probabilistic mindset leading people to base their decision on a likelihood judgment whereas other conditions foster a non-probabilistic mindset entailing a decision-making without likelihood judgment. Then, people rely rather on scenario or story construction, rules and rationales associated with roles, or rules reflecting social norms. The authors mention three factors leading to probabilistic instead of non-probabilistic mindset: the relative salience of probabilistic cues, the control on the event and the easiness of forming a likelihood judgment in the sense that certain situations are more or less amenable to likelihood judgment. Regarding promotional games based on chance, these three factors seem to favor a non-probabilistic mindset: first, advertisements tend to focus attention on the prize attractiveness more than on the associated probability to win. This tendency exacerbates people preference for positively skewed gambles like lotto associating a jackpot to a very small probability (Lovallo and Kahneman 2000, Cook and Clotfelter 1993). Second, participants to a sweepstakes have by definition no control on the outcome. Third, the missing information about the probability to win and the more or less complex procedure underlying the attribution of prizes may deter people from using a probabilistic reasoning.

In a similar vein, the preference for lotteries is more closely linked to values of outcomes when the probabilities are imprecise (Hönekopp, 2003). In other words, the ambiguity enhances the prominence of options outcomes to the detriment of options probability. Notably, this effect has been demonstrated with different operationalizations for uncertainty. Gonzalez-Vallejo and colleagues (1994) show that the outcome prominence effect increases when probabilities are stated verbally rather than numerically. Hönekopp (2003) manipulate the ambiguity of probabilities by concealing partially the spinner representing the precise probability with occlusion, and there is a linear relationship between the occlusion percentage and the outcome prominence.

Overall, the above results lead us to expect that people will usually not integrate the probability of winning in their entry decision, unless they are prompted to do so. On top of magnitude insensitivity, this prevents the number of prizes from impacting participation intention. In three studies, I try to disentangle both mechanisms and to show their conjunctive influence on participation intention. I show that making people subjective probability of winning sensitive to the number of prizes by increasing the evaluability of this number is not enough to increase their participation intention (Study 1 and 2), and the other way round, that prompting them into a probabilistic mindset does translate into participation intention only when the increase of the number of prizes is big enough for them to be sensitive to it (Study 3).

STUDY 1

Study 1 aims at testing if people response to promotional games based on chance are sensitive to the number of prizes to win when they judge the offer in isolation as in real-life. We predict that consumer estimates should not vary with the number of prizes, unless this piece of information is made evaluable in some way, in other words if a given number is represented in such a manner that it can be interpreted by consumers as a more or less good amount. Observing the practices to advertise a promotional lottery, we noticed that, if the prizes is almost always illustrated by a picture, the number of prizes may be reinforced or not by the same number of pictures. In the Mazda example (Appendix 1), one picture would have been enough to represent the type of prize to win, but the advertisement shows as many identical pictures as cars to win (i.e. three). Research has shown how visual representation can affect decision making (e.g. Lurie and Mason 2007). Furthermore, It has been clearly established that pictures are remembered better than words in tests of recall and tests of item

recognition (Hockley 2008). This picture superiority effect⁴ has been attributed to the fact that pictures are both encoded in verbal and image representations (e.g. Paivio 1976), that the image code is more distinctive than the verbal code (e.g. Mintzer and Snodgrass 1999), or that pictures benefit from more elaborate levels of processing than words (e.g. Craik and Lockhart 1972). Even if the entry decision in a lottery does not rely on recognition or recall processes, reinforcing the verbal information about the number of prizes by a consistent number of pictures could make this number more evaluable.

I test experimentally if this visual reinforcement of the number of prizes may improve magnitude sensitivity. Furthermore I measure both participation intention and estimated odds of winning in order to see if the latter has an impact on the former.

Procedure

One hundred and eight undergraduate students participated in exchange for partial course credit. To prevent the participants from having contact with each other, they were tested in groups of maximum six and seated at individual tables.

They were told to imagine that a website on current cultural events was organizing a promotional game offering to win iPods shuffle (unitary value: 79€). The participation required answering a few questions about one's opinions on the main cultural events in 2007, in a category chosen by the participant (movies, books, music, theater). The scenario said that this opinion survey took around 6 minutes to fill in. The scenario then included an advertisement for the game, which constituted the experimental manipulation. Two factors were manipulated within the advertisement. The first one was the number of iPods shuffles that were at stake: two iPods could be won in one condition and twelve in the other one. The number of prizes was given in digits. The other factor was the number of pictures of iPod

⁴ I thank Professor Christian Pinson for suggesting me this literature.

shuffles included in the advertisement: in one case, only one iPod was featured, while in the other case, there were as many iPods pictures as iPods to win, i.e. two or twelve images depending on the first factor. Hence, four different versions of the advertisement were created (see appendix 2). Participants were randomly assigned to one of the four different conditions in a 2 (number of iPods: 2 vs. 12) x 2 (1 picture vs. several pictures) between-subject design.

After reading the scenario, respondents were asked to give their participation intention on a 7-point scale going from “Very Unlikely” to “Very Likely”. Second, they had to estimate their probability of winning should they decide to participate in an open-ended answer. Third, they had to tell how attractive they found the prizes to win (iPods) on a 7 point scale from ‘Not Attractive’ to ‘Attractive’.

Finally, I measured respondents’ contest/sweepstakes proneness using a six-item, seven-point Likert-type scale developed by Lichtenstein, Netemeyer, and Burton (1995). This scale includes items pertaining to subjects’ enjoyment of contests/sweepstakes and general tendency to buy products associated with such games (e.g., “I feel compelled to respond to contest or sweepstakes offers,” “I have favorite brands, but if possible, I buy the brand that is connected with a contest or sweepstakes”). I take the arithmetic average of the six items to obtain an individual measure of sweepstakes and contest proneness (Cronbach’s alpha = .77).

Results

Estimated Probability of winning. The average probability was 1.67% (s.d. = 3.64). The answers are not well-behaved, in that they diverge from a Gaussian distribution and skew to the right (skewness = 5.11 with standard error [SE] = .23, kurtosis = 34.84 with SE = .46, compared with 0 and 0 for a Gaussian distribution).

Therefore, to apply tests based on Gaussian assumptions, I follow the procedure recommended by Tukey (1977, p.397) and add a constant to every probability estimate before

computing the logarithm. This method also handles the potential problem of answers equal to 0. Following Tukey, after testing different values of the constant from .001 to 1, I adopt a value of .3, which works best to generate a distribution of transformed probabilities that is close to Gaussian (after transformation, skewness is .84 [SE = .23] and kurtosis is -.00 [SE = .46]).

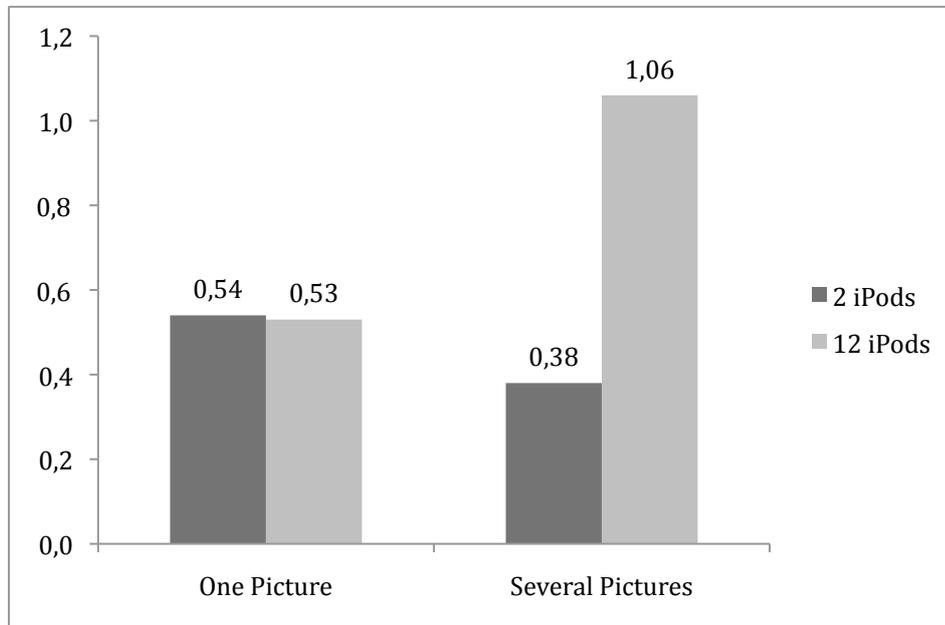
A univariate ANOVA is performed with the number of iPods and the number of pictures as discrete between-subject factors, and their interaction. The number of images has no main effect on the estimated probability ($F(1,104)=.46$; NS) nor has the number of iPods ($F(1,104)=2.61$; $p>0.1$). The interaction between the number of images and the number of prizes is marginally significant ($F(1,104)=2.78$; $p<0.1$). When the advertising features as many images as iPods to win, i.e. the number in digit is reinforced by the number of images, people estimate they have higher chances of winning when there are twelve prizes than only two (mean (2 iPods) = -.39 corresponding to .38% before the logarithm transformation versus mean (12 ipods) = .31 corresponding to 1.06% ; $t(56) = -2.34$; $p<0.05$). When the advertising features only one picture whatever the number of iPods to win, i.e. the number in digit is NOT reinforced by the number of images, people subjective odds do not vary when there are twelve or two prizes (mean(2 ipods)=-.18 corresponding to .54% vs. mean (12 ipods)=-.19 corresponding to .53% ; $t(48)=.04$; NS) (see Figure 1).

Figure 1

Average Estimated Probability of Winning (before logarithmic transformation)

As a Function of the Number of Prizes and the Number of Images

(Essay 1, Study 1)



Participation Likelihood. We perform the same analysis with the participation likelihood as dependent variable and controlling for sweepstakes proneness and prize attractiveness. We find no main effects nor interaction between the number of images and the number of iPods (all $F_s < 2$, NS). Then, participation likelihood is regressed on the logarithmic transformation of the estimated probability to win, the perceived attractiveness of prizes and the sweepstakes proneness of participants. The prize attractiveness and the sweepstakes proneness have significant impacts on the intention to participate (respectively, $B(\text{prize attractiveness}) = .248$; $t = 2.569$; $p < .05$ and $B(\text{sweepstakes proneness}) = .134$; $t = 4.729$; $p < .001$). However we find no significant influence of the estimated probability to win ($B = .137$; $t = .741$; NS).

Follow-up study

Study 1 demonstrates people insensitivity to moderate variations of the number of prizes. However, this insensitivity disappears when a consistent number of prize pictures reinforces the numerical information. We suggest that the number of images increases the evaluability of the piece of information even when it is judged in isolation.

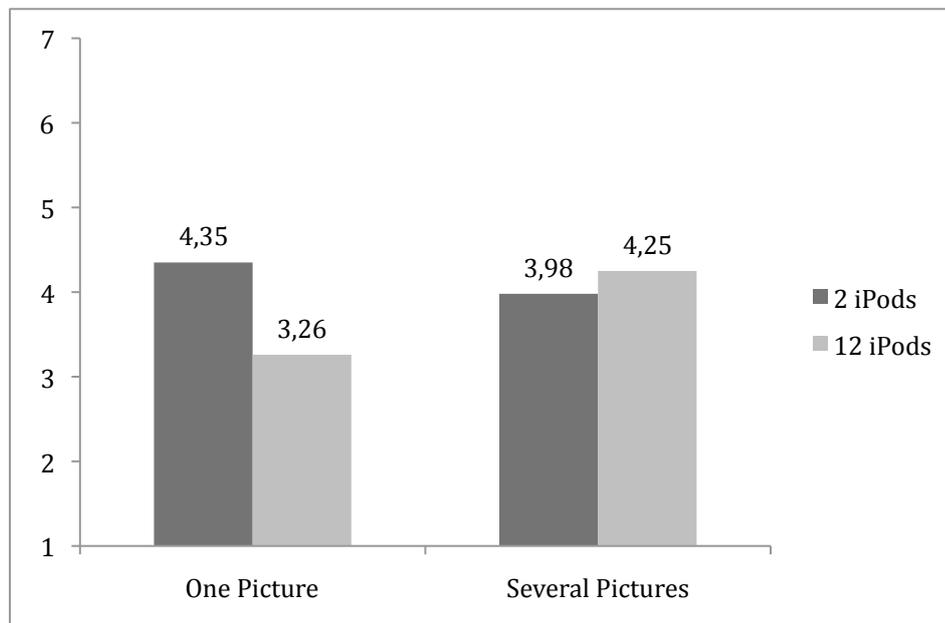
We tested this idea in a follow-up study. The cover story and the experimental design replicated study 1 but we explicitly asked participants about the evaluability of the number of prizes. The 96 participants (mean age= 30.85, 50 women) had to answer the two following questions. First: “Do you have any idea if {number of iPods to win in the condition: 2 or 12} iPods Shuffles is a high or low number of prizes for sweepstakes offering this kind of prize?” on a 7-point scale from “I don’t have any idea” to “I have a very good idea” (adapted from the manipulation check in Hsee 2000); Second: “What do you think about the number of iPod Shuffles to win?” on a 7-point scale from “It is a low number of prizes” to “it is a high number of prizes”. The first question is directly assessing the evaluability of the number of prizes, while the second one is about the desirability of a given number and should replicate what we found for the subjective probability of winning.

Evaluability of the number of prizes. Two participants did not answer the question and six outliers were removed. An observation is declared an outlier if it lies outside of the interval $[Q1-1.5 \times IQR; Q3+1.5 \times IQR]$, where $IQR=Q3-Q1$ is called the Interquartile Range (Tukey 1977). We will use this definition in the other studies. We performed a GLM analysis with the number of prizes and the number of picture as independent factors. Contrary to our expectations, the number of images (only one vs. 2 or 12) does not have a main effect on the evaluability of the number of prizes ($F(1,84)=.56, p>.4$). However the interaction between the two factors is marginally significant ($F(1,84)=2.77, p=.1$), meaning that the image

manipulation is not affecting the evaluability of two prizes and twelve prizes the same way. The contrasts reveal indeed that when only one image is displayed, 12 iPods is significantly less evaluable than 2 iPods ($m_{2iPods} = 4.35$, $m_{12iPods}=3.26$, $t(31.22)=2.405$, $p=.02$). However it is not the case when a consistent number of pictures are shown: 12 iPods is as evaluable as 2 iPods ($m_{2iPods} = 3.98$, $m_{12iPods}=4.25$, $t(43.60)=.445$, $p>.6$).

Figure 2

Evaluability of the Number of Prizes As a Function of the Number of Prizes and the Number of Images
(Essay 1, Study 1)



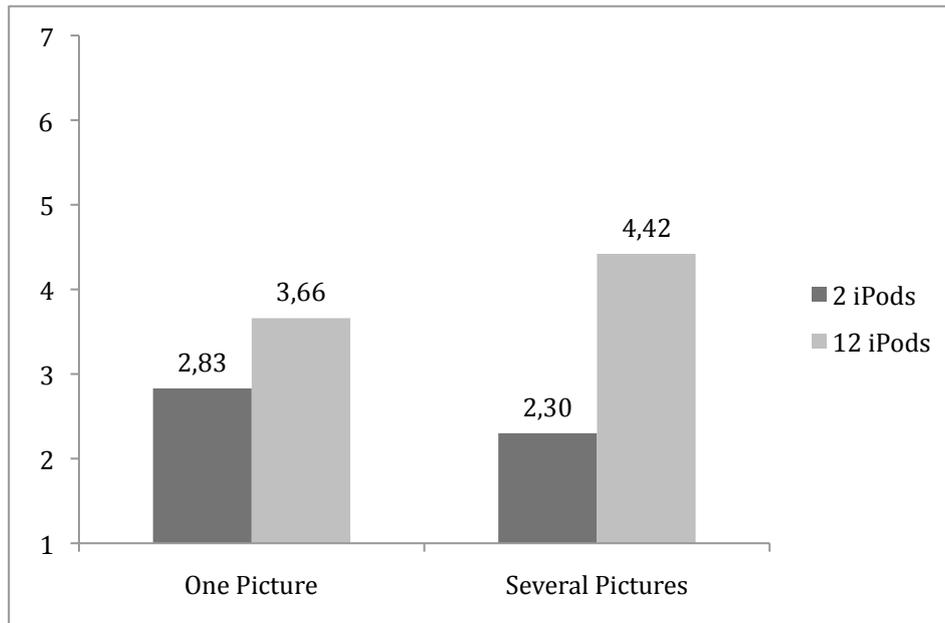
Desirability of the number of prizes. Two outliers were removed. When the number of iPods to win is illustrated only by the picture of one iPod, participants do not evaluate differently 2 vs. 12 iPods ($m_{2iPods} = 2.83$, $m_{12iPods}=3.66$, $t(46.84)=1.715$, $p=.093$). However, when the number of iPods to win is illustrated by a consistent number of pictures, the valuation of the two different numbers of prizes strongly differ ($m_{2iPods} = 2.300$, $m_{12iPods}=4.417$, $t(34.81)=4.306$, $p<.001$).

Figure 3

Evaluation of the Number of Prizes as Being High or Low

As a Function of the Number of Prizes and the Number of Images

(Essay 1, Study 1)



Hence this result replicates the impact of the number of prizes and the number of images on estimated probability of winning. When consumers visualize two iPods, it is easier for them to figure out that the chances of winning one of them are weak whereas visualizing twelve of them is more easily interpreted as a good signal for the odds of winning.

Discussion

The visual display of several images improves the sensitivity of the probability estimates by improving the evaluability of the number of prizes judged in isolation. However, whatever the visual layout, the number of prizes has no direct impact on participation intention. It has no mediated influence through the estimated probability of winning neither,

since the estimated probability doesn't influence participation intention. This is first evidence that decision making without likelihood judgment adds up to magnitude insensitivity. Participation intention does not depend on estimated odds of winning but rather on prize attractiveness and individual differences related to sweepstakes proneness. The significant impact of prize attractiveness is consistent with the outcome prominence effect: As incomplete information renders the probability of winning ambiguous, people rely all the more on their valuation of outcomes (i.e. prizes).

STUDY 2

Study 2 intends to provide more direct evidence for the evaluability explanation. The evaluability of an attribute, i.e. whether it is hard or easy to evaluate, depends indeed on the amount of knowledge the decision maker has on the attribute, especially about its effective range, its neutral point and its value distribution (Hsee 2000). Yeung and Soman (2005) elaborate on this definition and propose that evaluability of an attribute is the degree of difficulty associated with the evaluation of a product based solely on the level of the attribute alone, independent of any contextual information. Information about the distributional properties of an attribute allow to judge the desirability of a given value for the attribute. For lotteries, the number of winners is difficult to judge as high or low for people who have no idea about the usual numbers of prizes offered by this kind of games. In this study, I experimentally manipulate evaluability by providing information on the usual range of the number of winners or prizes in promotional lotteries.

Procedure

One hundred and fifteen undergraduate students from a large northeastern university in the United States took part in the study. Participants first read the following introduction: “Sweepstakes are a common promotional practice, in which winners are designated through a random drawing. They may require from the participants to visit a store, a website and to give some personal information in order to enter the drawing. We would like to have your opinion on a series of sweepstakes. These are representative of the variety of offers that you can encounter in real life for sweepstakes offering average-value prizes.” Five sweepstakes were then described including the type of organizing brand, the type of prizes and the requirements to enter the drawing. For each sweepstakes, they were asked questions such as: “Is the type of prize consistent with the organizer?” or “How demanding are the requirements to enter the sweepstakes?” (see an example in Appendix 3). In the high evaluability condition, each sweepstakes description included the precise number of rewarded winners, six winners for Sweepstakes 1, four for Sweepstakes 2, five for Sweepstakes 3, one for Sweepstakes 4 and ten for Sweepstakes 5. One of the questions about the promotion also dealt with the number of winners to reinforce the manipulation: “What do you think about the number of winners (10)?”. Thus in the high evaluability condition, participants were provided with information about the number of winners that are rewarded by sweepstakes offering average-value prizes (e.g. a 100ml female fragrance or an iPod Nano): the number of winners ranged from one to ten with an average of five. In the low evaluability condition, the same five sweepstakes were presented but the exact number of winners was not specified in the description.

After reviewing these five examples of sweepstakes, all the participants had to answer questions about their personal reactions to a last promotional offer, that I call hereafter the target sweepstakes. This ‘target’ scenario asked them to imagine that during their last visit at the DVD store, they were invited to visit the website where they could enter a sweepstakes by

ranking their favorite movies and giving their email address. The number of winners was manipulated between subjects: the DVD store rewarded either two or eight winners with the complete series of their favorite TV show. The two-winner condition was in the lower range of values to which participants in the high evaluability condition had been exposed to, whereas the eight winner condition was in the upper range. Consequently, I expect that in the high evaluability condition, people will estimate their chances of winning to be lower when the target sweepstakes rewards two winners than when it rewards eight winners. Participants were randomly assigned to one of the four different conditions in a 2 (Evaluability: Low vs. High) x 2 (number of winners: 2 vs. 8) between-subject design.

After reading the scenario for the target sweepstakes, respondents were asked how likely they would be to visit the website and participate to the sweepstakes on a 7-point scale. Then they had to estimate their chances of winning should they participate, on a visual analog scale from “Absolutely no chance” to “A good chance”. They also judged the attractiveness of the prize.

In the last part of the study, participants answered the same item I used in the follow up of study 1 to measure evaluability of the number of winners: “Do you have any idea if {number of winners in the condition: 2 or 8} winners is a high or low number of winners for a sweepstakes offering average-value prizes? “ on a 7-point scale from “I don’t have any idea” to “I have a very good idea” (adapted from Hsee 2000). Only in the high evaluability condition, I asked the respondents to give the minimum, maximum and average number of winners rewarded by the sweepstakes they evaluated before, to know if they paid attention to the number of winners. Finally the sweepstakes proneness (Lichtenstein et al 1995) scale was administered to all participants.

Results

Manipulation check. Providing the number of winners for the first five sweepstakes increases the evaluability of the number of winners for the target sweepstakes ($m_{\text{low eval}}=3.74$ vs $m_{\text{high eval}}=4.43$, $F(1,110)=3.85$, $p=.05$). Interestingly, two winners was also more evaluable than eight winners was ($m_2=4.51$ vs $m_8=3.6$, $F(1,110)=5.99$, $p=.02$). The interaction between the two factors is not significant. ($F(1,110)=.67$, $p>.4$). Hence, the evaluability manipulation seems to have the intended effect on participants evaluation of the number of winners in the target sweepstakes.

Subjective chance of winning. Twenty-five (25) participants in the high evaluability condition who did not recall correctly the maximum, minimum and average numbers of winners in the sweepstakes they evaluated were dropped from the analysis. These distributional information are indeed crucial to the manipulation, which is supposed to enlighten the judgment about the number of winners in the target sweepstakes. So it's important to keep only participants who remember them. A univariate ANOVA is used for the analysis with the number of iPods and the number of pictures as discrete between-subject factors, and their interaction.

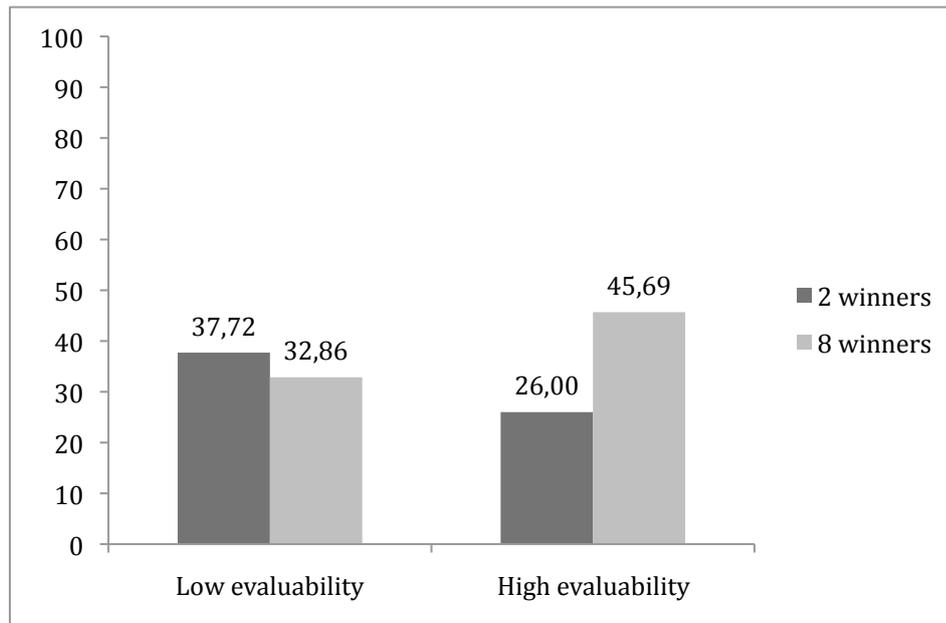
Both factors have no significant main effects (all $F_s < 2$). However there is a significant interaction ($F(1,83)=4.02$, $p < .05$). In the low evaluability condition, participants do not perceive they have higher chances of winning when eight winners are rewarded rather than only two ($m_2=37.72$ vs. $m_8=32.86$, $t(51.40)=.67$, NS). On the contrary, in the high evaluability condition, people think they have higher chances of winning when there are eight winners compared to two ($m_2=26.0$ vs. $m_8=45.69$, $t(24.68)=2.17$, $p < .05$) (see figure 4).

Figure 4

Subjective Probability of Winning As a Function of the Number of Winners

And the Evaluability of the Number of Winners

(Essay 1, Study 2)



Participation intention. The same analysis is performed with participation intention as the dependent variable and prize attractiveness and sweepstakes proneness as covariates. Evaluability and the number of winners do not have any significant main effect or interaction (all $F_s < 1$, NS). However, participation intention was positively influenced by prize attractiveness ($F(1,81)=36.56$, $p < .001$) and sweepstakes proneness ($F(1,81)=12.77$, $p = .001$) as in study 1. Furthermore when I regress participation intention on subjective chance of winning, prize attractiveness and sweepstakes proneness, the first variable has no significant impact ($b = .003$, $t = .45$, NS) while the two other ones have (respectively, $b = .56$, $t = 6.26$, $p < .001$ and $b = .43$, $t = 3.47$, $p = .001$).

Discussion

Study 2 provides more direct evidence about the role of evaluability on the magnitude insensitivity of estimated chance of winning a promotional lottery. When consumers are provided with information about the distributional characteristics of the number of winners for comparable sweepstakes, then they infer they have a greater probability of winning when there are more winners rewarded, even when they assess the lottery in isolation. However, as in Study 1, this effect of evaluability on magnitude sensitivity of likelihood estimates does not occur for participation intention. Consumers do not seem to adopt a strategy akin to expected utility models to make their entry decision, and do not rely on their subjective probability of winning.

STUDY 3

In study 3, I investigate another boundary condition of magnitude insensitivity. In study 1 and 2, I found that, without visual reinforcement or contextual information, people's subjective probability of winning did not change between two and twelve prizes or two and eight prizes, which may be considered as a moderate variation. I suspect however that bigger variations such as between ten and one hundred should reflect in people estimates, as these numbers are evaluable in and of themselves. Hsee (2000) acknowledges such a possibility when mentioning that a given attribute can be difficult to evaluate within a certain range but easier to evaluate in another range: for example, 10,000 entries for a music dictionary is hard to evaluate but 50 entries is clearly not desirable.

I also control for an alternative explanation to observed magnitude insensitivity. It is arguable that estimated probability of winning does not vary with the number of prizes to win, not because people are magnitude insensitive but because they make inferences about the

number of participants. They may indeed be sensitive to the increase of the number of prizes and estimate that the more prizes the more participants. The increase of the estimated number of participants may ‘cancel out’ the increase in the number of prizes (i.e. the number of winners), resulting in no variation of the estimated probability. Asking people their guess about the number of participants will enable to control for this alternative explanation.

Finally, I test more directly the hypothesis that people usually make their entry decision in promotional lotteries without integrating a likelihood judgment. For this purpose, I prompt participant to think probabilistically or not by manipulating the order in which they have to state their participation intention and to estimate their chances of winning the drawing (e.g. Rottenstreich and Kivetz 2006, Goldsmith and Amir 2008). I expect that if participants are asked first about their probability estimates, then they will take it into account in their entry decision that should consequently be sensitive to large variations of the number of prizes. When they are first asked their participation intention, as in study 1, they shouldn’t estimate their probability of winning spontaneously and will make their decision independently from even large variations of the number of prizes at stake.

Procedure

One hundred and fifteen MBA students answered the paper-and-pencil questionnaire during a course.

They had to imagine they were browsing a music web site featuring news, reviews and interviews on various kinds of music. They discovered that the web site was currently organizing a sweepstakes for the launch of the new iPod nano (new design and new features). As in study 1, the scenario then included an advertisement for the game, which featured pictures of the iPods and read “Participate to the Music-News.com lottery and maybe listen to your favorite songs on the new iPod Nano”. Participants were randomly assigned to one of

four versions of the advertisement differing on the number of iPods to win. The participants read in the ad either ‘ “1” or “10” or “100” or “1000” iPods Nano to win’. To draw people attention on this number, it was made salient through a bold and bigger font and a star surrounding it (see Appendix 4). Then participants were told that to participate they only needed to enter their e-mail address and that an opt-in question allowed them to specify if they did not wish to receive other promotional offers at this e-mail address.

As dependent variables, participants were asked how likely they were to participate to the drawing and what chances of winning they believed they had. The participation likelihood was measured on 7-point scale from ‘Very Unlikely’ to ‘Very Likely’. The estimated chance of winning was measured thanks to a visual analog scale developed by Woloshin and colleagues (2000) to measure perception of event probabilities, particularly low probabilities. The scale featured a magnifying glass to represent probabilities between 0 and 10% on a logarithmic scale (see Appendix 5). Our second manipulation regarded the order of these two questions. In the probability prompting, the probability scale came first, while in the no probability prompting condition, participation intention was assessed first.

Then, I asked the participants in an open-ended answer how many people would enter the drawing according to them. Finally, data on subjects’ enjoyment of sweepstakes and general tendency to buy products associated with such games were collected, using again the sweepstakes proneness scale developed by Lichtenstein, Netemeyer and Burton (1995) (Cronbach’s alpha = .81).

Results

Estimated Probability of winning. Answers on the visual analog scale with the magnifying glass are interpolated to obtain the probability measures. Most respondents (106 out of 113 answers) used the magnifying glass and believed that their chances of winning an

iPod Nano was inferior to 10%. The average probability is 1.79% (s.d. = .07). As answers are not well-behaved (skewness = 5.90, SE=.23; kurtosis=37.50, SE=.45), I perform a logarithmic transformation to obtain a distribution closer from a Gaussian distribution (after transformation, skewness=.80, SE=.23 and kurtosis=-.30, SE=.45).

Six extreme outliers are removed because they lie outside the interval $[Q1 - 3 \times IQR; Q3 + 3 \times IQR]$, where $IQR = Q3 - Q1$ is the interquartile range (Tukey 1977). This definition will be used in the other studies. A univariate ANCOVA is performed with the number of iPods and the order of questions as discrete between-subject factors and sweepstakes proneness as a covariate. The number of iPods to win has a significant main effect on the estimated chances to win ($F(3,100)=9.847$; $p<.001$). The analysis of contrasts between successive levels of the factor reveals that there are significant differences between 100 iPods and 1000 iPods ($m_{100}=-7.57$ corresponding to .05% before the logarithmic transformation, $m_{1000}=-6.94$ corresponding to .10%, $d=1.941$, $p<.001$) and between 10 and 100 iPods ($m_{10}=-9.53$ corresponding to .001%, $d=1.977$, $p<.001$). However the contrast between 1 and 10 iPods was far from reaching significance ($m_1=-9.55$ corresponding to .001%, $d=.014$, $p>0.5$).

The order of the questions about participation likelihood and the estimated probability to win has a marginally significant main effect on the estimated probability ($F(1,100)=3.556$; $p=.06$). The estimated chances are higher when participants evaluate their participation likelihood first. However, the order of the questions did not interact with the manipulation of the number of prizes ($F(3,100)=1.642$; $p>.1$).

Finally, sweepstakes proneness has a significant positive influence on estimated probability of winning ($F(1,100)=4.515$; $p<.05$).

Estimated number of participants. Can this pattern of results be explained by inferences on the number of participants, i.e. the denominator of the probability of winning? The initial

distribution of answers is not well-behaved (skewness=10.00 , SE=.23 and kurtosis=102.03, SE=.46) ; I remove one outlier (who estimated the number of participants to be 120 million) and perform a logarithm transformation (skewness=.13, SE=.24 and kurtosis=-.62 , SE=.47).

Running a one-factor ANOVA, I find no significant impact of the number of prizes on the estimated number of participants ($F(3,102)=2.11$; NS), meaning that the denominator estimation is not increasing with the numerator, i.e. the number of prizes.

I calculate the probability to win for each respondent by dividing the number of prizes to win in their experimental condition by their estimation of the number of participants. I then take the natural logarithm of this calculated probability to win. As expected, this quantity increases significantly with the number of prizes ($F(3,102)=34.11$; $p<.001$). The contrast between 1 and 10 prizes is significant ($t(102)=2.27$; $p=.025$), the contrast between 10 and 100 prizes is significant ($t(102)=4.90$; $p<.001$) but the contrast between 100 and 1000 prizes is not significant ($t(102)=1.50$; $p>.13$). This pattern of results is fairly different than what is obtained when participants directly estimate the probability of winning. It suggests that people do not go through the estimation of the number of participants to come up with an estimation of their chances to win the drawing.

Participation Intention. An ANCOVA is used for the analysis with the number of iPods and the order of questions as independent factors, their interaction, and the sweepstakes proneness score as covariate. In line with the above analysis of the estimated chances of winning, the order of questions about participation intention and estimated probability has a significant main effect on participation likelihood ($F(1,107)=9.306$; $p<.01$). Participants are less likely to enter the sweepstakes when they evaluate their chances to win first than second. However, the interaction between the counterbalancing and the number of prizes is not significant ($F(3,107)=0.614$; $p>0.5$).

Sweepstakes proneness has a significant influence on participation intention ($F(1,107)=15.855$; $p<.001$). As expected, the more the respondents like promotional games in general, the more willing they are to participate to this sweepstakes.

Most importantly, I find no significant effect of the number of iPods to win ($F(3,107)=2.029$; $p>0.1$). In other words, people are not more likely to participate to the game if there are 1 or 10 or 100 or 1000 prizes at stake.

Mediation Analysis. When I run again the above ANCOVA with the number of prizes and the order as independent factors (I dropped the non-significant interaction), the sweepstakes proneness and the transformed estimated probability as covariates, the estimated probability does not significantly affect participation intention ($F(1,101)=.195$; NS).

Following the recommendations of Preacher, Rucker, and Hayes (2007; see their model 3, p. 208), I performed a moderated mediation to test whether the relation between the number of prizes and participation is mediated by the estimated probability of winning, and whether this mediation is moderated by the order of the participation intention and the estimated probability of winning. This model (i.e., SPSS macro) automatically repeats all of Baron and Kenny's (1986) steps and provides the confidence interval for the reduction in the direct effect of number of prizes on participation intention when I include the mediator (i.e., logarithm on estimated probability). The model performs this procedure for the order conditions separately. When participants are first asked their participation intention, the estimated probability of winning does not mediate the effect of the number of prizes on participation intention (95% bootstrap confidence interval [CI]; $-.0008 < Z < .0002$). However, when I prompt participants to think about their probability of winning by asking their estimates first, their subjective probability mediates the effect of the number of prizes on participation intention (95% bootstrap CI; $.0000 < Z < .0011$).

Discussion

This study replicates findings about people insensitivity to moderate variations (one to ten) of the number of prizes offered by a promotional game based on chance. Moreover I did not find evidence that this stability of estimated probability of winning results from some ‘rational’ inferences about the number of participants. However, perceived odds of winning start increasing for larger variations (10 to 100, 100 to 1000) and magnitude insensitivity seems to be affected by threshold effects.

An increase in estimated odds of winning does not always entail greater participation intention. In the default setting (no probability prompting), potential participants seem actually to make their entry decision without likelihood judgment, as I hypothesized. Only prompting them to estimate the odds of winning puts them in a probabilistic mindset (Rottenstreich and Kivetz (2006), where increases of the number of prizes have an indirect impact on participation intention through estimated probability of winning.

The order of questions about subjective probability and participation intention also impacts the answers to these two questions. When they are first asked about their participation intention, respondents tend to give lower estimates afterwards. This result is in line with the findings of Brownstein et al (2004), who asked participants to rate horses’ chances to win a simulated race before and after placing a bet on a horse. They found out that the rating of the chosen horse increased after betting. They explain this effect by people desire to maintain consistency throughout a cognitive system. The other way round, respondents are less willing to participate when they are asked about their chances just before. Asking probability to win first may remind people of the small chances to win and discourage them from entering the drawing.

GENERAL DISCUSSION

Although the number of prizes is generally considered to have a positive influence on the attractiveness of sweepstakes, this paper shows that, in many cases, a moderate increase of the number of prizes does not change consumer intention to participate. First, people's judgments display magnitude insensitivity because the number of prizes at stake in a given lottery is difficult to interpret as a good or bad signal when it is judged in isolation. However magnitude insensitivity disappears when the number of prizes is underlined by the same number of pictures, when consumers are provided with distributional characteristics for the number of winners and when the increase is larger. Second, even in situations where consumer estimates of their probability of winning increase with the number of prizes, this increase is not always observable in participation. People seem indeed to make their entry decision independently from their subjective probability of winning, at least when they are not prompted to do so.

In studies 1 and 2, increasing the evaluability of the number of winners reflect in subjective probability of winning but not in likelihood to participate. At first sight, this result may sound surprising owing to new research on discriminability and preference reversal. Burson and colleagues (2009) show indeed that improving the discriminability of an attribute by expanding its scale (e.g. from 10 points to 100 points) increases the weight of this attribute in multi-attribute choice and can ultimately result in preference reversal. In their first study, participants have to evaluate cell-phone plans described in terms of number dropped calls and cost. Number of dropped calls is either on an expanded scale (dropped calls per 1,000 calls) or on a contracted scale (dropped calls per 100 calls). Price is also described either on an expanded scale (price per year) or on a contracted scale (price per month). Participants prefer the plan that is superior on price when price is expanded and the number of dropped calls is

contracted. However, preferences favor the plan that is superior on the number of dropped calls when the number of dropped calls is expanded and price is contracted. In the same vein, greater magnitude sensitivity of subjective probability of winning could have increased the impact of this attribute in the participation decision. However, it appears that magnitude insensitivity is not the only factor at play and that people do not use probability estimates unless they are prompted to do so. Furthermore, participants in Burson and colleagues studies were asked to compare two options while our participants evaluate lotteries in isolation.

This paper investigates how consumers react to a certain type of contextualized uncertainty. In decision research, uncertainty has been operationalized in different ways, through verbal likelihood expression (“is likely to”, “is very likely to”) or through vague numerical representations (Kuhn 1997). The latter encompassed range of probabilities (e.g. Bier and Connel 1994), anchoring values (e.g. Highhouse 1994), or spinners partially obliterated (e.g. Hönekopp 2003). However these manipulations do not reflect the kind of ambiguity characterizing probability of winning in promotional lotteries. In advertisements for sweepstakes, people are provided with partial information that constitute only cues to estimate the probability to win, such as the number of winners. The missing information, i.e. the total number of participants, can only be imperfectly inferred from the other characteristics of the promotion (attractiveness of prizes, requirements of participation). Furthermore, consumers are not prompted to do this inference work and more generally to think probabilistically as they implicitly are in the gambling paradigm.

In study 1, I found a significant impact of the judged attractiveness of prizes on participation intention whereas the estimated probability of winning had no impact. I suggested that this pattern of results could be consistent with the outcome prominence effect according to which outcomes gain more weight in a decision when the probability is ambiguous compared to non-ambiguous. However one limitation of study 1 was that prize

attractiveness was just measured and not manipulated. An interesting extension could be to compare participation intention between a sweepstakes offering a small number (e.g., 1) of high value prizes (\$100 gifts) against a sweepstakes offering a larger number (10) of lesser value gifts (\$10 gifts). More people could prefer the lesser value-higher number offer when the number is made evaluable (through visual reinforcement for example) and a probabilistic mindset is prompted, compared to the default condition where people do not take account of their probability of winning in their participation decision. This may represent an interesting future avenue for research.

Further research may also consist in exploring other kinds of probability cues imbedded in advertisements for promotional games. For example, promotional games following a “winner per store” mechanism can also mention the « scope » covered by the game. Consumers may read « 1 car to win for all stores in Ile-de-France ». However people also seem to be insensitive to this type of information and studies of willingness to pay for public goods offer numerous demonstrations of the ‘scope neglect’ phenomenon (Tversky & Kahneman 1983). For instance, survey respondents in Toronto were willing to pay almost as much to clean up the lakes in a small region of Ontario or to clean up all the lakes in that province. However, Raghubir (2008) showed recently that the more salient the denominator of a base rate is, the more the information draws attention to the population on which it is based. Information concerning smaller populations or sample groups, as well as geographically proximate populations, makes it easier for consumers to bring to mind the population involved. The increased salience of the denominator increases the attention paid to the numerator and translates into perceptions of greater risk. Thus, it would imply that if a same number of prizes were at stake in Paris or in France, people would pay more attention to the number of prizes in the first condition than in the second, and believe they have higher

chances to win in the narrow scope condition, consistently with their actual odds of winning. However, Raghubir's studies deal with health risk and not with the chances of benefiting from a lucky draw. Confronted to this empirical question, I found some preliminary evidence in favor of the scope neglect hypothesis. I asked participants to imagine they had to choose between two leading movie theatre chains to watch a movie: Gaumont and UGC. The Gaumont multiplex is 10-minute walk away from participant's home whereas the UGC multiplex is 20-minutes away. But the UGC is currently running a sweepstakes in several of its multiplexes, in which one hundred spectators are randomly drawn and win a 10-tickets pass. I manipulated the probability cue between-subject through the scope of this sweepstakes: in the low scope condition, the 100 spectators are picked among all the UGC movie theaters in Paris, while in the high scope condition, the 100 spectators are randomly drawn among all the UGC movie theaters in France. I found no effect of the geographical scope on people choice between UGC and Gaumont nor on their estimates of the probability of winning should they participate to the UGC drawing. This scope neglect did not disappear when I provided respondents with more precise information on the geographical scope by mentioning the number of UGC screens or the average number of spectators involved. Also more research is needed, people seem to be even less sensitive to variations of the denominator of their probability of winning than to variations of the numerator. This is consistent with literature on denominator neglect (Reyna & Brainerd 2008) and background neglect (Stone et al. 2003) that shows that people tend to focus on foreground information or numerator and neglect background information or denominator.

ESSAY 2

The Interpersonal Hot Hand Fallacy: How Similarity with Previous Winners Increases Subjective Probability of Winning

Abstract

Organizers of promotional or state lotteries often feature a recent winner in their advertisements, depicted by a photograph and some personal information. A consumer fallacy that constitutes the focus of this study may explain this choice. That is, potential participants in a lottery estimate their odds of winning the next drawing as higher when previous winners are similar to them than when they are dissimilar, which induces greater intentions to participate. The effect, referred to herein as the “interpersonal hot hand fallacy,” occurs across various manipulations of similarity (e.g., age, gender, educational background). It disappears when respondents have objective information about their actual odds of winning—rare information in the context of real-world lotteries. Showcasing previous winners seems to lead people to attribute the winning outcome to personal luck, and consequently to expect a positive effect of similarity. This research adds to vast literature that shows interpersonal similarity affects people’s attitudes, beliefs, and behavior: in conditions of uncertainty, similarity also can influence their estimates of the probability of benefiting from a random positive outcome.

INTRODUCTION

When they advertise, promotional and state lotteries commonly feature previous winners, using both photographs and personal information about them, such as their demographic characteristics, how they participated in the lottery, what they plan to do with their prize, and how they use the sponsoring product. For example, McDonald's launched the 17th iteration of its Monopoly promotional game in 2007 by featuring Charlotte Meade, the 2006 winner of \$1 million, in its television commercials (see Appendix 6). Because lottery organizers hope to attract as many participants as possible (to sell more tickets, create online or in-store traffic, or build databases), they must believe this practice increases consumers' intention to participate. Relying on evidence from five experiments, I propose that the underlying mechanism involves what I call the "interpersonal hot hand" fallacy that leads potential participants to estimate higher odds of winning the next drawing when they are similar to the previous winners than when they are dissimilar. This biased belief then increases their intention to participate.

A first mechanism explaining why marketers may showcase previous winners seems obvious: Compared with an advertisement that does not feature a winner, a promotion highlighting the victor provides direct, credible evidence that a person can and does win the lottery. This message counteracts the cynicism that customers express about their chances of winning a lottery (Quinton 2008).

But an examination of the featured winners suggests that a complementary mechanism also may be at work. During McDonald's advertising campaign for its 2008 Monopoly game, it showcased past winners of lesser cash prizes in its in-store promotional materials, television advertising, and video clips online, rather than focusing all the campaign on Charlotte Mead, a retired teacher, and her large prize, as they did in 2007. The featured winners represented a

variety of socioeconomic profiles (married women, students, etc.) from different states. Similarly, the Michigan State Lottery featured an elderly man, an Afro-American family, and a young woman together as a group of previous winners (see Appendix 7); American Dreamcard showcased winners with very different profiles (Appendix 8). It appears that these lottery organizers purposefully chose a diverse set of winners to feature, such that many potential future participants could feel similar to at least one of them in terms of sociodemographic profile. In other examples, the featured winner appeared typical of the target market for the brand or company, such as a college student for Apartments.com; a housewife accompanied by her husband for Purex laundry detergent; and a retired housewife from a small village for *Sud-Ouest*, a regional French newspaper (Appendices 9–11).

If potential participants feel similar to previous winners in one way or another, why should it increase their intention to participate in the lottery? As I already mentioned in Study 1, most lotteries mention the prizes to be won but provide little or no information about the potential number of entrants, which means participants do not know their probability of winning and cannot estimate it objectively. Potential lottery participants therefore make their decision in conditions of uncertainty (Gilboa, Postlewaite, and Schmeidler 2008). The entry decision also likely involves little involvement, considering the relatively low cost of state lottery tickets and the rules against promotional games requiring monetary consideration. I therefore propose that the similarity with the showcased winner constitutes a salient heuristic cue on which people rely to gauge their odds of winning the next drawing. Previous literature could lead to hypothesize either a positive or a negative effect of similarity on estimated probability, but I show particularly that the former holds and that potential participants estimate they have higher chances of winning the next drawing when they are similar to the previous winners compared with when they are dissimilar. I call this effect the “interpersonal

hot hand fallacy” and demonstrate that biased beliefs about chances to win increase people’s intention to play.

I derive our proposed name from the “hot hand” fallacy (Gilovich, Vallone, and Tversky 1985), according to which basketball fans believe a specific player has better chances of hitting the next basket after a successful shot than after a miss. I extend “hot hand” with the adjective “interpersonal” because our conceptualization pertains to persons *similar* to the previous winner, who believe they have higher chances to win during the next drawing. Previous research shows that interpersonal similarity can affect attitudes, beliefs, and behavior (e.g., Cialdini and Goldstein 2004; Festinger 1954; Suls, Martin, and Wheller 2000); I also show that it influences people’s estimates of the probability of winning in situations marked by uncertainty, in which they lack objective information about the actual probabilities of success.

To investigate this fallacy, I manipulate the characteristics of the featured winners and thereby reveal that a higher similarity with previous winners leads respondents to express a greater intention to participate, whether their similarity is based on age, gender, or education major. This effect is mediated by a greater perceived probability of winning, and it disappears when I eliminate uncertainty by giving the participants objective information about their actual odds of winning (as lotteries do not do in the real world). Furthermore, the attribution of winning to personal luck seems to explain the positive effect of interpersonal similarity on subjective odds of winning. In successive studies, I also eliminate several alternative explanations of the effect.

The remainder of this article proceeds as follows: I briefly review existing literature on the hot hand fallacy and the gambler’s fallacy (which would lead to a hypothesis of a negative effect of similarity), as well as on the impact of interpersonal similarity. To test the

hypotheses I derive and to rule out alternative explanations, I run six experimental studies. In our final discussion, I identify some managerial implications and further research directions.

THE HOT HAND FALLACY VERSUS THE GAMBLER'S FALLACY

The hot hand fallacy refers to a biased belief about the sequential characteristics of hits and misses in basketball (Gilovich, Vallone, and Tversky 1985). Basketball fans believe that a player has higher chances of scoring after a basket than after a miss—despite objective statistical evidence showing that the series of hits and misses in successive attempts by the same player in the same game can best be described by a binomial random variable with a constant success rate. That is, the outcome of each attempt is actually independent from the outcome of the previous attempt. The hot hand bias also emerges in lab studies, in which people exhibit more confidence in their guesses about what color will appear next after a string of correct guesses than after a string of incorrect guesses, even though the two colors appear randomly (Ayton and Fischer 2004). In casino gambling contexts, people also increase their bets after winning (Sundali and Croson 2006).

The opposite fallacy also can be observed: The gambler's fallacy leads people to expect a binary outcome to be followed by the opposite outcome rather than a repeated outcome, even if successive trials are independent (Tversky and Kahneman 1971). This bias influences actual betting behaviors in lottery play; in an analysis of the Maryland daily numbers game, Clotfelter and Cook (1993) find that the amount of money bet on a given number falls sharply immediately after it gets drawn and then recovers gradually to its former level over the course of several months.

These two fallacies could emerge when advertisements for lotteries showcase a previous winner: Potential participants may estimate they have higher chances of winning the next

drawing when they are similar to the featured winner (i.e., the hot hand fallacy), or they may feel their chances are boosted if the previous winner is dissimilar (i.e., the gambler's fallacy). Although the hot hand and gambler's fallacies traditionally have been attributed to a belief in the law of small numbers (e.g., Camerer 1989; Rabin 2002), recent research instead suggests the hot hand phenomenon may occur when people attribute the sequence of outcomes to human performance, as in basketball, or more generally to an animate cause (Ayton and Fischer 2004; Burns and Corpus 2004). Recently, Roney and Trick (2009) showed that drawing observers' attention on the person tossing a coin leads them to predict the repetition of the last outcome, consistently with the Hot Hand Fallacy. The gambler's fallacy instead occurs when people attribute the sequence of outcomes to an inanimate cause, as in a casino (Ayton and Fischer 2004). In their review about judging sequences of binary events, Oskarsson and colleagues (2009) suggest that the extent to which randomness, intentionality, and control are perceived by the observer as descriptive of the sequence-generating mechanism is strongly indicative of the observers's prediction of positive vs. negative recency.

Research on luck versus chance attributions, which likely play a significant role in gambling behavior (Rogers and Webley 2001) is also consistent with this idea. Chance and luck offer two possible causes for events; whereas "chance operates as a fair and balanced distributor which produces all possible outcomes with equal frequencies in the long and short run ... the effect of good luck is supposed to produce longer sequences of winning, the effect of bad luck to produce long streaks of losing" (Wagenaar and Keren 1988, pp. 65–66). Contrary to chance, which is external and uncontrollable, luck represents a personal stable attribute and a source of perceived control (Darke and Freedman 1997). Past luck leads to positive expectations for success in the future, similar to the hot hand fallacy.

On the one hand, people might attribute the winner designation to an inanimate cause or chance due to the random lottery process, which should result in a phenomenon akin to the gambler's fallacy, such that participants expect they have lower chances to win when they are similar to the last winner. On the other hand, by showcasing "lucky" previous winners and their personal information in promotional material, lotteries appear to focus on a potential human cause, and overlook the inanimate random character of the lottery by not mentioning the probability of winning. Dijksterhuis and colleagues (2008) found out that heightening the mere accessibility of an agent increases the tendency to attribute the authorship of an event to this agent and that this authorship processing does not require conscious awareness. Therefore I hypothesize that this focus leads potential participants to attribute the outcome of the drawing to the previous winners' luck and, in the absence of objective information about their chances to win, estimate they have higher chances if they feel similar to these "lucky" previous winners. This extension of the hot hand fallacy to interpersonal situations thus is situated at the center of extensive literature pertaining to the impact of perceived interpersonal similarity on beliefs, judgments, and behaviors in contexts characterized by incomplete information.

IMPACT OF INTERPERSONAL SIMILARITY

Advertisements for promotional games and lotteries do not explicitly state participants' probability of winning. Consumers instead have to rely on their estimations, which may demand significant cognitive effort to perform normatively. For example, they may need to estimate the total number of participants, given the characteristics of the game. However, the entry decision is likely to be less involving because of the minimal costs at stake. As a consequence, consumers may rely on heuristics to estimate their probability of winning. This

reasoning is all the more true for promotional games; in France, as in many countries, the law prohibits asking consumers for monetary input to participate in a promotional game based on chance. That is, to enter, participants cannot be required to purchase a product but may be asked to perform some time-consuming task (e.g., answering simple questions, depositing an entry form in an urn, completing a form on the Internet). Monga and Saini (2008) show that people rely more on heuristics when time is at stake rather than money.

A highly accessible heuristic attribute appears in the similarity information that the advertisement implicitly offers by providing very basic, general demographic information about previous winners, mostly conveyed by a picture, such as gender, age, or ethnicity. Significant research shows that similarity to others is especially informative when information is incomplete. According to the similarity hypothesis (Festinger 1954), people compare themselves with others when they are uncertain about their own beliefs and opinions, and similar others provide the most preferred standard. Literature on endorsement reveals that similar endorsers are more effective persuaders than are dissimilar endorsers; for example, in the context of testimonial or word-of-mouth advertising, similarity to the message source (e.g., educational background, occupation) increases the source's ability to shape the attitudes and purchase intentions of message recipients (Feick and Higie 1992). Suls, Martin, and Wheeler (2000) reaffirm the special role of similar others on preference assessments, such as responses to the question, "Do I like this?" More generally, uncertainty reduction can play a key motivational role in self-categorization and in-group identification (Reid and Hogg 2005). Finally, social influence literature highlights the behavioral consequences of similarity and how it can increase compliance with a request (e.g., Cialdini and Goldstein 2004; Jiang et al. 2009; Shang, Reed, and Croson 2008).

Raghubir and Menon (1998) investigate the impact of similarity on probability assessments and find that college students believe that their best friend (most similar) is at

less risk of contracting AIDS than is an average undergraduate (less similar), who in turn seems less at risk than an average person (least similar). Raghurir and Menon's research question provides a counterpoint to ours: On the basis of similarity between the respondent and others, they investigate perception of the risk of a negative outcome for those others; I investigate perceptions of the chances of a positive outcome for the respondent. Furthermore, they do not investigate perceived probabilities in the context of repeated drawings. Nevertheless, their result suggests that greater similarity should lead a person to predict a more favorable outcome.

But what initiates perceptions of similarity? Social perception theories reveal that in a low-information context, people automatically rely on salient attributes, such as gender, age, ethnicity, or national origin, to allocate others into social categories (Brewer and Harasty-Feinstein 1999; Fiske, Lin, and Neuberg 1999). Furthermore, according to self-categorization theory (Turner 1987), this categorization serves to distinguish similar and dissimilar others into in- and out-groups, respectively (Liviatan, Trope, and Liberman 2008). Mussweiler (2003) also suggests that category membership (e.g., gender, ethnicity) influences holistic similarity judgments. Although consumers can consciously evaluate their relative similarity or dissimilarity to other people, much of this self-categorization occurs without conscious processing (Eiser, Pahl, and Prins 2001; Stapel and Koomen 2000). Therefore, I posit that people who process an advertisement that features previous winners automatically will arrive at a similarity judgment and categorize the previous winner as either similar or dissimilar. This categorization depends on selected personal information provided in the advertisement, most of it conveyed by the picture, such as gender and age, or made salient in the textual information, such as an occupation.

By combining these elements about the hot hand fallacy and interpersonal similarity, I derive our formal hypotheses. First, I hypothesize that people rely on their similarity with the

previous winners to estimate their probability to win the next drawing and, in line with the interpersonal hot hand instead of the gambler's fallacy, that similarity has a positive impact on their estimation.

H₁: Consumers estimate that they have better chances to win a lottery if they are similar to featured previous winners.

Furthermore, I posit that the interpersonal fallacy increases participation intentions.

H₂: Consumers express higher intention to take part in a lottery if they are similar to featured previous winners.

H₃: The positive impact of the respondent's similarity with previous winners on the respondent's intention to participate is mediated by his or her estimation of his or her chances to win.

Finally, people should not rely on their similarity with the showcased winner any more when they know their actual probability to win.

H₄: The effect of similarity on the intention to participate disappears when people do not make their decision under uncertainty, that is, when they have objective information about the probability of winning.

For robustness, I test these hypotheses using three manipulations of similarity with previous winners. These manipulations (age, gender, and education major) are consistent with those used in real life by organizers of promotional lotteries. In Study 1, I test the impact of age similarity with the previous winners on the intention to participate and compare this effect with the impact of the number of prizes to win. Studies 2A and B reveal the impact of similarity on estimated chances to win, using gender and educational background, respectively, as the similarity manipulations. Both studies control for the simulation heuristic, and Study 2A rules out an attractiveness-based explanation. In Study 3, I show that the effect of similarity on participation intention is mediated by the estimated probability to win but not

by the attitude toward the organizing brand. Moreover, the effect proves particularly effective for consumers with a low propensity to participate in such promotional games. Study 4 provides additional evidence for the mechanism by showing that similarity does not influence participation intention when the advertisement provides information about the objective probability of winning. Finally, Study 5 explores the process underlying the positive effect of similarity with the previous winner on subjective chance of winning and shows the role of luck attribution.

STUDY 1

In Study 1, I test H₂: Do consumers express a greater intention to take part in a lottery if they are similar to featured previous winners? Moreover, I contrast the effect of the similarity with the previous winner, which is an irrelevant cue, with the effect of a relevant cue, the number of prizes to win, that should logically impact the subjective probability of winning.

Procedure

One hundred nineteen students in a European Master's of Science in Management program (48 women) participated in exchange for course credit. Respondents imagined they had received a flyer in their mailbox, as presented in the questionnaire. The flyer advertised a sweepstakes organized by a fictitious mobile phone operator, PhonePlus. The prizes were weekends trips for two persons to Barcelona (see Appendix 12). Participants were randomly assigned to four conditions. The design was a 2 (similarity with previous winners: same age versus older) × 2 (probability cue: 1 versus 10 prizes to win) between-subjects design.

I used the age of the previous winners to manipulate similarity. Age drives perceived interpersonal similarity (e.g., Avery, McKay, and Wilson 2007). In the similar condition, the

flyer showed a photograph of a young couple, with text explaining they had won the last sweepstakes organized by PhonePlus. It also specified their first names (Pierre and Marie, two very common first names, which are not age specific), ages (22 years, the average age of the respondents), and place they live (the metropolitan city in which I ran the study). In the dissimilar condition, the text remained the same with regard to the first names and place, but the age (70 years) and photograph differed to reveal an elderly couple. For the other experimental factor, I manipulated the number of available weekends as either 1 or 10, which should provide a cue that people may use to infer their probability of winning. People need both the number of prizes (i.e., the number of winners) and the number of participants in the drawing to come up with their probability to win; I provided participants with only partial information, though they should deem the promotional lottery with ten prizes more attractive than the lottery with one prize. All conditions indicated that to win, the respondents needed to return the flyer to the nearest PhonePlus store.

After reading the scenario, respondents indicated how much time they would be willing to spend to visit the store and enter the sweepstakes (seven-point scale from “1 = 0 minutes, I would not participate” to “7 = 12 minutes”). I use this measure as the dependent variable, because in France, the law prohibits asking consumers for monetary considerations to participate in a promotional game based on chance.

Results

I removed two extreme outliers that lay outside the interval $[Q1 - 3 \times IQR; Q3 + 3 \times IQR]$, where $IQR = Q3 - Q1$ is the interquartile range (Tukey 1977). I use ANOVA to analyze the data, with similarity to previous winners, number of prizes, and the interaction as the between-subject factors. Age similarity has a significant effect on how much time respondents are willing to spend to enter the sweepstakes ($F(1,113) = 5.02; p < .03$).

Specifically, when they are similar to previous winners of the same age, respondents would spend more time, which indicates their higher intention to participate ($m_{\text{sameage}} = 3.31$ versus $m_{\text{older}} = 1.97$). The number of prizes at stake has no significant impact ($F(1,113) = 1.2, NS$), nor does its interaction with similarity ($F(1,113) = .45, NS$).

Discussion

Study 1 provides initial evidence of the positive impact of similarity with the previous winner on the intention to participate. Moreover, respondents' intentions depend more on similarity with previous winners than on the number of prizes, despite the relatively great variation in the latter factor. In other words, showcasing a similar previous winner has a greater impact on the intention to participate than multiplying the probability to win by ten.

STUDY 2A

I undertake Study 2 to test H_1 : Do consumers estimate that they have better chances to win in a lottery if they are similar to featured previous winners? In this case, I manipulate interpersonal similarity through gender. Gender commonly serves to manipulate similarity in social identity research (e.g., Shang, Reed, and Croson 2008). Furthermore, by employing gender, I can rule out an alternative explanation for the Study 1 results that would suggest young respondents are more willing to participate in the promotional lottery when previous winners are young because those younger models are more attractive, not more similar to the respondents. A pretest confirmed that participants perceive young winners of the opposite gender as more attractive than same-gender winners. This claim receives support from the pretest of the four pictures (2 boys, 2 girls) used to feature the previous winners in Study 2. Specifically, I asked the pretest respondents ($N=83$) how attractive each of the four persons

was on a seven-point scale. I then summed the ratings for the two girls and the two boys. Using a repeated measure generalized linear model, I find the expected interaction between respondents gender and target gender ($F(1,81)=5.526$; $p<.05$); that is, male respondents rated the girls' pictures as more attractive than the boys' pictures ($m_{\text{girls}}=8.04$, $m_{\text{boys}}=7.25$), and female respondents offered opposite evaluations ($m_{\text{girls}}=7.17$, $m_{\text{boys}}=7.81$). Therefore, if the higher participation intention associated with previous winners of the same age actually reflects their attractiveness, respondents should estimate a higher chance of winning when the previous winners are of the opposite (i.e., more attractive) gender. On the contrary, if similarity drives this probability estimation, I posit that respondents should estimate their higher chances to win when the previous winners are of the same gender.

In addition, I wish to rule out the simulation heuristic as an alternative explanation for the link between similarity with previous winners and estimated probability to win. I have clarified why contestants might evaluate the chances of winning with a heuristic; in turn, an alternative explanation for the effect of similarity could be the simulation heuristic, according to which people judge the likelihood of an event by mentally constructing scenarios and examples (Kahneman and Tversky 1982). Thus, providing a more or less vivid description of the previous winner may facilitate the mental simulation of winning. The perceived similarity with this previous winner then should accentuate this effect, so similarity or dissimilarity with the previous winners could facilitate or hinder the process of coming up with images of oneself as the next winner. Sherman and colleagues (1985) also offer evidence that the ease and difficulty of imagining an event influence people's belief that the event will occur: When they have trouble imagining symptoms, people tend to think they are less likely to contract a disease, whereas when the symptoms are easy to imagine, they increase their estimated probability of suffering from that disease. Therefore, if similarity with the previous winner improves the ability to imagine winning the lottery, the interpersonal hot hand fallacy actually

may be the result of a simulation heuristic. Finally, mental imagery could directly affect participation intentions by generating positive feeling. Lee and Qiu (2009) show that consumers facing uncertainty associated with a positive event can experience greater, longer-lasting positive feelings than consumers not facing uncertainty. I test these ideas by measuring respondents' ability to imagine winning the next drawing.

Procedure

Fifty-one undergraduates (31 women) from a European business school participated in this experiment for course credit. They imagined that a social network Web site for students regularly organized a random drawing among its members to boost their loyalty. In each drawing, ten varied gifts would be at stake (e.g., weekends in European capital cities, mobile phones, Mp3 players, concert tickets). The scenario then featured the winners of the previous two drawings. Respondents were randomly assigned to one of two conditions. In one condition, the previous two winners were two young women; in the other, they were two young men. Both conditions included pictures of the two winners and text that indicated their first names (common male and female French first names), their ages (21 and 23 years), and their prize (a mobile phone and a weekend in London) (see Appendix 13).

I then asked respondents to imagine they already had a profile on this Web site and that to enter the next drawing they would have to fill in a five-minute questionnaire about the strengths and weaknesses of the site. After they read the scenario, participants indicated their perceived chances of winning if they decided to participate; they provided this estimate as a percentage in response to an open-ended question.

To test for the simulation heuristic explanation, I asked respondents to complete a scale measuring the ease of developing images of themselves winning the prize, as well as the quantity of the images generated by the scenario, on four seven-point items adapted from

Bone and Ellen (1992), such as “How difficult or easy is it for you to create images of yourself as one of the next winners?” and “As you read the scenario and the flyer, to what extent did any images come to mind?” I calculate an imagery score by taking the arithmetic average of the four items (Cronbach’s alpha = .92).

Results

The answers on the perceived chances of winning are not well-behaved, in that they diverge from a Gaussian distribution and skew to the right (skewness=4.78 with standard error [SE]=.34, kurtosis=26.72 with SE=.66, compared with 0 and 0 for a Gaussian distribution). The probabilities of winning that respondents cite range from .001% to 50%, with an average at 3.35%, and 75% of the answers fall below 5%. Therefore, to apply tests based on Gaussian assumptions, I follow the procedure recommended by Tukey (1977) and add a constant to every probability estimate before computing the logarithm. This method also handles the potential problem of answers equal to 0. Following Tukey, after testing different values of the constant from .001 to 1, I adopt a value of .5, which works best to generate a distribution of transformed probabilities that is close to Gaussian (after transformation, skewness is .84 [SE = .34] and kurtosis is .12 [SE = .66]).

I code participants as “similar” when they have the same gender as previous winners (e.g., a male student in the condition that features two previous male winners) and “dissimilar” when they have the opposite gender (e.g., a male student in the condition that features two previous female winners). One respondent did not answer to the question about the probability estimation. I first analyze data with an ANOVA, in which similarity and respondent gender serve as the independent factors and the transformed estimated probability to win is the dependent variable. Gender has no significant main effect, nor does it interact with similarity, which means that both genders react the same way to the similarity with the

showcased winners. Therefore, I remove gender from the model. With a t-test, I next compare the transformed probabilities for similar and dissimilar participants. Participants estimate higher chances of winning the next drawing when the previous two winners are of the same gender rather than the opposite gender ($m_{\text{same gender}} = .872$, corresponding to a probability of 1.89% before transformation; $m_{\text{different gender}} = .286$, corresponding to a probability of .83% before transformation; $t(48) = 1.817$; p (one-tailed)⁵ < .05). Finally, the similarity manipulation has no significant impact on respondents' ease of imagining themselves as the next winner ($m_{\text{dissimilar}} = 11.93$; $m_{\text{similar}} = 12.87$; $t(49) = .573$; *NS*).

Discussion

These results support the interpersonal hot hand fallacy rather than the gambler's fallacy and show that people believe they have higher chances to win the next drawing when the previous winners are similar (H_2). Moreover, they provide evidence of the impact of similarity through a different manipulation than that in Study 1 (i.e., gender instead of age), which enables us to rule out attractiveness as an alternative explanation. What's more, similarity does not seem to influence the estimated probability of winning by changing the ease and quantity of generated images, contrary to the predictions derived from a simulation heuristic-based explanation.

The availability heuristic could also be evoked as a slightly different explanation for the positive impact of similarity on subjective probability of winning. This heuristic refers to how people judge the likelihood of an event as a function of the ease with which relevant instances come to mind (Tversky and Kahneman 1973). However, I believe that ease of retrieval cannot explain our result, because respondents see the winners' pictures while they answer the

⁵ Because our hypotheses about the effect of similarity on participation intention and estimated probability are directional, we use unilateral statistical tests whenever the analyses allow it.

probability estimation question. This setting is consistent with a real-life context in which consumers have the opportunity to enter a lottery at the same time that they process advertisements featuring previous winners (e.g., in-store promotion, Internet, direct mailing).

STUDY 2B

With Study 2B, I replicate Study 2A and test H_1 with a different manipulation of similarity, based on education major (Liviatan, Trope, and Liberman 2007). The latter offers the best equivalent of occupation—another characteristic of previous winners that advertisements often emphasize—for our respondent population, which is composed of students. I again measured the quantity and ease of generating images of oneself as a winner to test for the simulation heuristic with this new manipulation.

Procedure

Sixty-two undergraduates (44 women) from a European business school participated in exchange for course credit. The procedure was identical to that of Study 2A, except for the descriptions of the past winners. In both conditions, the photographs of the two previous winners, a young woman and a young man, were identical, as were their first names, ages, and prizes won. The difference across conditions pertained to the legends that appeared below the photographs. In the similar condition, the two previous winners studied in business schools and thus had the same major as the respondents. In the dissimilar condition, they respectively majored in arts and physiotherapy. After reading the scenario, participants estimated their probability of winning, should they decide to participate, using the same format as in Study 2A. Finally, I administered the same imagery scale as in Study 2A (Bone and Ellen 1992) (Cronbach's $\alpha = .89$).

Results

The distribution of open-ended probability estimates poses the same problem as in Study 2 (skewness = 4.99 [SE = .30], kurtosis = 30.40 [SE = .60]). Therefore, I apply the Tukey transformation described previously; the value of .5 again provides the distribution closest to a Gaussian (skewness = .70 [SE = .30]; kurtosis = -.40 [SE = .60]).

The respondents also again indicate their belief that they have a higher chance to win the next drawing when the two previous winners have the same major ($m_{\text{same studies}} = 1.077$, corresponding to a probability of 2.44%; $m_{\text{different studies}} = .252$, corresponding to a probability of .79%; $t(60) = 2.643$; p (one-tailed) < .05). However, the ease of generating and quantity of images of themselves winning the prize generated by the scenario does not differ between the similarity conditions ($m_{\text{dissimilar}} = 12.07$; $m_{\text{similar}} = 13.35$; $t(60) = .947$; *NS*)

Discussion

Study 3 reinforces the demonstration of the interpersonal hot hand by revealing the positive impact of similarity with previous winners on the estimated odds of winning with a different manipulation for similarity. This manipulation does not facilitate the mental simulation of winning, so the simulation heuristic cannot explain the effect of similarity.

STUDY 3

To test H₃, which suggests that the positive impact of respondents' similarity to previous winners on their intention to participate is mediated by their estimation of their chances to win, I conduct Study 3.

I also test an alternative mechanism through which similarity could influence participation intention. The influence of similarity with previous winners on participation likelihood may be mediated by the respondent's attitude toward the sponsor brand rather than by her or his estimated probability of winning. People often rely on similar others to form their attitudes (Feick and Higie 1992; Festinger 1954; Suls, Martin, and Wheeler 2000), which may lead respondents to develop a better attitude toward the sponsor when the previous winners appear similar. To test for this possibility, I measure respondents' attitudes toward the brand.

Finally, I investigate the moderating role of individual differences regarding the proneness to participate to such promotional games. The similarity with a previous winner may have differential impacts on people more or less accustomed to entering such games, which may be useful for the targeting purposes of organizers.

Procedure

One hundred MBA students (35 women) from a European business school participated in exchange for course credit. The procedure was identical to that of Study 1: Respondents imagined they had received a flyer advertising a sweepstakes organized by a mobile phone operator called Phone+. However, in this case, the prize was a €500 check. In the similar condition, the winning couple was 29 years of age (i.e., average age of respondents), whereas in the dissimilar condition, the picture revealed an elderly couple, said to be 70 years of age.

After reading this scenario, respondents indicated their intention to enter the sweepstakes on a seven-point scale from “1 = Very Unlikely” to “7 = Very Likely.” They then responded to an open-ended question: “If you enter this lottery, what do you believe your chance of winning is?” Then I measured the attitude towards the organizing brand on a seven-point scale with the item: “What is your attitude toward Phone+?”

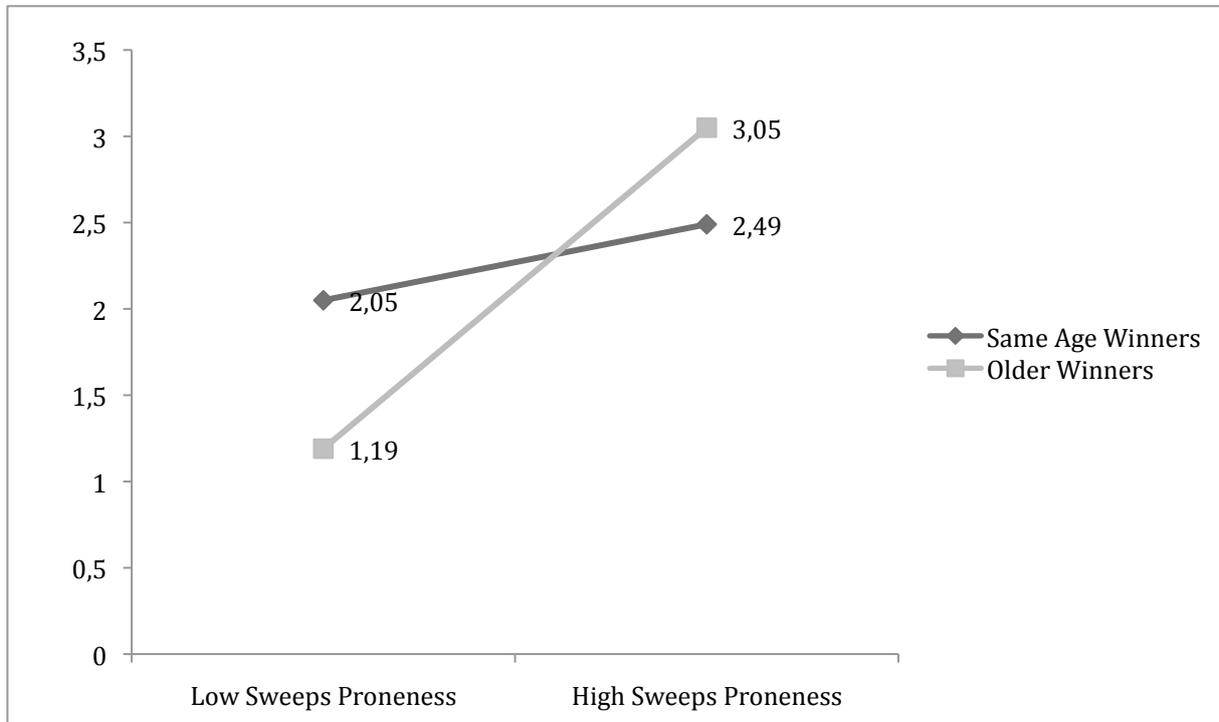
Finally, I measured respondents’ contest/sweepstakes proneness using a six-item, seven-point Likert-type scale developed by Lichtenstein, Netemeyer, and Burton (1995). This scale includes items pertaining to subjects’ enjoyment of contests/sweepstakes and general tendency to buy products associated with such games (e.g., “I feel compelled to respond to contest or sweepstakes offers,” “I have favorite brands, but if possible, I buy the brand that is connected with a contest or sweepstakes”). I take the arithmetic average of the six items to obtain an individual measure of sweepstakes and contest proneness (Cronbach’s alpha = .73).

Results

Estimated probability of winning. Three respondents did not answer this question. Again, the answers are not well-behaved and skew toward the right. The stated probabilities of winning range from 0% to 50%, with an average of 2.95% (skewness = 4.15 [SE = .25], kurtosis = 17.97 [SE = .49]). As in Studies 2 and 3, I use the Tukey transformation (after transformation, skewness = 1.72 [SE = .25], kurtosis = 2.36 [SE = .49]). Respondents think their probability of winning the next sweepstakes (if they participate) is significantly higher when previous winners are of the same age compared with when the previous winners are older ($m_{\text{same age}} = .354$, corresponding to a probability of .92%; $m_{\text{older}} = -.140$, corresponding to a probability of .37%; $t(95) = 2.109$; p (one-tailed) < .05).

Participation likelihood. I ran an ANCOVA, with intention to participate as the dependent variable, similarity with previous winners as a factor, and sweepstakes proneness as a covariate. Respondents express a greater intention to participate when previous winners are of the same age than when those winners are older ($m_{\text{same_age}} = 2.274$, $m_{\text{older}} = 2.122$; $F(1,96) = 5.098$; $p < .05$). As expected, sweepstakes proneness significantly increases the intention to participate ($F(1,96) = 13.198$; $p < .001$). I also find an interaction between similarity with previous winners and sweepstakes proneness ($F(1,96) = 5.021$; $p < .05$). To explore this interaction, I examine the slopes at each level of the similarity manipulation (Aiken and West 1991), as I show in Figure 5. The slope of sweepstakes proneness is not significant in the similar condition ($\beta = .207$; $t = 1.091$; *NS*), whereas the slope is significant and positive in the dissimilar condition ($\beta = .874$; $t = 3.796$; $p < .01$). In addition, a spotlight analysis at one standard deviation above the mean of sweepstakes proneness shows no significant difference, such that participants with higher sweepstakes proneness are not affected by the similarity manipulation ($\beta = -.557$; $t = -1.265$; p (one-tailed) $> .10$). A similar spotlight analysis at one standard deviation below the mean of sweepstakes proneness reveals a significant difference between the two similarity conditions ($\beta = .861$; $t = 1.934$; p (one-tailed) $< .05$). In other words, similarity has no significant impact on participation intention among sweepstakes-prone respondents but a significant and positive impact among respondents who are not sweepstakes prone. Thus, to increase participation, featuring a similar previous winner is particularly effective for people who generally are not attracted by such games of chance.

Figure 5:
Participation Likelihood Regressed on Sweepstakes Proneness (1 Standard Deviation
Below and Above the Mean) as a Function of Similarity with Previous Winners
(Essay 2, Study 4)



Attitude toward the organizing brand. One respondent did not answer this question. Similarity with previous winners has no significant impact on attitude toward the sponsor brand ($m_{\text{same age}} = 2.73$, $m_{\text{older}} = 2.96$; $t(97) = .79$, NS). Therefore, the effect of similarity on participation intention appears to be explained poorly by the impact of similarity on attitude toward the brand.

Mediation. Following Preacher and Hayes's (2004) SPSS procedure to estimate the indirect effect, I find that the reduction in the direct effect of the experimental condition on participation, when I take the estimated probability to win into account, differs significantly from 0, with a 95% bootstrap confidence interval $[.0152 < Z < .5131]$. Therefore, I achieve

support for the mediation of the estimated odds of winning. The direct effect of the similarity manipulation on participation likelihood is not significant when I control for the estimated odds of winning (b (YX.M) = .188; $t = .579$; $p > .5$). That is, the effect of similarity on participation likelihood is mediated completely by estimated chances to win.

Discussion

Study 3 provides additional support for H₁ (impact of similarity on estimated chances to win) and H₂ (impact of similarity on intention to participate), with age as the similarity manipulation. Moreover, I find support for H₃: The positive impact of respondents' similarity to previous winners on their intention to participate is mediated by their estimation of their chances to win. I also can eliminate attitude toward the sponsor brand as an alternative mediator. Finally, I show that the respondent's sweepstakes proneness, which is a personal trait, plays a strong moderating role. The practice of showcasing a similar winner is particularly effective to increase the participation intention of consumers who usually are reluctant to enter such games.

STUDY 4

Whereas Study 3 relies on statistical mediation, the purpose of Study 4 is to provide a more direct test of the process by which similarity with previous winners influences participation in promotional lotteries. I therefore test H₄: If people rely on their similarity with previous winners to estimate their chances of winning the next drawing, because they lack objective data on which to base their estimates (i.e., they make their decision under uncertainty), the impact of similarity may disappear if respondents have sufficient objective data (i.e., number of participants in the drawing and number of prizes).

In Study 4, I attempt to rule out another possible mediator between similarity and participation intention. That is, the similarity with the showcased winner might increase the perceived attractiveness of the prize, which could heighten participation intention.

Procedure

One hundred thirty-one students (59 women) from a European university participated in the study in exchange for 12 euros. They imagined that they were planning to buy a digital camera and browsed a specialized Web site to gather information about the latest models. In their information-gathering process, they discovered that the Web site organizes a monthly lottery with a prize of a digital camera. The camera at stake this month happened to be the very model that the respondents have decided they would like to buy. To participate in the promotional lottery, they would have to answer a few questions about their camera usage, which would not require any specific knowledge. Respondents then saw an ad for the lottery.

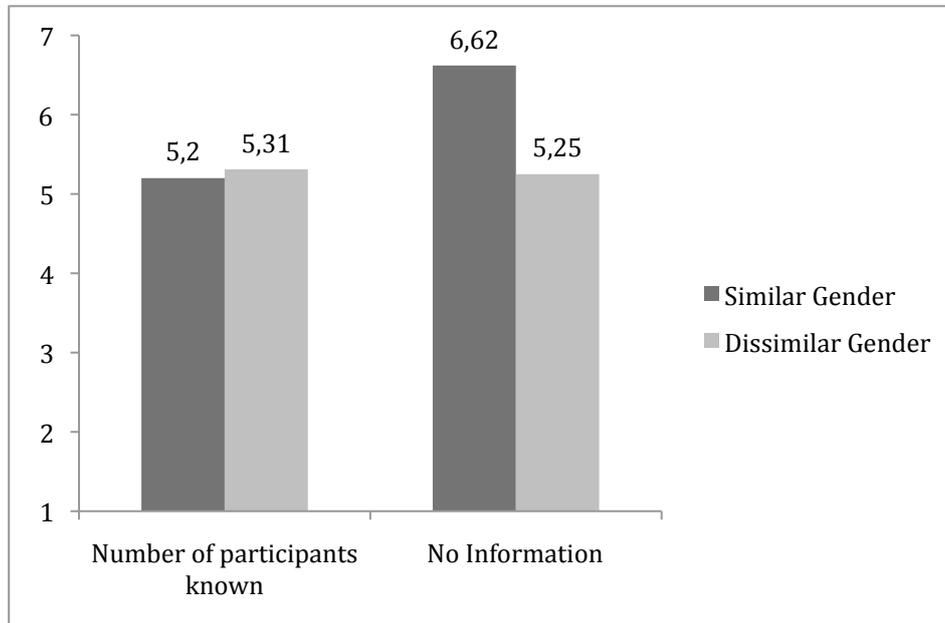
They were randomly assigned to four different conditions in a 2 (similarity: same versus opposite gender) \times 2 (uncertainty: information about the likely number of participants versus no information) between-subjects design. I manipulated similarity according to gender, as in Study 2. Therefore, the two featured winners were either two young women or two young men, portrayed by photographs and first names. In the uncertainty condition, no additional information appeared, whereas in the no uncertainty condition, participants could read, just below the ad, that on average 350 persons entered the lottery each month.

Respondents answered a seven-point scale about their intention to enter the commercial lottery and rated the attractiveness of the prize (digital camera) on a seven-point scale from “not attractive” to “attractive.” To measure their individual differences, as in Study 4, I assessed sweepstakes proneness using Lichtenstein, Netemeyer, and Burton’s (1995) scale (Cronbach’s alpha = .87).

Results

Participation intention. I removed three extreme outliers that lay outside the interval $[Q1 - 3 \times IQR; Q3 + 3 \times IQR]$, where $IQR = Q3 - Q1$ is the interquartile range (Tukey 1977). I performed an ANCOVA to analyze the data, with similarity and information as the independent factors and sweepstakes proneness as a covariate (see Figure 6). Similarity has a positive, significant effect on participation intentions ($F(1,123) = 4.456; p < .05$), as does sweepstakes proneness ($F(1,123) = 31.479; p < .001$). I further find the expected interaction between similarity and uncertainty ($F(1,123) = 5.114; p < .05$), such that when respondents make a decision under uncertainty, with no information about the number of participants, they rely on their similarity to the two previous winners. They participate more when they are of the same gender ($m = 6.619$) than when they are of the opposite gender ($m = 5.246; F(1,52) = 8.227; p < .01$). When there is no uncertainty, because participants know the number of people who usually enter the promotional lottery, similarity has no effect on their willingness to participate ($m_{\text{same gender}} = 5.199, m_{\text{opposite gender}} = 5.313, F(1,70) = .071, NS$). Furthermore, the intention to participate is significantly higher in the condition that does not reveal the number of participants and the previous winners have the same gender as the respondents compared with any of the three other conditions ($p < .05$). I also test the same model with respondent gender as an independent factor and find no main effect of gender on the intention to participate, nor any interaction with similarity or uncertainty.

Figure 6:
Participation Intention as a Function of Similarity with Previous Winners and
Information about the Number of Participants
(Essay 2, Study 4)



Prize attractiveness. I perform the same analyses with prize attractiveness as the dependent variable. Similarity with previous winners again has no significant impact on the perceived attractiveness of the prize ($F(1,127) = .48, NS$). Neither the main effect of uncertainty nor the interaction with similarity reaches significance ($F_s < 1$). Therefore, the effect of similarity on participation intention cannot be explained by the impact of similarity on attitude toward the prize.

Discussion

Study 4 provides two results pertaining to how similarity with previous winners increases participation intentions for the next drawing. First, I reveal that the effect disappears when consumers do not make their decision in conditions marked by uncertainty. If they know the number of participants and prizes, which could enable them to calculate the

estimated probability of winning, similarity with previous winner no longer influences their participation intention. As a consequence, participation intentions can be maximized when people ignore the number of participants and consider a similar lucky winner. This new evidence helps confirm that similarity influences participation intentions, because consumers rely on similarity to estimate their odds of winning when they are uncertain of that value. Second, I disprove another potential path, in that similarity with previous winners does not affect perceptions of prize attractiveness.

STUDY 5

I propose that similarity has a positive impact on subjective probability in line with the Hot Hand fallacy because featuring previous winners with personalized details makes a human cause salient for the winning event. Specifically I hypothesize that potential participants will attribute the outcome of winning to previous participants' luck defined as a personal attribute. Study 5 aims at testing this process by showing that the interpersonal hot hand effect disappears when the attribution to personal luck is counteracted. To do that, I use supraliminal priming of randomness. Kay and colleagues (2010) have recently shown that priming people with randomness-related words heightens beliefs in supernatural sources of control, i.e. sources of control external to the self. Moreover, randomness perception is supposed to decrease belief in streaks (Burns and Corpus 2004, Tyszka et al 2009, Oskarsson et al 2009). Hence, I expect that priming people with randomness should eliminate the interpersonal Hot Hand fallacy by decreasing the attribution of winning to personal luck.

This study also tests an alternative explanation for the impact of similarity on estimated probability of winning. Presenting dissimilar previous winners could lead people to infer that a larger variety of socioeconomic profiles are likely to participate in the drawing.

Consequently, our respondents could expect that there are a greater number of entrants in the dissimilar condition than in the similar condition, which may explain the lower perceived odds of winning in the dissimilar condition than in the similar condition⁶.

Procedure

Fifty-nine graduate students participated in the study. The first part consisted in the randomness priming manipulation. Respondents had to form sixteen grammatically correct four-word sentences out of scrambled word sets. In the randomness prime condition, eight sets out of the sixteen included a word related to randomness (e.g. “chance”, “random”). These primes were adopted from Kay, Moscovitch and Laurin (2010). In the neutral prime condition, these words were replaced by neutral ones (see the full list of word sets in Appendix 14).

After finishing the scrambled sentences task, participants moved to a seemingly unrelated questionnaire on sweepstakes. The same mobile phone cover story was used as in studies 1 and 3. For half of the respondents, the advertisement featured two male previous winners and for the other half two female previous winners.

Just after the sweepstakes scenario, I asked participants what they believed their chance of winning was, if they entered the PhonePlus sweepstakes (visual analog scale from “Absolutely no chance” to “A good chance”).

The following question was then asked in order to gain some insights about the attribution process of the winning event by participants: “To which extent do you think participant’s LUCK accounts for winning in the PhonePlus sweepstakes? Luck is defined here as the attribute of a person as in the expression: “to be a lucky person”. Synonymous expressions are “being fortunate” or “having good fortune” or “avoir de la chance” in

⁶ I am grateful to Professor Luk Warlop for this valuable suggestion.

French.” (ten-point scale from ‘Not at all’ to ‘totally’). I provided an explicit definition of luck because previous pre-tests demonstrated that people doesn’t hold a clear definition of the concept and tend to confound it with chance (defined as something external to the person and uncontrollable.)

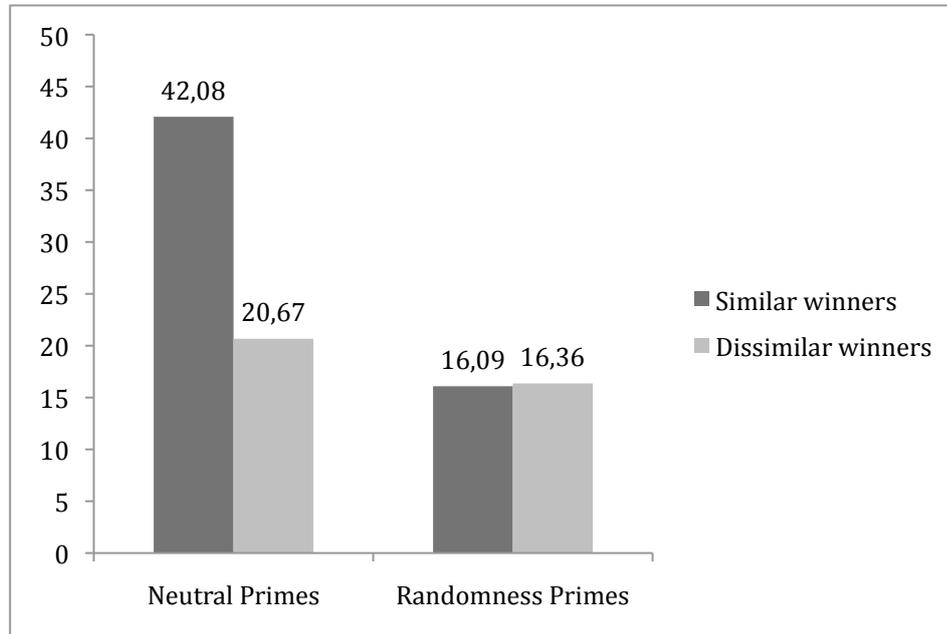
Finally, three ten-point items aimed at measuring respondents inference about the number and diversity of participants to the promotional lottery: “How successful do you think this sweepstakes will be regarding the number of participants?”, “How many people will fill in the participation form to enter the PhonePlus drawing?” and “How diverse the socio-demographic profiles of the participants to PhonePlus sweepstakes will be?”.

Results

Manipulation check. The priming manipulation had the expected effect on how much participants attributed the winning outcome to luck. Luck attribution was significantly lower in the randomness condition ($m=5.02$) than in the neutral condition ($m=6.70$, $F(1,55)=3.51$, $p=.07$).

Subjective probability of winning. Nine respondents did not answer the question and three extreme outliers were removed. When participants were exposed to neutral primes in the scrambled sentences task, gender similarity with showcased winners had a positive effect on their probability estimates as in the previous studies ($m_{\text{similarity}}=42.08$ vs. $m_{\text{dissimilarity}}=20.67$, $t(43)=2.45$, $p<.05$). However, for the respondents primed with randomness words, the interpersonal hot hand effect did not occur ($m_{\text{similarity}}=16.36$ vs. $m_{\text{dissimilarity}}=16.09$, $t(43)=.03$, $p>.0$, interaction $F(1,43)=2.88$, $p=.097$) (see figure 7).

Figure 7
Subjective probability of winning in function of priming and similarity
with previous winners
(Study 5, Essay 2)



Perceived variety and number of participants. The three items were highly correlated (Cronbach's alpha=.74) so I computed the arithmetic average as a composite measure. The similarity manipulation did not have any main effect on the perceived number and variety of participants ($F(1,55)=.18$, NS), and did not interact with the randomness priming ($F(1,55)=1.07$, NS).

Discussion

Study 5 provides preliminary evidence about the mechanism underlying the Interpersonal Hot Hand. I show that by counteracting the attribution to personal luck by priming respondents with randomness, similarity with previous winners does not influence subjective probability any longer. Moreover the study rules out the idea that people perceive

the number and the variety of potential participants in the lottery differently depending on their similarity with previous winners.

GENERAL DISCUSSION

I investigate the process by which showcasing previous winners of a promotional lottery may foster consumers' intentions to participate in a subsequent drawing. A series of experiments shows that consumers are more willing to enter a lottery when they are similar to featured previous winners than when they are dissimilar. Moreover, the effect of similarity on participation intention is mediated by the estimated probability of winning the promotional lottery and not by the attitude toward the organizing brand or the perceived attractiveness of the prize to win. Accordingly, this effect disappears when consumers possess sufficient information to calculate their objective winning probability and no longer make entry decisions in conditions of uncertainty. Finally, preliminary results support the idea that the interpersonal hot hand effect stems from the causal attribution of winning to personal luck.

By demonstrating that people generally believe they have a greater probability of winning when the previous winners are similar to them, rather than dissimilar, I add to existing literature on similarity by showing that interpersonal similarity can also influence probability judgments about a good outcome. This effect may be regarded as the interpersonal version of the hot hand fallacy and does not hinge on imagery facilitation. Moreover, I reveal that showcasing similar previous winners is especially effective for consumers who usually are reluctant to participate in such sales promotions. Finally, the effect remains robust across several manipulations of similarity that are easy to implement in real life, such as age, gender, and education major.

Some recent research considers the neurological impact of observing somebody winning and demonstrates a critical role of similarity on vicarious rewards (Mobbs et al. 2009). Volunteers viewed socially desirable or undesirable contestants playing a game and winning or not, then played the game themselves. Using fMRI methodology, the authors show that the brain region involved in the experience of reward and elation (ventral striatum) connects to the region involved in assessing self–other similarity (ventral superior cingulate cortex [vACC]). Therefore, “seeing a socially desirable contestant win modulates neural systems associated with reward, and this rewarding experience is further influenced by perceived similarity to a contestant” (Mobbs et al. 2009, p. 900). Using a different approach, I show that seeing a similar other win also influences the observer’s subsequent judgment and behavior with regard to participating in the same game.

Among future avenues for research, I plan to investigate the potential moderating role of the number of previous similar or dissimilar previous winners featured within the advertisement. Subjects were indeed exposed to only one or two previous winners in our studies. However literature on Hot Hand and Gambler’s Fallacy has focused on the number of previously observed events, i.e. the length of the sequence, as a central determinant for both kinds of expectations. The results on the nature of the impact of run length on the hot hand fallacy are contrasted. Some evidence exist that belief in Hot Hand is amplified when the streak lengthens, at least until a certain number. In Gilovich and colleagues’ basket ball studies, 68% of the interrogated fans in study 1 declared that a player had a better chance to make his next shot after having made the previous one than after having missed the previous shot, but this percentage jumped to 91% when the same affirmation was presented with after having made the previous two or three shots. Ayton and Fisher (2004) also observe that hot hand fallacy tends to be amplified with run length, although this trends stops after four successes. On the contrary, some existing results lead to expect a reversing of Hot Hand into

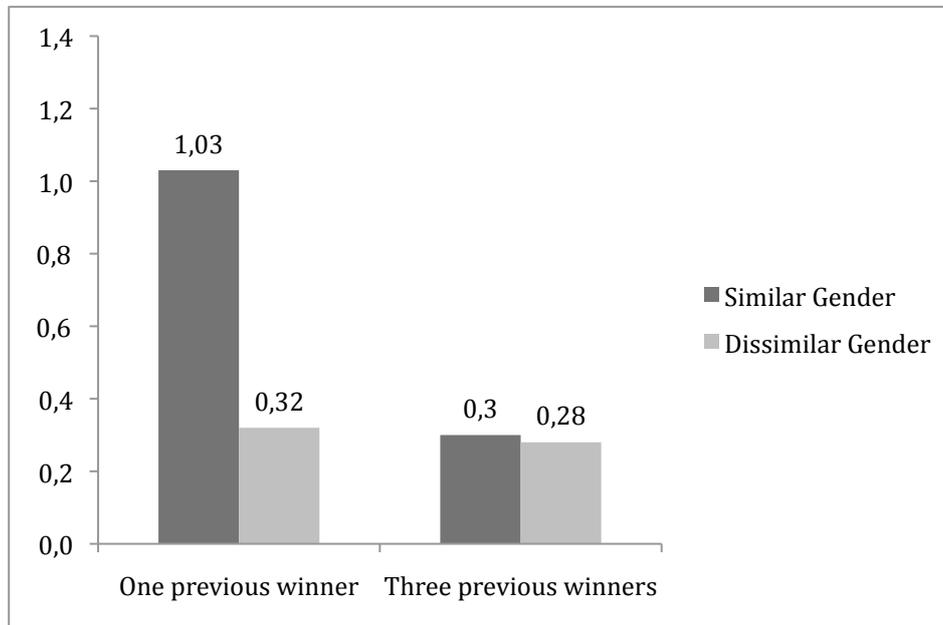
Gambler's Fallacy when the previously observed streak lengthens. In one of the first papers on probability learning where people had to serially anticipate alternative symbols, Jarvik (1951) showed a tendency to predict the same as the last event (positive recency or Hot Hand) for the first trial but then this tendency gave rise to negative recency (or Gambler's Fallacy) when more than one similar previous event were observed. Thus, by increasing the number of similar vs. dissimilar previous winners featured in the advertisement, we could also observe an interpersonal gambler's fallacy. When the streak of featured winners increases, consumer may think they have a smaller chance to win the next drawing when the previous winners are similar to them than when they are dissimilar.

I ran a study similar to the previous ones where the number of showcased previous winners (one vs. three) and the gender similarity with the previous winner(s) were manipulated between-subjects (N=94). When one single previous winner was featured, the Interpersonal Hot Hand occurred as in previous studies: people estimated they had a higher chance to win the next drawing when the previous winner had the same gender as them ($m_{\text{same gender}} = .124$ i.e. 1.03% before transformation vs. $m_{\text{different gender}} = -.870$ i.e. .32% ; $t(41) = 2.095$; $p < .05$). When three previous winners were featured, gender similarity had no effect ($m_{\text{same gender}} = -.907$ i.e. .30% vs. $m_{\text{different gender}} = -.970$ i.e. .28% ; $t(49) = .135$; $p > .5$, interaction $F(1,90) = 1.95$, $p = .17$). Actually, contrast analysis showed that the estimated probability to win when one single winner with similar gender was presented, was significantly higher than the estimated probabilities to win in any of the three other conditions ($d_{1\text{similarwinner}-3\text{similarwinners}} = 1.094$, $p < .05$; $t_{1\text{similarwinner}-3\text{dissimilarwinners}} = 1.031$; $p < .05$). The estimated probabilities to win in the three other conditions do not significantly differ between each other (see figure 8).

Figure 8:

Estimated Probability of winning the next drawing in function of the number and gender of previous winners

(Essay 2)



I need to explore the reasons why a higher number of showcased winners eliminates the interpersonal hot hand effect. Multiplying the number of featured winners all sharing one common characteristics could for example activate consumers persuasion knowledge (Friestad and Wright 1994). However, when a subsample of the respondents were asked to describe in few sentences how they came up with their participation decision, none of them mentioned the featured previous winners. Specificities of similarity judgments can also be evoked. First, the automatic similarity judgment becomes significantly more complex when the number of featured previous winners increases: it is possible that contrary to our Increased Interpersonal Hot Hand hypothesis, the similarity/dissimilarity judgment is diluted rather than accentuated when the number of targets to process increases. Secondly, the Interpersonal Gambler's Fallacy hypothesis relied on the hypothesis that similarity and dissimilarity

judgments occur in a symmetrical way: while Interpersonal Hot Hand is driven by a similarity judgment (“the previous winner is similar to me so I should have a good chance to win the next drawing”), the Interpersonal Gambler’s fallacy should be driven by a dissimilarity judgment (“the previous winner is dissimilar to me, so I should have a good chance to win the next drawing”). However, it has been shown that similarity judgment is the default, meaning that people tend initially to focus on the fundamental ways two objects are similar (Mussweiler 2003). Hence we cannot argue as I did for Interpersonal Hot Hand Fallacy, that Interpersonal Gambler’s Fallacy is triggered by a spontaneous dissimilarity judgment. Figure 8 and the associated contrast analysis are indeed in line with the primacy of similarity testing on dissimilarity testing, since the estimated probability for one single similar previous winner is the only one to be significantly higher than the three other conditions, that do not significantly differ from each other (i.e. the estimated probabilities for three similar and dissimilar previous winners are equivalent to the estimated probability for one single dissimilar previous winner).

Another way to extend this essay could be to investigate perceptions of similarity in behavior with the previous winner, such as how they used the cash prize or how they entered the game. As illustrated by the McDonald’s campaign, video clips that feature previous winners often describe how they used the prize money⁷. Nate, a bachelor student from California, bought a game console, a projector, and a trip to New York for New Year’s Eve; Christy, a married woman from Mississippi, gave part of her prize to a church; Joanne, a married woman from Arizona with children, bought a second car; and Justin from Michigan not only paid off his credit card and college loans but also made several trips to Indianapolis to see his favorite football team. The video clips also depict the variety of situations in which the featured winners bought their McDonald’s product to enter the Monopoly game: a student

⁷See <http://vids.myspace.com/index.cfm?fuseaction=vids.individual&VideoID=18586132>.

on the way back from college, a housewife sending her husband to buy fries to eat with the hamburgers she was cooking, a mother buying Happy Meals for her kids, and a young man picking up food at the drive-through window with his brother. It thus appears that McDonald's purposefully chose a diverse set of winners to feature, such that every potential future participant can feel she or he is similar to at least one of them, whether in terms of a sociodemographic profile, consumption of McDonald's products, or potential use of the cash prize.

Similarity thus may be derived from certain behaviors, habits, or settings, not just basic identity variables. Goldstein, Cialdini, and Griskevicius (2008) reveal the influence of this kind of similarity on compliance behavior in their examination of the effectiveness of signs requesting hotel guests to participate in an environmental conservation program. The normative appeals are most effective when they describe group behavior in a setting that closely matches the subjects' immediate situational circumstances (e.g., "the majority of guests in this room reuse their towels"), which these authors call provincial norms. Firms similarly could influence potential lottery participants by encouraging them to mimic past winners in the form of loyalty to the brand or the game itself: The *Sud-Ouest* article featuring Colette, a previous winner (Appendix 11), stresses that she is a regular reader of the newspaper and a regular participant in the game she won. Guryan and Kearney (2008) also provide some econometric evidence regarding this effect. Analyzing sales for the Texas state lottery, they find that ticket sales by a retailer increase in the weeks after it has sold a large prize-winning ticket and that this increase persists for up to 40 weeks; they call this effect the "lucky store effect." People may think they have a higher probability of winning if they buy a ticket in a store where a previous winner bought the winning ticket than if they buy in another store. Acting similarly to a previous winner thus may appear to provide a way to increase the probability of winning and likely explains the McDonald's video clips.

Another avenue for research could elaborate on boundary conditions for the interpersonal hot hand fallacy. For example, the attribute that the respondent shares with the previous winner may be very common (e.g., gender, a feature shared with roughly half the population) or relatively rare (e.g., belonging to a small ethnic group, living in a specific small town). It is much less surprising to see a person of the same gender win than to see a person living in the same small city win. When the feature is rare, personal luck may seem even more essential, and the interpersonal hot hand fallacy could be accentuated.

Finally, it may be worth investigating whether interpersonal similarity also influences probability estimations for other kinds of positive but uncertain outcomes. In a promotional campaign, run by 1000Mercis for a European dating site, prospects received personalized messages that featured a past client testifying that he or she had found a partner. While the testimonial always remained identical, the past client was described as similar to the prospective client on five dimensions: gender (with a picture), number of children, occupation, age (two years older), and first name (most common first name in the target's age cohort). These similarities led to a significant increase in the number of site registrations (Thibaut Munier, personal communication), perhaps because the targets' similarity with the featured users increased their perceptions that they too could find a partner on the site—an outcome some people likely consider as uncertain as a lottery!

ESSAY 3

Sunny Side Up: How Process Regret Leads to Optimism

Abstract:

While most research on regret regulation has investigated outcome regret, this paper explores how people regulate process regret, which is experienced in situations where a decision process is regretted even before its outcome is known. I hypothesize that this type of regret may distort the subjective probability of the upcoming outcome when the decision is moderately self-significant. Under this condition, regretful people are optimistic compared to non-regretful people as a way to reduce self-blame. In Study 1, process regret is manipulated with decision justifiability. People who regret not having prepared an exam estimate they have higher chances of passing it than people who do not feel process regret. However regretful people hold these optimistic expectations only when the consequences are limited (i.e. when the course is not in their major). Study 2 manipulates process regret with decision responsibility and shows its impact on prefactual thinking: people regretting not taking a vaccine shot underestimate its efficacy against the disease compared to the no-regret control group, but only when the disease is moderately serious. Study 3 replicates these results with a real decision: people responsible for not practicing before taking a test (high process regret) are more optimistic about their performance to the test than people who are not responsible for not practicing. Regretful people also judge that practicing would have improved their performance less than the control group does. This difference occurs only for respondents whose self-concept is not threatened by the test results (low-self-significance).

INTRODUCTION

Regret has proved an important topic for consumer behavior research. It is one of the negative emotions most tightly related to decision-making; it is pervasive in everyday decisions and may be elicited in many different situations. People are strongly motivated to avoid or decrease it and the regulation strategies they implement may have strong influence on their judgments, decisions and behaviors.

Regret has been defined as the emotion that we experience when realizing or imagining that our current situation would have been better, if only we had decided differently (Zeelenberg & Pieters 2007). Surprisingly this definition seems to imply that regret is related to an upward counterfactual thinking regarding the decision outcome exclusively. However everybody is familiar with situations where one feels regretful about a decision or action without even knowing yet its outcome. Although most research on regret has been dedicated to situations where the negative emotion stems from disappointing outcome, regret can also be related to the decision process independently from the outcome (Pieters and Zeelenberg 2005). Regret may result from a decision process that is not judged as sensible and wise, i.e. justifiable (Connolly and Zeelenberg 2002): Having neglected some topics while preparing for an exam, having had sexual relations without using condoms, having invested in highly risked financial products. Before even knowing the academic exam questions, the more or less severe consequences for one's health or the performance of the financial products, one can feel the sting of regret resulting from one's decisions. Research has already documented strategies that people may implement to mitigate their regret but hardly anything is known about regulation processes of regret experienced before outcome disclosure.

This project aims at filling this gap by concentrating on one cognitive strategy that may allow people to decrease their pre-outcome regret. As they are still uncertain about the

consequences of their deeds but they cannot do anything to change their decision, they may minimize the probability of a bad outcome to ease their consciousness. They cannot undo their decision but the motivation to avoid self-blame distorts their judgment under uncertainty compared to situations where they are not experiencing regret. Based on the literature about the antecedents of regret, such regret is likely to be experienced only when people feel responsible for the decision and when the decision is not easily justifiable.

I also propose that an important boundary condition of this strategic optimism is the self-significance of the decision consequences. If the decision is not too consequential, regretful people can afford to be unrealistically optimistic, whereas it is not an option anymore when the consequences at stakes are more serious. In this case, in order to learn from their mistakes in line with the functionality of regret, they should not hold different expectations than non-regretful people.

In the conceptual background, I will discuss research on decision-process regret, and how it may lead to either optimistic subjective probabilities under certain conditions.

PROCESS REGRET

There are two sources of regret: the outcome and the process of a decision (Pieters and Zeelenberg 2005). Outcome regret is experienced when the outcome of a decision is bad in an absolute sense or relative to a forgone outcome that would have been obtained if a different decision had been taken. Most consumer research has investigated this type of regret (e.g., Tsiros and Mittal 2000). But people can also experience regret because of a decision independently from the valence of its outcome. More specifically, process regret can stem from the inconsistency between intention and actual behavior. In a longitudinal study about voting behavior, Pieters and Zeelenberg (2005) found that participants who were inconsistent

because they intended to vote but eventually did not, experienced significantly more regret than participants who were completely consistent. Also, participants who were inconsistent by voting for a different party than intended, experienced significantly more regret than participants who were consistent. These results remained significant whatever the outcome of the vote, i.e. whether the party they voted for won or not. Hence, I assume that people could experience process regret even before knowing the outcome of their decision, in situations where the outcome is delayed. In other words, people can experience regret while they are still uncertain about the outcome of the decision.

People employ strategies to cope against regret they experience. Zeelenberg and Pieters (2007) offer a typology of these different strategies, which may focus on the decision, the alternatives or the emotion in itself. This is in line with the two general types of coping that have been distinguished in the coping literature (Folkman and Lazarus 1980; Carver, Scheier and Weintraub 1989). Problem-focused coping is aimed at problem solving or doing something to alter the source of the stress, whereas emotion-focused coping is aimed at reducing or managing the emotional distress that is associated with or cued by the situation. I am interested in situations where people regretting their decisions cannot do anything to improve it and cannot rely on problem-focused coping. Although the outcome of the decision is still uncertain they can't change their decision any more and have only the possibility to develop emotion-focused coping. Similarly, Heckhausen and Schultz differentiate between primary control - or the control over external events - and secondary control or the control over internal events, in their life-span theory of control (1995, 1999). They contend that there is a primacy of the primary control over the secondary one, however secondary control may compensate for failures of the primary control. Thus I expect that when people regret the process of a decision and they are unable to improve the situation, they will rely on cognitive processes in order to decrease the bad affect. Strategically distorting the subjective probability

of the upcoming bad outcome and perceiving it as less likely than in a situation without regret is a possible strategy in situations of uncertainty.

SELF-SIGNIFICANCE AND STRATEGIC OPTIMISM

Literature has already documented strategic distortions of outcome probabilities estimates, but they have never been related to the regulation of process regret.

In their review about situated optimism, Armor and Taylor (1998) underline that optimism may have some cognitive, motivational and emotional origins. The two last categories of causes may be at work when process regret is experienced. However the emotional causes for optimism mostly refer to mood (e.g. Johnson and Tversky 1983, Salovey and Birnbaum 1989) and not to specific emotions like regret. Regarding the motivational aspect, optimistic expectations may derive from self-enhancing motives or self-defensive denial. Accordingly optimistic biases tend to be exaggerated in response to threat. Taylor et al. (1992) found that, among a group of gay men at risk for AIDS, those who were HIV-seropositive were more likely to believe that they could avoid AIDS in the future than those who were HIV-seronegative. In performance situations, optimism has proved to increase motivation, persistence and goal-directed efforts (e.g., Zhang & Fishbach 2009, Chan, Mukhopadhyay and Sengupta 2009). However, the desirability bias (also called wishful thinking), that describes the positive influence of outcome desirability on optimism, has generally been observed in contexts where people do not control the outcome, like in random drawings or competitions (Krizan & Windshitl 2007). In stressful situations where people have no control anymore on the outcome, as when people regret a decision process without being able to change anything to the upcoming outcome, optimism may constitute a coping strategy. In the Taylor and colleagues (1992) study, men who had reported more AIDS-

specific optimism (i.e., optimism that evolved directly in response to the threat of AIDS) perceived themselves as being more in control of their situation and reported more active coping efforts in response to the threat. Hence I believe that being optimistic about the outcome of a regretful decision by its outcome with rose-tinted glasses can be an efficient strategy to regulate process regret.

In which conditions are people who regret a decision going to distort optimistically their outcome expectations? Strategic optimism has often been conceptualized as an individual difference (e.g. Sanna 1995). However characteristics of the situation can also influence the propensity to be optimistic. Armor and Taylor (1998) explain that people are not indiscriminably optimistic and that they are doing a trade-off between self-enhancement and believability or need for accuracy. One factor increasing the need for accuracy and decreasing optimistic biases is the self-significance or importance of the decision consequences. Severity indeed decreases comparative optimism (Harris, Griffin and Murray 2008) and higher stakes should decrease desirability bias (as claimed by Krizan and Windshitl 2007). Hence, I propose that it is only when the decision is slightly consequential that people who regret a decision process will be optimistic about the probability of a bad outcome (compared to non-regretful people). This allows them to cope with self-blame while keeping a sustainable discrepancy with reality. When the accuracy motive increases because the potential bad consequences loom larger, then regretful people should not be optimistic any longer (compared to non-regretful people).

H₁: When the outcome of the decision is slightly self-significant, people regretting their decision should be *more optimistic* about the outcome than people who do not experience regret. This optimism should disappear for highly self-significant decision.

PROCESS REGRET AND PREFACTUAL PROBABILITY ESTIMATION

Regret is a counterfactual emotion that stems from the gap between what actually occurs and what could have occurred if we had chosen differently. As I explore situations where the outcome is not known yet, I name the expected outcome of the non-regretful decision process “prefactual”. Depending on the self-significance of the consequences, process regret may also distort prefactual probabilities. The generation of prefactuals has indeed been shown to play an important role in strategic optimism (Sanna 1996): Optimists tend to avoid prefactual thinking and engage in downward (worse than actuality) counterfactual thinking. I propose that in order to fulfill the coping goal for low self-significant consequences, people regretting a decision process may estimate prefactual events differently than non-regretful people.

People may minimize regret by convincing themselves that things would not end up much better if they had decided differently. This bears some similarities with retroactive pessimism (Tykocinski and Steinberg 2005). To render a disappointing reality more palatable, people sometimes change the perceived probabilities of relevant events post facto so that the disappointing reality appears almost inevitable and the more positive alternatives now seem highly unlikely. However, by definition, these results about hindsight bias apply to situations where the outcome is known. On the contrary, in our framework, it is the uncertainty about the outcome of a regretful decision that may drive people to expect that things will go wrong anyway.

More specifically:

H₂: When the outcome of the decision is slightly self-significant, regretful people estimate that the likelihood of a negative outcome if they had followed a better decision process would have been *higher* than non-regretful people do.

Three studies, either based on scenarios (pilot studies) or inducing real behaviors, are testing these hypotheses, and show how people regretting a bad decision process display strategic optimism compared to non-regretful people.

STUDY 1

The first study intends to test H₁, i.e. the impact of process regret on probability estimates. To manipulate process regret, I follow Pieters and Zeelenberg's (2005) approach, who were the first to demonstrate the existence of regret independently from the outcome of a decision. In their framework, process regret arises from the inconsistency between intention and actual decision. In Study 1 scenario, participants have to imagine that they ended up not working over the weekend to prepare for an exam contrary to their first intentions. The authors also show in their seminal paper that process regret may be decreased if the inconsistency can be justified. Thus, I use decision justifiability to manipulate process regret.

Procedure

This study was conducted in a behavioral laboratory at a large northeastern university. Sixty eight subjects were compensated \$1 for completing this study.

The participants were asked to imagine it was one week before the final exam of a course they had taken during the semester. They had found the class difficult and felt they

needed to work hard to succeed. Hence they had decided to spend their week end focusing on the preparation of this exam.

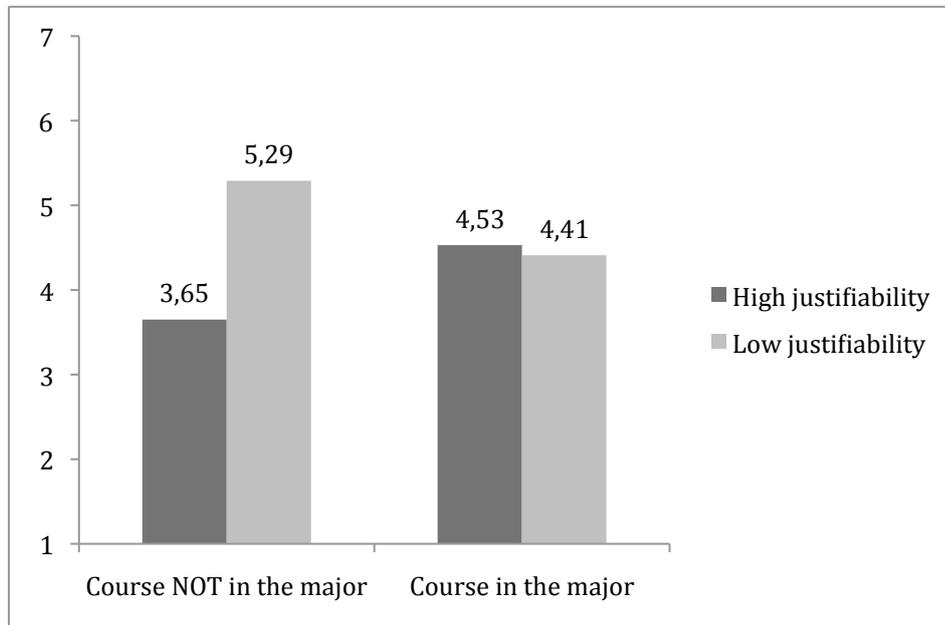
The following part of the scenario differed between the experimental conditions. The participants were randomly assigned to four different versions. It was a 2 (decision justifiability: justifiable vs. not justifiable) x 2 (Outcome self-significance: low self-significance vs. high self-significance) between-subject design. In the low self-significance condition, the course is not part of the student's major, while in the high self-significance condition the course is part of the student's major. In all the conditions, participants imagined they stayed outside on Thursday night despite the cold temperature, they fell sick just before the week end and were stuck in bed with a strong fever. However, in the low justifiability condition, they had stayed outside on Thursday night because they had decided to go to a party on Thursday night, whereas in the high justifiability condition, they had stayed outside because a friend had asked them for their help. In all cases, they were told that that the remaining days before the exam turned out to be insufficient to catch up for the weekend. They hadn't studied enough to prepare for the exam and managed to answer only half of the questions.

After reading the scenario, subjects were asked how confident they were that they would pass the exam on a 10-point scale from "Not at all confident" to "very confident".

Results

Results are presented in Figure 9. When the course is not in their major, people in the low justifiability condition are more confident that they will pass ($m=5.29$) than people who are in the high justifiable condition ($m=3.65$) ($t(32)=1.69$, $p=.05$ (one-tail)). When the course is in the major, there is no difference between the two justifiability conditions ($m_{\text{high justifiability}}=4.53$, $m_{\text{low justifiability}}=4.41$, $t(32)=.131$, *NS*, interaction $F(1,64)=1.77$, $p=.18$).

Figure 9:
Confidence Rating about Passing the Exam As a Function of Decision Justifiability and
Self-Significance of the Course
(Essay 3, Study 1)



Discussion

When people feel regret about a bad decision and they cannot justify the inconsistency between their intentions and their behavior, they tend to cope with self-blame by being optimistic about the outcome compared to non-regretful people (i.e. people who can justify the inconsistency). However, this strategy is restricted to the cases where the outcome at stake in the decision is not too self-significant.

STUDY 2

I designed study 2 to test H2, i.e. the impact of process regret on prefactual thinking: What people think the outcome would have been if they had decided better? The scenario regards a different domain than Study 1, i.e. the health domain.

Furthermore, I manipulate process regret by varying the responsibility for the bad decision. Responsibility is indeed a distinctive element of regret (Zeelenberg, van Dijk, Manstead 2000, Ordoñez and Conolly 2000) and process regret is likely to occur only when people control the decision.

Procedure

This study was conducted in a behavioral laboratory at a large northeastern university. Sixty seven subjects were compensated \$1 for completing this study.

They were asked to imagine that they were traveling in Africa for three weeks. One of their friends had warned them some weeks ago that they should pay attention to the specific vaccines that were necessary before visiting certain African countries.

The following part of the scenario differed between the experimental conditions. The participants were randomly assigned to four different versions. It was 2 (responsibility for the decision: low responsibility vs. high responsibility) x 2 (Outcome significance: low self-significance vs. high self-significance) between-subject design. In the high responsibility condition, they imagined they did not follow the recommendation and did not schedule an appointment with the doctor to talk about the vaccines. In the low responsibility condition, they did follow the recommendation and scheduled an appointment with the doctor, but the doctor assured them that no supplementary vaccine was required for travel to their destination. All participants then read that once in Africa, they found out that the embassy

strongly recommended to all visitors to be vaccinated against the yellow fever that was endemic in the area they visited. In moderate self-significance condition, the scenario mentioned that a specific treatment had proven to be beneficial for patients infected by yellow fever. It was unlikely that the disease could lead to a very serious condition. In the high self-significance condition, no specific treatment had proven to be beneficial and it was likely that the disease could lead to a very serious condition.

After reading the scenario, they had to evaluate their probability of getting yellow fever on a visual analog scale (150 points). Second, they estimated the probability to acquire yellow fever even if they had been vaccinated (visual analog scale, 150 points). This corresponds to the prefactual, i.e. the alternative pre-outcome prediction. Third I interrogated people about their future behavior in a similar situation: “If you encounter the same situation in the future, will you make a different decision about the vaccine?” (10 points). Finally I asked some questions about the scenario in order to check the manipulations. Participants answered the following questions on ten-point scales: “How responsible do you find yourself for the situation?” “To what extent did you cause the situation?” “To what extent did external factors cause the situation?” “How significant are the consequences?”

Results

Manipulation checks. Participants who did not schedule an appointment about the vaccines felt significantly more responsible for the situation ($m_1=7.97$) than people who saw their doctor before traveling ($m_2=5.21$) ($t(65)=4.38$; $p<.001$). The former ones also attribute the situation to internal causes ($m_1=8.18$) more than the latter ones ($m_2=4.59$) ($t(65)=5.72$; $p<.001$) and less to external causes ($m_1=4.64$ vs. $m_2=7.35$, $t(65)=4.09$, $p<.001$). Moreover, people gauged the consequences of the situation more significant when the disease was not healable ($m=8.65$) than when a treatment existed ($m=6.55$) ($t(65)=4.129$; $p<.001$).

Probability of acquiring the disease. I use an ANOVA to analyze the data, with responsibility, self-significance, and the interaction as the between-subject factors. There is a main effect of responsibility ($F(1,63)=5.34$; $p<.05$): people feeling responsible for not having taken the shot believe they have higher chances to acquire yellow fever than people not responsible. But this effect is not moderated by the self-significance of the outcome (treatment or not). Hence, hypothesis H_1 on strategic optimism of regretful people for low-self-significant decisions is not supported.

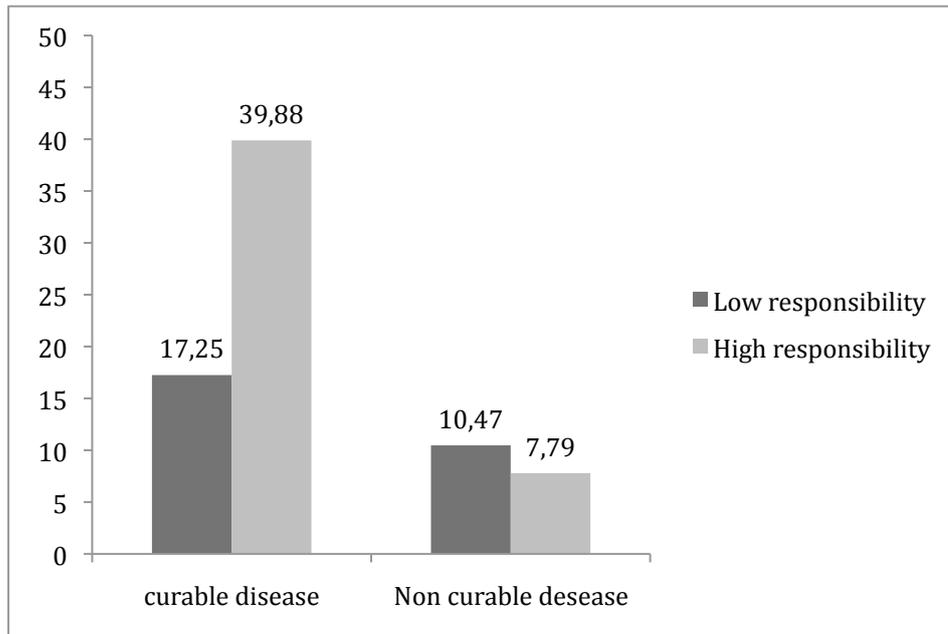
Prefactual. I removed five outliers that lay outside the interval $[Q1 - 1.5 \times IQR; Q3 + 1.5 \times IQR]$, where $IQR = Q3 - Q1$ is the interquartile range (Tukey 1977). The same definition of outlier will be used in the other experiments. Performing the same ANOVA analyses as above, I find a significant interaction between the outcome significance and the responsibility for the decision ($F(1,57)=3.96$; $p=.05$). As depicted in Figure 10, when there is a treatment, people in the high responsibility condition think they would have been more likely to acquire yellow fever after being vaccinated ($m=39.88$) than people in the low responsibility condition do ($m=17.25$) ($t(30)=1.91$; $p=.07$). When there is no treatment, the two responsibility groups do not differ in their estimations of the prefactual probability ($m=7.79$ and $m=10.47$, $t(27)=-1.08$, $p>0.2$). This supports H_2 : people in the low self-significance-high responsibility condition try to convince themselves that the probability to acquire yellow fever with the vaccine is still quite important, minimizing the impact of their decision not to take the shot.

Figure 10

Perceived Probability of Acquiring Yellow Fever even if Vaccinated (prefactual)

As a Function of Responsibility and the curable nature of the disease

(Essay 3, Study 2)



We also looked at the impact of manipulations on the difference between the estimated probability to acquire yellow fever after the bad decision and the estimated probability if the bad decision wouldn't have been made (prefactual described above). We calculated the change in the probability estimation as follows:

$$\text{Probachange} = \left(\frac{\text{proba}(\text{bad_outcome_postdecision}) - \text{proba}(\text{bad_outcome_prefact})}{\text{proba}(\text{bad_outcome_postdecision})} \right) \times 100$$

i.e. the percentage change in the estimated probability to acquire yellow fever with and without the vaccine, which can be interpreted as the judged effectiveness of the vaccine.

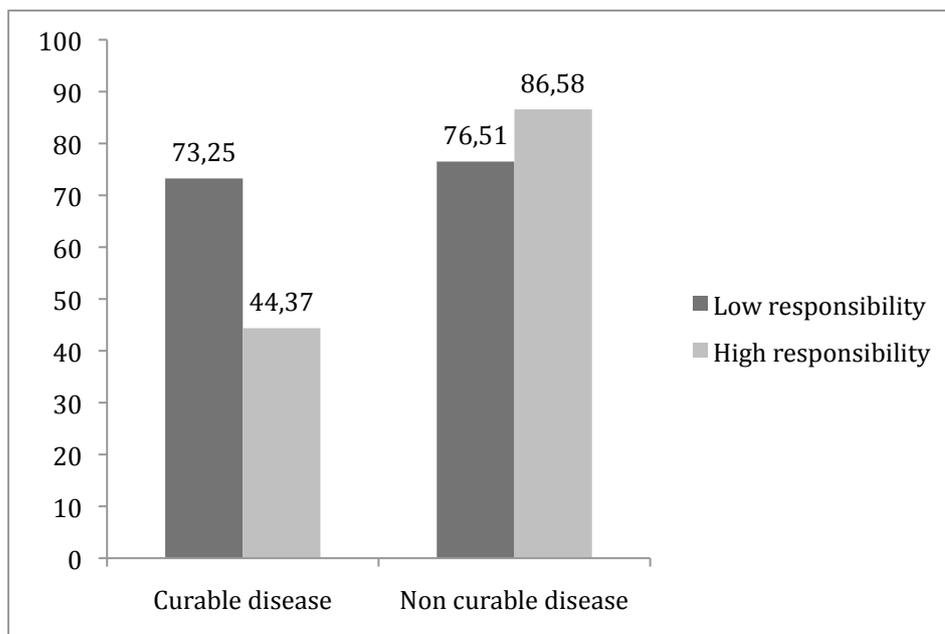
We found a similar pattern of results as for the prefactual analysis. There is a main effect of outcome significance ($F(1,57)=6.79$; $p<.05$): people think the vaccine is less

effective when a treatment exists than when there is no treatment. The interaction is also significant ($F(1, 57)=4.98$; $p<.05$): Within the moderate significance condition, responsible people think the vaccine is less effective ($m=44.37$) than non-responsible people ($m=73.25$) ($t(30)=1.83$; $p=.08$), while the difference between the two responsibility conditions is in the opposite direction when the consequences are highly significant ($m=86.58$ and $m=76.51$, $t(27)=-1.832$, $p=0.08$) (see Figure 11). Hence responsible people seem to cope with process regret by perceiving the vaccine as less useful than non-responsible people do when the health consequences are moderate. However when their health is seriously at stake, they acknowledge their mistake by perceiving the vaccine as more useful than non-regretful people do.

Figure 11:

Percentage change of the perceived probability to acquire yellow fever with or without the vaccine in function of responsibility and the curable nature of the disease

(Essay 3, Study 2)



Discussion

While I expected strategic optimism from regretful people in the low self-significance condition as in study 1, I find that people responsible for the unwise decision are pessimistic compared to non-responsible people whatever the self-significance of the consequences. However these results may be related to the nature of the scenario, which deals with the health domain. Acquiring the yellow fever may sound pretty scary, even if a treatment has proved beneficial and the pessimism of people experiencing process regret compared could be an example of the functionality of regret. Research has indeed underlined that experiencing regret after a decision should prevent people to repeat the same mistake in the future (Zeelenberg 1999). For example, Zeelenberg and Beattie (1997, study 3) show that participants in an ultimatum game who regret having given too much money in a first round tend to give less in the second round. Escalation-specific regret reduces subsequent escalation in a different context (Ku 2008). Moreover process regret seems to spur more learning than outcome regret: In a series of laboratory experiments involving repeated choices among uncertain monetary prospects, participants primed with self-blame regret (regret over an unjustified decision) tended to accept more feedback, learned the task faster, and performed better than decision makers primed with outcome regret (Reb and Connolly 2009). To our knowledge, no research has investigated the functionality of regret pertaining to risk estimation. However, if experiencing process regret is a way to improve upcoming similar decisions by not repeating the same faulty decision process, then, for very consequential decision as in study 2 scenario, regretful people could be pessimistic about the probability of a bad outcome compared to non-regretful people as a way to learn from their mistake by “punishing” themselves.

I did find the hypothesized moderating role of self-significance on prefactual reasoning. People experiencing process regret tend to minimize the extent to which their decision

worsened the outcome: their estimates reflect the belief that the outcome would not have been better if they had decided otherwise. As expected, the significance of the decision outcome seems to be a boundary condition for this coping strategy aiming at minimizing regret: it is restricted to situation where the consequences are less harmful.

STUDY 3

In study 3, in contrast with the hypothetical scenarios used in the studies 1 and 2, I want to test the hypotheses by actually making people experience process regret following a decision. Participants have to make a decision related to the academic domain and I manipulate the process regret associated with this decision.

Procedure

This study was conducted in a behavioral laboratory at a large northeastern university. One hundred thirty three subjects were compensated \$10 or \$11 for completing this study, which was presented as the first in a series of unrelated experiments. As in the previous studies, the participants were randomly assigned to four different conditions in a 2 (responsibility for the decision: low responsibility vs. high responsibility) x 2 (Outcome self-significance: low self-significance vs. high self-significance) between-subject design.

The introduction stated that the AAHE (American Association for Higher Education), an independent non-governmental association dedicated to the advancement of higher education, had launched a nationwide study on the skills and knowledge of students in American universities. For this purpose, AAHE had designed a standardized test focusing on quantitative and verbal reasoning. The aim of AAHE was to produce a public ranking of US Universities based on objective measures of their students' abilities. The University Executive

Committee was said to debate the possibility to participate in this study and the behavioral Research Lab was in charge of making a preliminary assessment of the AAHE test. The participants were told that they were going to take the test for that purpose. Among a few questions about their year of study and their major, they were asked to tell which type of reasoning they preferred between verbal and quantitative reasoning. The next screen explained that ten minutes were needed to assign the tests to participants. Furthermore in order to be well prepared for the AAHE test, it was strongly recommended to answer practice questions so as to familiarize oneself with the kind of required reasoning and knowledge. Students who chose to practice before taking the actual test, usually scored significantly higher than those who didn't practice.

Process regret was manipulated at that point through responsibility for the decision not to practice. In the high process regret condition, participants were given the choice between practicing before the actual test or earning one additional dollar by answering another unrelated questionnaire for a different research project. All participants in this condition but 11 (out of 69) did choose the additional payment rather than practicing⁸. In the low process regret condition, the experimenter gave them the unrelated questionnaire without any other choice. After spending ten minutes answering the unrelated questionnaire (or practicing for the 11 persons who chose to), they moved to the AAHE test.

The cover story mentioned that due to time constraints, each participant would be randomly assigned to one of two versions of the test: verbal or quantitative reasoning. Half of them were assigned to questions adapted from the verbal part of the GRE General Test, and the other half to questions adapted from the quantitative part. At the beginning of the study, I asked participants about their preferred type of reasoning. This was intended to elicit and make salient their self-schema (Markus 1977), which represents one's domain-specific

⁸ We pretested that a large majority of respondents would choose the unrelated questionnaire for one extra dollar instead of practicing.

attributes or abilities and one's experience in this domain. This was a good indicator of the domain (between verbal and quantitative reasoning) that was the most important for participants and from which they derive a strong feeling of competence (Markus, Cross and Wurf 1990, Swann et al 2007). Hence, if the version matched their self-stated preferred type of reasoning, respondents were in the high self-relevant condition, while if the version mismatched their preferred type of reasoning they were in the low self-relevant condition. In both conditions, participants were not given enough time to finish the actual test in order to increase the uncertainty about their performance.

Just after they finished the test I asked them several questions about how they evaluated their performance. First, they estimated the percentage of questions they answered correctly out of the total number of question. Second, the satisfaction with the performance was measured with two ten-point items: How satisfied are you with your performance in the test? And to what extent do you agree with the following statement: "I am pleased with my performance to the test". The prefactuals were then elicited with two questions: "Do you think your performance would have been better if you had practiced before the test?" (from 1: Not at all, to 10: Much Better) and the percentage of questions they believed they would have answered correctly if they had practiced instead of answering the other questionnaire. Finally, I asked them, should they have to take the test again in the future, if they would decide to practice before and if they would recommend to practice to a friend who would have to take the test (ten-point scales).

Results

The eleven participants who chose to practice before the test instead of answering the unrelated questionnaire for one extra dollar were not included in the analyses.

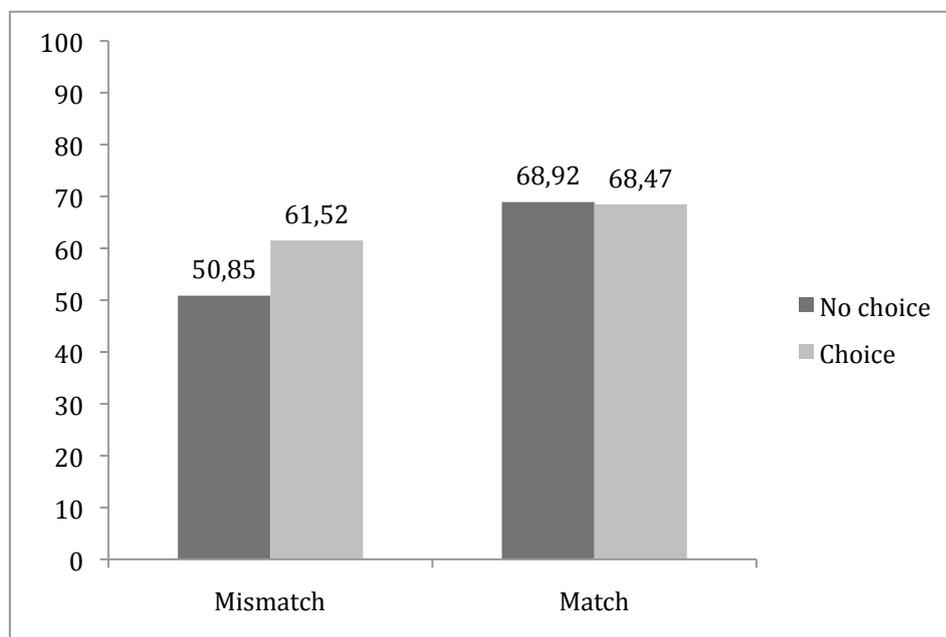
Estimated percentage of correctly answered questions. Five outliers were removed. I apply an ANOVA to analyse the estimated percentage of correctly answered questions as a function of the two manipulated factors. The results are shown on Figure 12. When the consequences of the decision are not self-significant, people who chose not to practice estimate they answered correctly more questions ($m=50.85$) than people who did not choose ($m=61.52$) ($t(56.61)=2.20$, $p=.03$). However when the consequences are self-significant, the estimations of the choice ($m=68.47$) and no choice ($m=68.92$) groups do not differ (68.47) ($t(112)=.09$, $p>.9$, interaction $F(1,112)=2.74$, $p=.10$). (see Figure 12). This supports H1.

Figure 12:

Estimated Percentage of Correctly Answered Questions

As a Function of choice and test matching

(Essay 3, Study 3)



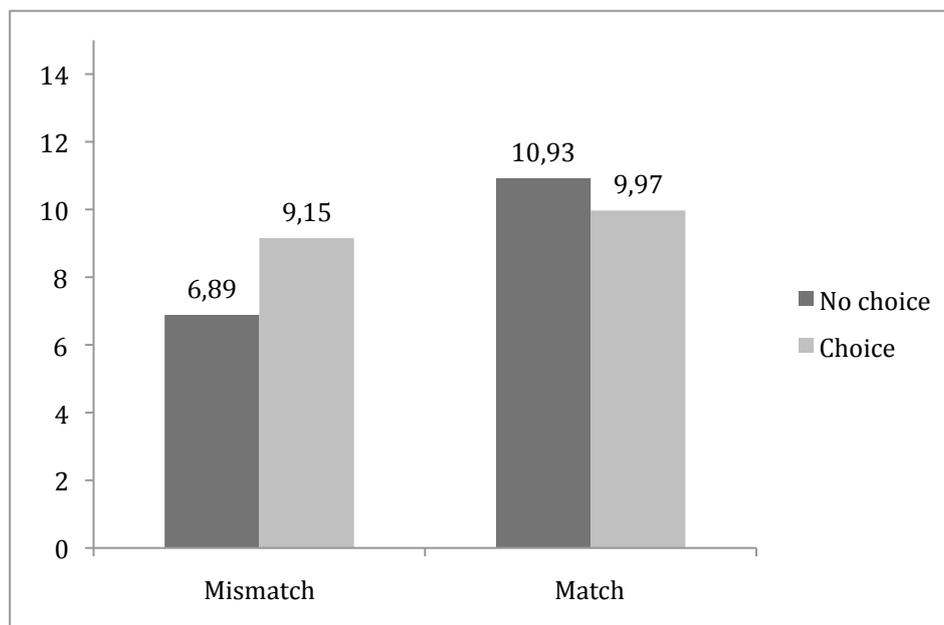
Satisfaction about the performance. Two outliers were removed. As the two items are highly correlated ($r=.94$, $p<.001$), I use their arithmetic average as a satisfaction score. The

same analysis as above yields similar results. When the test version mismatches their self-stated type (low self-significance), regretful people are more satisfied about their performance ($m=9.15$) than non regretful people ($m=6.89$) ($t(116)=2.03$, $p<.05$), whereas the regret manipulation does not affect performance satisfaction when the test matches ($m=10.93$ vs. $m=9.97$, $t(116)=.85$, NS, interaction $F(1,116)=4.13$, $p<.05$) (See figure 13).

Figure 13:

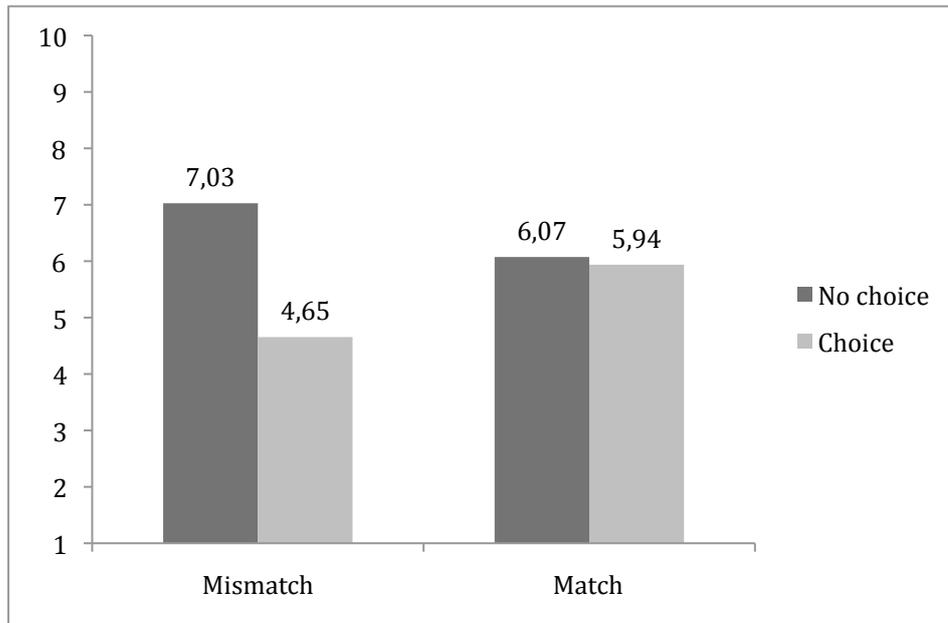
Performance Satisfaction As a Function of Choice and Test Matching

(Essay 3, Study 3)



Prefactuals. Among participants in the mismatched condition, those who chose not to practice believe their performance would have been worse than those who didn't choose not to practice (respectively, $m=4.64$ vs. $m=7.03$, $t(118)=3.37$, $p=.001$). Among participants in the matched condition, there is no difference in prefactuals depending on the choice condition ($m=5.94$ vs. $m=6.07$, $t(118)=.19$, NS) (interaction $F(1,118)=4.94$, $p<.05$). (See figure 14) This supports H2.

Figure 14:
Prefactuals, or Performance if the Participant Would Have Practiced As A Function of
Choice and Test Matching
(Essay 3, Study 3)

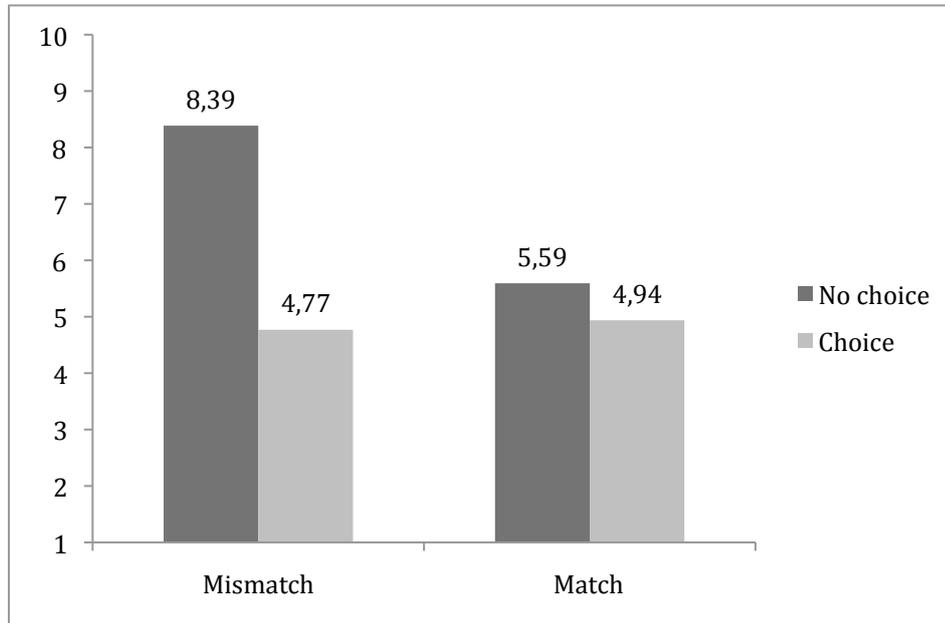


Behavioral intentions. Six outliers were removed. Again, within the low self-significance condition, the participants' intentions for future behavior diverge between the choice and no choice conditions: respondents who had chosen not to practice during the experiment answered they would be less likely to practice if they had to take the test again ($m=4.77$) compared to participants who were not given the choice during the experiment ($m=8.39$, $t(35,64)=5.68$, $p<.001$). However there is no difference in the intention to practice in the future among the high self-significance groups ($m=4.94$ vs. $m=5.59$, $t(57.00)=.864$, NS, interaction $F(1,112)=9.09$, $p<.05$) (See figure 15).

Figure 15:

Intention to Practice in the Future As a Function of Choice and Test Matching

(Essay 3, Study 3)



Discussion

This study shows that it is possible to elicit strategic optimism about an actual outcome by making people feel responsible for a bad decision. As in studies 1 and 2, this only occurs for low self-significant decisions, when respondents self-concept is not threatened by the outcome of the test. Also only for these types of decision, people regretting the decision not to practice also express different prefactuals than people without regret: they cope against regret by minimizing the extent to which making a better decision would have changed their performance to the test. Finally in line with these judgments, they are less willing to change their decision in the future if they are confronted again to the same situation.

DISCUSSION

This paper contributes to research on regret regulation strategies by investigating how people handle pre-outcome regret. More specifically, I show that process regret may lead to a distortion of subjective outcome probability. Being optimistic compared to non-regretful people (i.e. people not responsible for the unwise decision) is a way to decrease self-blame and alleviate regret by persuading oneself that “all is going to be fine.” Although our results are preliminary, I suggest that the self-significance of decision consequences may be a boundary condition. While it is not harmful in the long run to see the world with rose-tinted glasses when not much is at stake, it may become a very unsafe strategy when it regards highly significant issues.

This research may shed some new light on another possible response when people regret a decision without knowing its outcome yet: they delay or avoid the feedback (Inman 2007). Although they don't deal with regret, Karlsson and colleagues (2009) illustrate the “ostrich effect” by showing that Scandinavian and American investors tend to monitor their portfolio more often in rising markets than when markets are flat or falling. Moreover, the avoidance of feedback is more related to outcome regret than process regret (Reb & Connolly 2009). However the impact of regret on feedback postponing could be mediated by people being more or less optimistic about the outcome. They may be less eager to seek potential disconfirmation when they hold optimistic beliefs about the upcoming outcome as a coping strategy against regret.

Learning about the actual outcome has some implications for the impact of regret-driven optimism on subsequent behavior. The biased estimates may be either confirmed or disconfirmed by the actual outcome, and people have the opportunity to update their probability estimation only in the disconfirmation case. Thus, a future avenue of research

could consist in studying the stickiness of optimistic probability distortions and how they are adjusted or not as a function of the actual outcome. The post-outcome probability may then serve as an input for subsequent decisions, where people will have to choose between repeating the same bad decision as before or improve it.

GENERAL CONCLUSION

This dissertation aims at highlighting some aspects of consumer judgment and decision-making under uncertainty. More precisely, I study which individual or contextual variables impact subjective probability estimates and subsequent decisions when the actual outcome probabilities are not available or computable in an objective way. I adopt the same methodological approach in the three essays: experiments where some characteristics of the situation and the decision maker are modified between subjects.

Essays 1 and 2 complement each other by focusing on the relative salience of some information conveyed by advertisements for lotteries. Together both essays show that the consumer's entry decision is more affected by a logically irrelevant factor such as the similarity with previous winners than by the number of rewarded winners. To my knowledge, these first two essays represent the first attempt to understand which factors influence consumers' decision to participate in a lottery by using realistic advertisements as stimuli. Furthermore, by suggesting some explanations that may underlie the effects, I was able to unveil a certain number of moderating variables that specify under which conditions the insensitivity to the number of winners or the influence of similarity are likely to occur.

More specifically, I show in Essay 1 that consumers are not sensitive to a moderate increase in the number of prizes offered by a sweepstakes, because this attribute is not evaluable, i.e. the number of prizes is not easily judged as high or low, when it is presented in isolation. Featuring as many prize pictures as prizes to win or providing consumers with the distributional characteristics of the number of prizes for comparable offers are two ways to increase the evaluability of this lottery attribute: Under these conditions, people's estimates of their chances of winning increase with the number of prizes. However, I also found out that

by default prospective participants do not base their entry decision on these probability estimates. They have to be prompted to think probabilistically to do so.

Essay 2 provides some insights about a common advertising practice for lotteries, which consists in showcasing previous winners with a few personal information. When a consumer feel similar to this winner because he or she is the same age, has the same gender or the same educational background, he is more likely to enter the next drawing. This is explained by what I call the Interpersonal Hot Hand Fallacy, which describes people's belief that they have higher chances of winning the next lottery if they are similar to the previous winner than if they are dissimilar. Consistently the effect of similarity on participation intention disappears when people do not make their decision under uncertainty and know the number of participants. Showcasing previous winners seems to lead people to attribute the winning event to personal luck and to expect higher chances of winning if they are similar to the previous lucky winners. This contributes to the Hot Hand literature by extending the fallacy to the interpersonal domain.

The third essay differs from the two first one by exploring the mechanism through which process regret can lead to optimism. In line with motivated cognition research, it shows that some motivational forces can also drive probability estimation independently from the content and the presentation of contextual information. The motivation stems from the willingness to decrease regret following a bad decision process. If the decision is moderately consequential, then regretful people will form optimistic expectations compared to non-regretful people as a way to cope with the negative affect. This optimistic glow also tints the prefactual beliefs: regret leads people to minimize how much a better decision could improve the outcome. So far existing research has not emphasized optimism as a way to regulate regret.

As the issues specific to each essay have already been discussed, this general conclusion mentions future avenues for research and implications common to two or all three essays.

Managerial implications for lotteries

The results of Essays 1 and 2 may provide interesting managerial recommendations for marketers organizing promotional or state lotteries. Basically, relying on similarity with previous winners while downplaying the random nature of the drawing to encourage attribution to personal luck appears as a better strategy than capitalizing on the number of prizes at stakes. However, before asserting such managerial implications, the results of the lab studies presented in this dissertation should be cross-validated by field experiments in order to improve their external validity. The Interpersonal Hot Hand effect and the insensitivity to the number of winners should be replicated for a population not exclusively composed of students and for lotteries with real stakes. I am currently working to provide such evidence with MilleMercis, a European firm specialized in designing online promotional games.

Another limitation of this work from a managerial perspective is that all our lab experiments showcased only similar or only dissimilar previous winners. This setting can be implemented in emailing or mailing campaigns, where the contents of the email showcasing a previous winner can be personalized depending on the recipient demographics in order to present a similar winner. If such a personalization process is not feasible, then managers targeting a broad population with their lotteries could simultaneously showcase winners with different socio-economic profiles as in the McDonald's example. It could be interesting to run experiments to study how consumers react when they are exposed to both similar and dissimilar winners at the same time.

Generalization to other decision contexts

Another remaining open question regards the possible generalization of the results to different kinds of decision under uncertainty. Casino gambling may represent a first logical extension: Does the similarity with other gamblers that just won a certain type of game affect the decisions of other gamblers? The Hot Hand and Gambler's fallacies have already been explored in the casino context and it would be interesting to test their interpersonal aspect. Regarding that domain, I would like to underline that my results should enlighten public policy rather than casino managers. Using the interpersonal similarity could worsen even more the gambling addiction of certain people, who are likely to hold strong beliefs in personal luck.

From a public policy perspective, it would also be interesting to study probability estimation for negative outcomes such as health risk, transportation risk, and financial risk. What would be the impact of showcasing similar previous persons having just undergone a negative outcome? Literature on comparative optimism and pessimism has studied related issues by showing the moderating role of interpersonal similarity on both comparative biases (Raghubir and Menon 1998, Menon et al 2009). Interestingly, Menon and colleagues recently found out the crucial role of perceived controllability in determining if people display comparative optimism or comparative pessimism. In a similar vein, perceived level of control over an event is closely linked to causal attribution to luck, which plays an important role in the Interpersonal Hot Hand effect as we show in Essay 3 Study 5. However, this dissertation adds new insights to previous work on comparative optimism and pessimism by focusing on the sequential aspects of probability judgment and by eliciting absolute judgment for oneself and not in comparison with a more or less similar other.

Decision-making strategies under uncertainty

While I was able to establish that similarity affects intention to participate through a heightened subjective odds of winning, the number of winners turns out to be much more difficult to take into account for decision-makers. Making this number evaluable in a non-comparative context allows overcoming the magnitude insensitivity of subjective probabilities. However it doesn't translate in participation intention unless people are prompted to think probabilistically.

This leaves us with an important research issue: Why do consumers make their entry decision without likelihood judgment in the first essay while they take this information into account in the second essay? The scenarios employed in both essays are very similar, which may indicate that the difference between decision-making strategies stems from the nature of the manipulated factors. Estimated probability of winning gains a greater weight in the participation intention when it is affected by similarity with the previous winners than when it is affected by the number of winners. Hence, it seems that there is an interaction between the type of available information and the decision strategy people decide to follow when facing uncertainty. This question represents a promising avenue for future research.

Judgment Biases

The three essays present respondents' estimations as biased. In each case, using the word "bias" implicitly refers to a normative expectation to which respondents' estimations are compared. In essay 1, the estimated odds of winning don't increase with the number of winners; in Essay 2, the estimated probability differs depending on the characteristics of previous winners whereas successive drawings are independent from each other; in Essay 3, estimations are impacted by an emotion unrelated with the outcome of the decision. While these estimations are compared to a normative reference defined in advance, I could also have

looked at the actual probability of winning calculated on the basis of the stated participation intentions (Essays 1 and 2) or at the actual performance (Essay 3). For Essays 1 and 2, it is not likely to change the conclusions. If people participation remains the same whatever the number of winners, then the higher the number of winners, the higher the probability of winning. The aggregated effect of similarity is difficult to accurately predict for a mixed sample composed of similar and dissimilar prospects, but there is no reason to expect that the actual probability of winning for somebody similar to the previous winner is higher than for somebody dissimilar. For Essay 3, the possibility of comparing performance expectations to actual scores in Study 3 remains an interesting analysis to perform, although participants in the process regret condition do not seem to put more efforts in the test than those in the no-regret condition.

Boundary conditions for the biases

In Essay 3, the estimation discrepancy between the regretful and non-regretful groups disappears for highly self-significant decisions. This last result about decision importance as a boundary condition represents an opportunity to put the three essays into perspective. The biases described in the two first essays characterize low-involving decisions where little time or money is at stake. In other words, people's erroneous judgments are unlikely to prove harmful. However, the preliminary results of Essay 3 seem to indicate that decision-makers can be better calibrated when stakes are higher. Thus, while the initial purpose of this dissertation was to study how probability estimates can influence decisions, it also highlights that, the other way round, the importance of the decision may determine how people come up with these estimates and how they are biased. The pretty low costs of promotional and state lotteries may explain why people rely on salient cues such as similarity with previous winners or the visual display of prizes to estimate their chances of winning. Decision importance also

plays a crucial role when probability estimation is driven by process regret regulation. Studying more closely the interplay between decision significance, probability estimation process and the weight of subjective probability in the decision may prove a relevant future avenue for research.

Another relevant boundary condition for the biases affecting subjective probability of winning a lottery may be consumer expertise. In Study 2 of Essay 1, the manipulation of evaluability consists in providing examples of similar sweepstakes, so that participants can gain some insights about the range of values that can be expected for the number of winners. Experts in promotional games may arguably have this kind of knowledge stored in memory. Hsee (2001) also points out this positive relation between expertise and evaluability. In Study 3 of Essay 2, the impact of similarity is lesser for participants who are highly prone to enter sweepstakes: sweepstake proneness, by leading to regular participation, can be viewed as an indirect antecedent of expertise. In a similar vein, experts could have a better idea of the typical number of participants in a sweepstakes, which would suppress the similarity effect as shown in Study 5.

These two boundary conditions, decision self-significance and expertise, show that people are not biased in an indiscriminate way. When introducing the heuristics and biases approach in the general introduction, I pointed out that Kahneman discusses the interplay between System 1 and System 2 when people formulate a judgment under uncertainty. The core of the dissertation deals with examples of intuitive System 1 processing and ensuing biases. However, decision self-significance, expertise or simply providing numerical information can change the processing level and trigger more vigilance and monitoring from System 2. This discussion outreaches the scope of the dissertation but underlining the likely generalization limitations of the results is necessary with respect to the ongoing debate on human judgments of probability. Some early research comparing actual judgment to

normative principles from probability theory suggests that the mind operates in the manner of an intuitive statistician (Peterson and Beach 1967)⁹: people are able to learn proportions and distributional properties they encounter in their experience (Gigerenzer et al 1989). This view contrasts with the heuristics and biases approach which brings to the forefront the limitations of intuitive judgment. Hogarth (1981) argues that the systematic dysfunctional consequences of judgmental heuristics are always demonstrated in discrete incidents preventing any feedback and learning process. Hence, several biases identified in discrete incidents result from heuristics that are functional in the more natural continuous environment. This distinction between the discrete and continuous perspectives can also be related to the Bayesian vs. frequentist view of probability: Some authors argue that the human mind represent probabilities as frequencies and not as subjective degrees of confidence as in the Bayesian approach (e.g. Gigerenzer 1991), which leads many judgmental biases to disappear when the problems are expressed in frequentist terms (Cosmides and Tooby 1992). To sum up, I acknowledge that in all the studies, participants have to respond to a discrete decision environment with no chance to adjust their estimations after receiving feedback. This may clearly facilitate the occurrence of biases. However, although these qualifications are necessary, they do not question the implications of the results: people are often confronted in real-life to uncertain situations where no priors may enlighten their judgments.

⁹ I am grateful to Professor Christian Pinson for suggesting me this reference.

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Appendix 1: Advertising for Mazda/la Redoute sweepstakes



Jouez et gagnez !

3 nouvelles Mazda2
1 téléviseur Full HD et de nombreux cadeaux

Une offre spéciale vous attend.
Cliquez ci-dessous pour la découvrir !

→ **Entrez dans le jeu**
Cliquez ici

GRAND JEU
DU 18 MARS AU 18 JUILLET 2008

LA REDOUTE  **mazda**

Appendix 2: Stimuli for study 1



2 iPods Shuffle mis en jeu !

Répondez à quelques questions sur les événements culturels qui vous ont marqué en 2007...

...et gagnez peut-être 1 iPod Shuffle!



2 iPods Shuffle mis en jeu !

Répondez à quelques questions sur les événements culturels qui vous ont marqué en 2007...

...et gagnez peut-être 1 iPod Shuffle!



12 iPods Shuffle mis en jeu !

Répondez à quelques questions sur les événements culturels qui vous ont marqué en 2007...

...et gagnez peut-être 1 iPod Shuffle!



12 iPods Shuffle mis en jeu !

Répondez à quelques questions sur les événements culturels qui vous ont marqué en 2007...

...et gagnez peut-être 1 iPod Shuffle!



Appendix 3: Example of sweepstakes Essay 1 Study 2

A cosmetics store gives some secret codes to its customers and invites them to come back two weeks later where six winning secret codes will be drawn. The customers who received a secret code have to visit the store two weeks later if they want to enter the drawing. Each of the six winners (high evaluability condition, “Each winner” in the low evaluability condition) will receive the women’s fragrance “Allure” de Chanel (100ml, 3.4 FL.OZ).

How demanding are the requirements to enter the sweepstakes?

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

Is the type of prize appropriate for 30-year old women?

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

Is the type of prize consistent with the organizer?

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

(Only in the high evaluability condition:

What do you think about the number of winners (6)?

It’s a low number 1 2 3 4 5 6 7 It’s a high number)

Appendix 4: Advertising for the promotional game used in Study 2

Music-News.com 



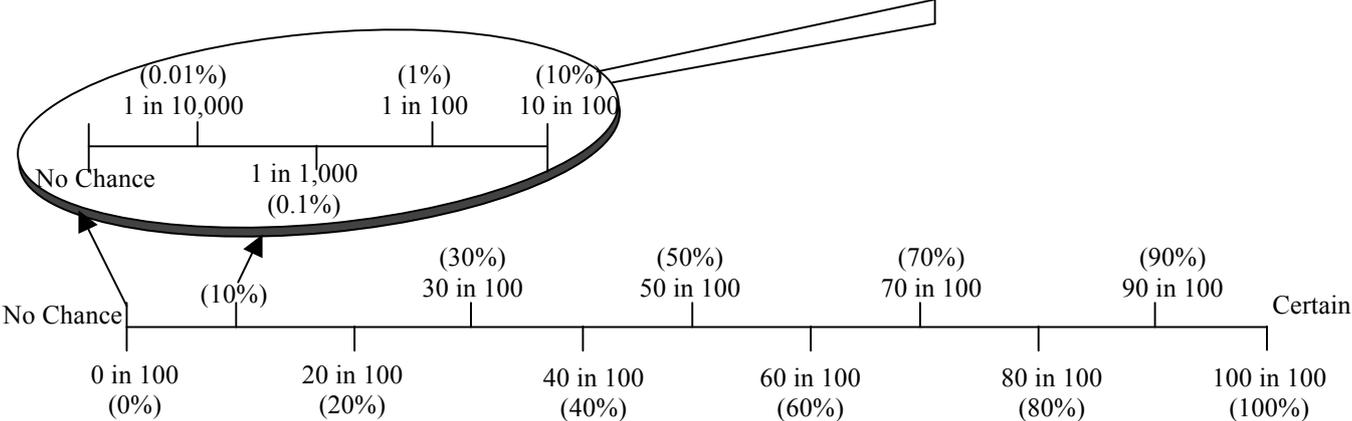
1 New iPod Nano to win!

Participate to the Music-News.com lottery and maybe listen to your favorite songs on the new iPod Nano

Appendix 5: Visual Analog Scale adapted from Woloshin et al. (2000) used in Study 1 to measure the estimated probability to win

If you enter this lottery, what do you believe your chance of winning is?

Place an “X” in EITHER the magnifying glass OR the lower part of the scale to describe the chance you win if you participate to the random drawing.



Appendix 7: American Dreamcard Sweepstakes

Source: <http://www.americandreamcard.com/winners.asp>



**James Tolson
November 2008
Stafford, VA**

28 Year U.S. Postal Veteran Wins the November American DreamCard™ Jackpot

Windermere, Florida – February 4, 2009 – James Tolson of Stafford, Virginia won \$12,000.00 in the American DreamCard™ monthly credit card sweepstakes. Tolson, a long time employee of the United States Post Office, now working in the insurance industry, is looking forward to taking a cruise with his wife. Upon learning he had won the November jackpot said, "I couldn't believe it. I didn't think it was possible. It came at a time when I really needed it."



**Neelam Patel
March 2008
Iselin, NJ**

Masters Student Applied Online and in Time, Won Big with the American DreamCard™

Windermere, Florida - May 7, 2008 -Neelam Patel of Iselin, New Jersey, won \$12,000.00 in the American DreamCard monthly credit card sweepstakes, after previously applying online at www.americandreamcard.com. Patel is a systems engineer for the Intertex Apparel Group and attends night school, working towards his Masters Degree. Neelam explained his reaction to winning as "Amazed! I have never won anything so it was a really big thrill." Neelam said his plans for the money are to "pay off other credit card debt".



**Susan Deer
December 2006
McComb, MS**

FARMING AN AMERICAN DREAMCARD™

McComb, MS – March 26, 2007 – Susan Deer of McComb, Mississippi won \$18,000 in the December American DreamCard™ credit card sweepstakes. Deer who has farmed for her living over the last twenty-five years found her yield with the American DreamCard MasterCard® surprising. When she was notified of winning, the reaction in her words was "Shock!" Deer then took the winner's information package to several people asking "Is this real???" Susan became a cardholder in 2005 after applying online at www.AmericanDreamCard.com and now that the reality of winning has set in, she plans to spend her winnings on a new car.

Appendix 8: Michigan Lottery

Source: http://www.michigan.gov/lottery/0,1607,7-110-37002_37004---,00.html



Damian Flournoy was the lucky winner of the second \$1 million top prize in the Michigan Lottery's Million Dollar Mega Play Instant ticket. Damian and his family claimed the mega prize today at Lottery Central in Lansing!



Marshall Forbes is a very lucky Mega Millions player. He matched five white ball numbers in the February 6 drawing and won \$250,000!



Rayanne Drensky of West Branch was thrilled when she won \$75,000 after scratching a Cadillac Cash instant ticket!

Appendix 9: Apartments.com

Source: <http://contests.about.com/od/realwinners/ig/Prize-Winner-Photo-Album/Photo-of-Dan-Oswalt-s-Cash-Win.htm>



Appendix 10: Purex

Source: <http://contests.about.com/od/realwinners/ig/Prize-Winner-Photo-Album/Smart-Car-Winner.htm>



Appendix 11: *Sud-Ouest*

FRANCE/BOURSE

KELBOL. Depuis Castelnau-de-Gratecambe (47), elle a gagné un séjour à Marrakech

Le Maroc pour Colette



Colette Bonis, fidèle lectrice de « Sud Ouest », a gagné un voyage à Marrakech

PHOTO « SUD OUEST »

■ Aurait-elle la main heureuse ? « Pas forcément, je ne suis pas vraiment joueuse », confie Colette Bonis. Pourtant, elle vient de gagner un voyage au Maroc grâce à Kelbol. « C'est marrant, on doit s'y rendre la semaine prochaine. A Casablanca puis à Fès ! », sourit cette fidèle lectrice de « Sud Ouest » qui ne rate aucun jeu organisé par son quotidien. Il y a quelques jours, cette habitante de Castelnau-de-Gratecambe, sur les hauteurs de Villeneuve, a appris qu'elle avait décroché « le gros lot ». Grâce à Kelbol, c'est Marrakech qu'elle va pouvoir découvrir d'ici quelques mois. Le lot comprend en effet un séjour Fram en pension com-

plète pour deux personnes au Jardins de l'Agdal, le tout nouvel hôtel Framissima de Marrakech, un établissement qui doit ouvrir d'ici à la fin de l'année.

En attendant, Colette Bonis et son mari Simon, patron d'une entreprise de maçonnerie auront découvert une partie des charmes du royaume chérifien.

Pas forcément joueuse, mais souvent gagnante tout de même : la Lot-et-Garonnaise s'est ainsi rendue par deux fois en Tunisie après avoir gagné deux séjours, notamment grâce à un tombola organisée voici quelques années par les commerçants de Villeneuve. Assurément la meilleure façon de voyager

Appendix 12: Stimuli Study 1 Essay 2



10 week-ends à Barcelone à gagner avec l'opérateur Phone+!

Pierre et Marie (22 ans, Paris) sont les gagnants de la dernière édition du jeu Phone+, et ont passé un week-end à Barcelone.

Participez au nouveau tirage au sort avec Phone+ et soyez l'un des 10 gagnants d'un week-end pour deux à Barcelone comprenant l'hébergement et l'Aller-Retour depuis Paris en Avion.



1 week-end à Barcelone à gagner avec l'opérateur Phone+!

Pierre et Marie (70 ans, Paris) sont les gagnants de la dernière édition du jeu Phone+, et ont passé un week-end à Barcelone.

Participez au nouveau tirage au sort avec Phone+ et soyez le gagnant du week-end pour deux à Barcelone comprenant l'hébergement et l'Aller-Retour depuis Paris en Avion.

Appendix 13: Stimuli Study 2A Essay 2

Un site Internet communautaire pour étudiants organise de temps en temps un grand tirage au sort parmi ses membres pour les fidéliser. A chaque fois, 10 cadeaux variés sont mis en jeu (des we dans une capitale européenne, des téléphones portables, des baladeurs MP3, des places de concert, etc).

Les gagnants des deux derniers tirages au sort étaient :

(condition A)



Sophie, 21 ans
A gagné un we pour 2 à Londres



Claire, 23 ans
A gagné un téléphone portable

(Condition B)



Matthieu, 21 ans
A gagné un we pour 2 à Londres



Julien, 23 ans
A gagné un téléphone portable

Appendix 14: Scrambled Sentences Task (Essay 2)

Randomness condition

committee the door chaotic is
brown play desk the is
systematic sew anarchists disorder hurdle
orange at he random chose
easily paper store ripped the
ball the hoop toss normally
the haphazardly flew for robin
athletes the perform confusion unpredictably
sky the seamless is ruddy
forget not try fool to
send I mail it over
long the today is book seven
faith virtue is a mayhem
that garbled spoke nonsense Mary
Dennis flat chance a takes
big chairs they box are

Neutral condition

Prepare the gift wrap neatly
brown play desk the is
ate she eat selfishly all
he observes occasionally people watches
easily paper store ripped the
ball the hoop toss normally
the push wash frequently clothes
play wind children quietly the
sky the seamless is ruddy
forget not try fool to
send I mail it over
long the today is book seven
decoration hobby apartment is a
slowly landscape window unfolds the
empty class in students are
big chairs they box are

Essays on Consumer Judgment and Decision Making Under Uncertainty

Summary:

The dissertation studies several factors that impact likelihood judgments and decisions in concrete situations characterized by uncertainty. The first two essays study the entry decision in a lottery where the number of participants is unknown. This decision is not affected by the number of prizes, i.e. by the number of winners to be rewarded (Essay 1), whereas it is influenced by the similarity with the previous winners, a logically irrelevant factor (Essay 2). Consumers' insensitivity to the number of prizes is driven by the combined effect of the low evaluability of this attribute and decision making without likelihood judgment. Similarity with the previous winners increases participation intention because of the Interpersonal Hot Hand Fallacy: consumers believe their chances of winning the next random drawing are higher when they are similar to the lucky previous winners than when they are dissimilar. The final essay shows that, when regretting a recent decision before its consequences are known, people tend to be optimistic about these consequences, provided that the self-significance of the decision is limited.

Key words: Uncertainty, Probability Judgment, Lotteries, Evaluability, Interpersonal Similarity, Hot Hand Fallacy, Luck, Regret, Optimism.

Essais sur les Jugements et la Prise de Décision des Consommateurs en Situation d'Incertitude

Résumé:

La thèse étudie, dans des situations concrètes caractérisées par l'incertitude, plusieurs facteurs qui influencent les jugements de probabilités et les décisions. Les deux premiers essais portent sur la décision de participer à une loterie dont le nombre de participants est inconnu. La décision n'est pas influencée par le nombre de prix, c'est-à-dire le nombre de gagnants qui seront récompensés (Essai 1), alors qu'elle l'est par la similarité avec les gagnants précédents, un facteur logiquement non pertinent (Essai 2). L'insensibilité des consommateurs au nombre de prix découle de l'effet combiné de la faible évaluabilité de cet attribut et de la prise de décision sans estimation de probabilité. La similarité avec les gagnants précédents augmente l'intention de participer en raison du biais de « Hot Hand » interpersonnelle : les consommateurs pensent que leurs chances de gagner le prochain tirage sont plus élevées quand ils sont semblables aux gagnants précédents que quand ils sont dissemblables. L'essai final montre comment le fait de regretter une décision avant que ses conséquences soient connues peut conduire à être optimiste sur ces conséquences, pourvu que l'importance de cette décision pour la personne reste limitée.

Mots-clés : Incertitude, Jugement de Probabilité, Loteries, Evaluabilité, Similarité Interpersonnelle, Biais de « Hot Hand », Chance, Regret, Optimisme.