Behavioural responses to risk on remote outcomes

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Behavioural responses to risk on remote outcomes

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Computer mediation of communication allows interaction with events remote in space or time. However, the uptake and use of videotechnology requires an understanding of its effects upon willingness to take risks. To understand how responses to remote events are influenced by computer mediation, the present study compared responses to collocated outcomes with those conveyed over a videolink or as pre-recordings. Willingness to risk on an outcome was quantified using wagering behaviour during a simulated game of roulette: measuring preferred outcome format, levels of risk sought, and times required to make decisions. Participants tended to be more confident of winning and preferred the collocated version of roulette. Participants took greater risks with pre-recorded video outcomes and tended to spend more time locating bets. For videolinked outcomes, participants were more cautious, hedging their bets, and taking more time deliberating the odds. Although the amounts wagered did not change, a potential predictability in pre-recordings appears to encourage risk taking, while the reduced presence inherent in real-time videolinks engenders caution.

Keywords: videolink; videorecording; presence; risk; decision-making

1. Introduction

Computer mediation of the communication process has allowed a range of organisations to overcome limitations of space (connecting to remote locations) and time (recording information for later access) when delivering services. Unfortunately, this capability also increases competition. Although the electronic delivery of services enhances an organisation’s ability to contact its customers, it also enhances the ability of an organisation’s competitors to contact their customers, with Nielsen (2000) warning that one’s competitors are only a mouse click away. Hence organisations have attempted to increase their competitive edge by increasing the attractiveness of their websites (Lindgaard et al. 2006) or by tracking consumer behaviour to provide enhanced customer support (Hoffman et al. 1999). Within the context of this capacity to track consumers (Shaffer et al. 2010), the present paper addresses behavioural responses to risk on events remote in space or time conveyed using videotechnologies.

1.1. Events remote in time

Although the Internet was initially a text-based medium, an increased access to high speed broadband now allows the use of video to depict the products and services that are available, making them more tangible (Stafford 1996, Vilnai-Yavetz and Tifferet 2009). Videorecordings can be used to deliver information captured at a remote time allowing the online provision of services such as education, entertainment, or health care (Della Mea 2005, Ambikairajah et al. 2006, 2007).

Indeed for educational purposes, some authors have deemed recordings equivalent to live lectures (Ambikairajah et al. 2006, 2007), whereas others in the medical sector have suggested that recorded information should not be considered equivalent to live consultations (Della Mea 2005, Ng et al. 2013), as they lack a necessary immediacy (Della Mea 2005). Nevertheless, such recorded information can serve as a form of preamble with the tracked consumer browsing of the information then serving as a basis upon which further interaction can be based (Ng et al. 2013).

1.2. Events remote in space

In addition to the depiction of products and the delivery of services, video can be used to enhance communication (e.g. Skype and GoogleMail) and provide real-time live feeds of events remote in space (e.g. sport). The increased interactivity can be important for some applications (e.g. Nilsen 2011), improving transactions and contributing to consumer trust (Inbar and Tractinsky 2012). As such video can deliver medical (Andrews 1999, Frueh et al. 2000) and educational services (Conlon and Pavlika 2009) to remote communities.

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where there are problems sourcing appropriately trained personnel and the costs of travel might be prohibitive.

Although some meta-analyses suggested that a videolink delivers equivalent service face to face (Hyler et al. 2005, Demiris et al. 2006, Antonacci et al. 2008, Barak et al. 2008), media richness theory would suggest that a richer format would be more appropriate under conditions of uncertainty (Daft and Lengel 1986), and that removing cues might enhance perceptions of risk. Indeed, other studies have suggested that videolinks alter the perception of messages (Matarazzo and Sellen 2000, Riegelsberger et al. 2002, Dey et al. 2009) or alter the appreciation of risk (Goh et al. 2011). Hence, there is a need to address the impact of the format in which an outcome is depicted upon consumer response.

1.3. Tracking

The account keeping necessary for the accurate delivery of services, along with consumer loyalty and patron tracking schemes mean that every element of a person’s online behaviour can potentially be monitored. For instance, research indicates that a reduced range and increased depth of product search (Moe 2003) or a greater period of time or more clicks on a website (Kim et al. 2005, Kim and Yum 2011) could be related to purchase intention.

The potential to monitor participation in online behaviours such as gambling (LaBrie et al. 2007, Broda et al. 2008, Nelson et al. 2008) also confers a potential to control behaviour (Haefeli et al. 2011). Nevertheless, a greater potential for consumer protection needs to be considered in the light of findings that consumer support systems can suffer from problems determining the needs of new users (cold start) and can suffer difficulties when faced with missing values (sparsity) (Montaner et al. 2003, Marlin et al. 2011) if patrons move from provider to provider, and there is evidence that this occurs for more involved consumers in some online environments (Johnson et al. 2004). Indeed, problem gamblers report frequenting a larger number of offline gaming venues (Phillips and Ogeil 2011) and report engaging in a greater number of different forms of gambling (Phillips et al. in press), and this brand switching (Givon 1984) could pose problems for systems that track gambling participation if databases are not integrated.

It is, therefore, important to consider whether the behavioural response to outcomes conveyed online might manifest in terms of a diffusion of interest or a change in search patterns, and consider how the remoteness of an event might influence risk-taking behaviour. A previous study demonstrated that the behavioural response to increased risk was enhanced when events were remote in space (Goh et al. 2011). As an extension, the present study addresses not just behavioural responses to events remote in space but also to responses to events remote in time.

<table>
<thead>
<tr>
<th>Format</th>
<th>Spatial</th>
<th>Temporal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collocated</td>
<td>Proximal</td>
<td>Interaction</td>
</tr>
<tr>
<td>Videolinked</td>
<td>–</td>
<td>Interaction</td>
</tr>
<tr>
<td>Pre-recorded</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

1.4. Videotechnology and affordances

Daft and Lengel (1986) recommended richer communication channels when dealing with ambiguity or uncertainty. Videotechnologies might not allow equivalence to collocation, as some of the cues used to evaluate uncertainty are potentially lost (Table 1). Conveying outcomes over a videolink removes a variety of potential proximal cues operating in peri-personal space. For instance, a videolink eliminates the possibility of reach to grasp or collision. Additional cues are eliminated when an outcome has previously been recorded. Where outcomes are pre-recorded, a variety of potential cues as to the immediacy of the event are no longer available. As the event is historic rather than current, a recording eliminates the ability to test causality by interacting with and then influencing events (Cohen 1979).

To address the willingness to make decisions concerning outcomes remote in time or space, the present study adopted a simulated gambling task (Goh et al. 2011). A number of forms of gambling are available online. Casino games allow a precise quantification of behaviour in response to risk and also allow a degree of face validity as outcome formats currently vary. A range of casino games are now being offered in collocated and remote forms (e.g. Rapid Roulette and bingo), and some of these games may have time delays when conveying outcomes, either inherent in Internet connections or as part of the game procedures. For instance, in the game Sic Bo an outcome is initially created by ‘tumbling’ the dice in a covered device, a delay then occurs as bets are taken, and then after bets have been placed the outcome is revealed by removing the cover (http://www.tcsjohnhuxley.com/en/live-gaming/gaming-tables/sic-bo-tables.html). Such procedures require that people hazard their efforts on an outcome that occurred in the past and has elements in common with the use of other pre-recorded services such as lectures or entertainment.

A simple game of roulette was adopted for purposes of tractability, as it allowed us to vary the format of the outcomes participants responded to. Participants could wager upon the fall of a ball that could be remote in time or space. In addition, as roulette offers a wide range of wagering combinations, it was possible to monitor the period of deliberation, the range and levels of risk sought, and the values associated with these levels of risk. By documenting the elements of the decision-making process (Mann and Ball 1994), we can better address deliberation, depth, and breadth of selection associated with the taking of risks on...
outcomes remote in time or space conveyed by videotechnologies. Some authors have suggested an equivalence of formats, such that responses to collocated outcomes would equate with pre-recorded (Ambikairajah et al. 2006, 2007, McKenzie 2008) or videolinked (Hyler et al. 2005, Demiris et al. 2006, Antonacci et al. 2008, Barak et al. 2008) outcomes. However, if remote outcomes are conveyed over a videolink, the observer loses a number of cues to verisimilitude that would be available when physically present (Griffiths and Parke 2004). In addition, when pre-recorded outcomes are employed, the observer loses cues as to the immediacy of the outcome. An altered willingness to risk on remote outcomes would be indicated behaviourally by reduced bet size, the selection of lower levels of risk, spread across more numbers, or greater time spent in deliberation.

2. Method

2.1. Participants

A group of 23 university students (18 males and 5 females) with a mean age of 23.22 years (SD = 6.5) completed the experimental study. Participants were solicited via university newspapers and bulletin boards and had no prior relationship with the experimenters. Participants were asked to nominate their highest level of completed education, with n = 11 reporting high school completion, n = 3 nominating a technical course or diploma, n = 6 nominating an undergraduate degree, and n = 3 nominating a postgraduate degree. Participants were paid for the time taken to complete the study ($A 6/hour) and were informed that the top two scorers would receive an Apple iPod Classic (120 GB) worth $A 200.

2.2. Apparatus and task

The roulette game was played on a Pentium 4 IBM compatible Personal Computer on custom written software that recorded wagering patterns and timed responses using assembly code. The layout for the computerised roulette resembled the layout as displayed in casinos except there was no provision for betting on odds/evens or red/black. A variety of paraphernalia associated with roulette were also provided, namely a picture of the wheel, a card listing types of bets and odds, and a pencil and paper.

A short tone signalled the beginning of each bet, followed by a visual message ‘Place your Bets’ which then appeared on the screen. Participants entered their wager (range: 1–9) using the keyboard and were then asked to specify the location of the wager, as they would a ‘call bet’ for roulette in a casino (i.e. low number and high number). The two numbers of a call bet specified the range of the locations to be covered on the roulette layout and thus the numbers bet upon. The first part of the call bet effectively locates the bet, while the second part of the call bet, by specifying a range of numbers, denotes the odds sought.

Only recognised call bets were accepted and after inputting a correct bet the payout for that wager was displayed on the computer screen (e.g. ‘Pays 35-1’ for a straight-up bet). Hence there was provision to place bets at a variety of odds, namely 1-1, 2-1, 5-1, 8-1, 11-1, 17-1, or 35-1. However, there was no provision for the corner bet 0-3 that pays 8-1. These payouts on a single-zero roulette wheel give the house a 2.7% advantage (Hannum and Cabot 2005).

For each spin, there was the provision to place 15 bets consisting of between 1 and 9 points for each bet. The amounts wagered, and the two numbers used to define the call bet were displayed on the screen. In addition, the numbers covered by the bet were displayed on the layout in a different colour. There was some degree of time pressure, as would be found in a casino. Participants were given 10 seconds to place each bet, otherwise a null bet was registered for 1 of the 15 opportunities to place a bet. After wagering points and specifying the location of bets, the roulette wheel was spun. The roulette wheel was manufactured by Dal Rossi of Italy and was 22 cm in diameter and of the French style in that it had one green ‘0’ but no ‘00’.

2.3. Conditions

Participants were exposed to three different conditions in the experiment, such that outcomes were conveyed in three different formats: collocated, where the wheel was spun by an experimenter in the same room as the participant; videolink, where Marratech® software was used to give a real-time full screen video and audio link to a live spin in another location; and a pre-recorded video condition, where a pre-recorded wheel spin was shown on a computer terminal as a full screen video image. At the completion of each spin, the experimenter entered the outcome and the computer informed participants of the result of their wager via an on-screen message detailing any payout on the number spun. The amount won or lost on each spin and the amount won or lost in each condition were displayed at the bottom of the screen. To reduce any carry-over effects, the total amounts won or lost were reset between conditions.

2.4. Procedure

The experimenter explained the rules of roulette and how to specify locations of wagers using call bets. The experimenter then described the three experimental conditions to the participants, and after practice, but prior to commencement of play, participants were asked about their confidence about winning under each experimental condition. Participants then completed sufficient practice trials to familiarise themselves with the apparatus and task, followed by the three conditions each containing 10 spins, for a total of 30 spins overall. The order of presentation of conditions was randomised to manage any carry-over effects. The computer software recorded the wagering behaviour of participants including the number of bets, location of bets, and degree
of risk for each spin. After participants had completed the experiment, they were asked which conditions they preferred most and which they preferred least. At the end of the experiment, participants were paid for their time and the aggregate totals won or lost for the three conditions were determined. The two highest scoring participants were given iPods.

2.5. Design and analysis

Wagering is a complex proposition in roulette and there are a number of ways in which the preferred risk can be quantified (Wagenaar 1988). Wagering can be quantified in terms of the number of chips placed, and the proportion of the layout covered. As a measure of potential outcome and preferred risk, we analysed the average payout sought that would be associated with the bets placed. For instance, if a participant used all corner bets paying 8-1, the average potential outcome and the average payout sought would be 8. Data were analysed using separate repeated measures ANOVA, using planned comparisons to determine differences between means.

3. Results

After practice, but before commencing wagering, participants were asked how confident they were about winning in each condition. The effect of outcome format was significant \( F(2,44) = 3.201, p = .050, \eta^2 = .13 \). People tended to be more confident when presented with the collocated \( (M = 2.57, SD = 1.20) \) or videolinked \( (M = 2.52, SD = 1.08) \) than the pre-recorded \( (M = 2.09, SD = 1.04) \) conditions.

The method by which outcomes were conveyed influenced risk perception as measured by wagering behaviour (Table 2). Confidence, as indicated behaviourally by the mean number of bets placed per spin did not vary as a function of outcome format \( F(2,44) = 0.944, p > .05, \eta^2 = .04 \). However, outcome format appeared to influence the appreciation of risk, as indicated by bet placement. As a measure of risk we determined the degree to which people covered the roulette layout, hedging their bets to defray risk. Outcome format influenced the proportion of the roulette layout covered by wagers \( F(2,44) = 7.349, p < .01, \eta^2 = .250 \). As may be seen in Table 2, people hedged their bets, spreading bets on more numbers when outcomes were transmitted over a videolink.

As betting behaviour can be complex in roulette, another measure of risk could be the mean payouts sought by participants if their numbers were spun. The payouts sought varied significantly as a function of outcome format \( F(2,44) = 8.297, p < .01, \eta^2 = .274 \). As may be seen in Table 2, people acted as if there was a greater predictability in the pre-recorded format and accepted greater risks on their wagers.

To offer insight into the reduced reported confidence associated with the collocated and videolinked conditions, the time spent in placing bets was analysed. There was no effect of outcome format upon the time spent thinking before placing a bet \( F(2,44) = 0.011, p > .05, \eta^2 = .001 \). However, there were indications that the method by which outcomes were conveyed influenced deliberation during wager placement.

The time taken by participants to register the first and last number for their call bets was analysed. Outcome format tended to affect the time taken to register the first part of the call bet \( F(2,44) = 3.116, p = .054, \eta^2 = .124 \). Simple contrasts indicated that people took longer to register the first number of their call bet in the pre-recorded condition than the collocated condition \( (F(1,22) = 5.527, p = .028, \eta^2 = .201) \). As the first part of the call bet specifies the location of the bet, it seems that people thought more about bet location when outcomes were pre-recorded.

The time to register the second number in a call bet varied significantly with outcome format \( F(2,44) = 4.204, p < .05, \eta^2 = .160 \). Simple contrasts indicated that people took longer to place the second part of a call bet in the videolinked condition than the collocated condition \( (F(1,22) = 6.105, p = .022, \eta^2 = .217) \). As the second part of the call bet specifies the range of numbers to be covered by the bet, it seems that people thought more about the degree of risk when the outcome was conveyed over a videolink.

Table 2. Wagering behaviour as a function of computer-mediated communication of outcomes (standard deviations in brackets).

<table>
<thead>
<tr>
<th></th>
<th>Collocated</th>
<th>Videolinked</th>
<th>Pre-recorded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points bet</td>
<td>20.67 (17.69)</td>
<td>23.01 (4.27)</td>
<td>24.86 (15.04)</td>
</tr>
<tr>
<td>Numbers covered</td>
<td>17.92 (6.86)</td>
<td>19.46 (6.79)</td>
<td>16.60 (8.14)</td>
</tr>
<tr>
<td>Payouts sought</td>
<td>41.26 (26.31)</td>
<td>31.06 (13.72)</td>
<td>62.62 (48.13)</td>
</tr>
<tr>
<td>Times to place bet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Register amount(s)</td>
<td>2.39 (0.76)</td>
<td>2.38 (0.79)</td>
<td>2.36 (1.02)</td>
</tr>
<tr>
<td>First part of call bet</td>
<td>3.98 (1.98)</td>
<td>4.49 (2.42)</td>
<td>4.78 (2.78)</td>
</tr>
<tr>
<td>Second part of call bet</td>
<td>1.92 (0.65)</td>
<td>2.40 (0.94)</td>
<td>2.13 (0.86)</td>
</tr>
</tbody>
</table>

Note: Bold typeface indicates significantly different from the collocated value.
After the experiment concluded, participants were asked which condition they preferred. These data were compared with that expected from a uniform distribution using the Kolmogorov–Smirnov test. People preferred the collocated condition (\( n = 20 \)) over the videolinked (\( n = 1 \)) and pre-recorded (\( n = 2 \)) conditions (\( Z = 4.170, n = 23, p < .001 \)). Participants were also asked which condition they preferred the least. There was again a significant departure from a uniform distribution (\( Z = 3.545, n = 23, p < .001 \)). People preferred the pre-recorded condition the least (\( n = 17 \)), followed by the videolinked (\( n = 5 \)) and collocated (\( n = 1 \)) conditions.

4. Discussion

The capacity to remotely deliver services also increases competition by enhancing a consumer’s ability to access other service providers. To understand how service format might influence behaviour we examined preferences and the behavioural responses to risk on events remote in space or time, specifically measuring not just the time spent in deliberation, but also the values hazardred at specific probabilities.

People preferred to be collocated with outcomes and disliked pre-recordings, with confidence as to successful wagering being highest during collocation, lower for a videolink, and least for pre-recorded outcomes. However, behavioural measures offer additional insights as to these preferences, with variations in outcome format influencing deliberation and the odds selected. People covered more options, hedging their bets in response to videolinks, and tended to think more about the degree of risk, whereas people actually accepted greater risk in response to a pre-recording.

4.1. Equivalence

Some authors have suggested that a service delivered using information recorded at a remote time (Ambikairajah et al. 2006, 2007, McKenzie 2008) or from a remote location (Hyler et al. 2005, Demiris et al. 2006, Antonacci et al. 2008, Barak et al. 2008) will be equivalent to a collocated service. This is unlikely. There will always be differences, the issue instead being whether any differences can merely be attributed to chance, or whether the sizes of any differences are meaningful. In particular, reduction in the richness of cues in a media does not always increase uncertainty (Daft and Lengel 1986) as a reduced immediacy actually increased some behavioural indices of risk taking.

The present study found differential behavioural responses to videolinks and pre-recordings. When outcomes were conveyed over a videolink, participants placed wagers that covered more of the available numbers. Covering more numbers is a strategy adopted to increase the likelihood that one’s number does come up (Wagenaar 1988). Nevertheless, a hedging of bets is a conservative strategy as it reduces the likelihood of bigger wins (Wagenaar 1988). In contrast, when outcomes were pre-recorded participants acted as if the outcomes were more predictable as participants sought greater payouts.

These observations are supported by the times spent in deliberation. In the pre-recorded condition, players spent a greater time in deliberation specifying the first part of the call bet that indicates where a bet is placed. In the videolinked conditions, players spent a greater time in deliberation specifying the second part of the call bet that indicates the range of numbers the bet covers and the prefferred odds.

It seems the reduction of physical presence has effects upon the willingness to rely upon outcomes remote in space conveyed over a videolink. We speculate that the lack of a physical presence reduces a participant’s potential to monitor or influence outcomes, or enforce social contracts (Kücklich 2008). Or perhaps that participants felt removed from the ‘action’ and that the experience was less authentic (McCormack and Griffiths 2010). Indeed, for such reasons Griffiths and Parke (2004) advocate gambling upon events where independent verification of outcomes is possible.

Such findings, however, are likely to be a function of the reference level and measurements employed. The present study compared a videolink with face-to-face outcomes and demonstrated that remote outcomes led to equivalent amounts wagered, but less confidence, more deliberation, and greater spread of wagers. If a videolink was compared with text for the notification of outcomes, it is likely that the enhanced cues offered by a videolink would increase confidence and confer other benefits (Bos et al. 2002, Inbar and Tractinsky 2012).

The present study considered not just how outcomes remote in space influence risk-taking behaviour, but also considers how outcomes remote in time influenced risk-taking behaviour. As expected people did not prefer wagering on pre-recorded outcomes, however, they unexpectedly sought greater payouts. The pre-recording of an outcome eliminates an observer’s physical presence and removes the immediacy and potential interactivity associated with the event. This means that the observer cannot influence the event or test its verisimilitude. Nevertheless, as a pre-recorded outcome lacks immediacy and is recorded, it can be repeated and is thus potentially predictable. This is probably why the pre-recorded event is not preferred but encouraged risk taking. Indeed a potential predictability has formed the basis of some confidence tricks in the past (http://www.blongerbros.com/gang/wire.asp) such as detailed in the movie ‘The Sting’.

4.2. Tracking

Prior studies have associated a greater range or variability of behaviour with the process of product search (Moe 2003) or brand switching (Givon 1984); hence the spread of
wagers was of interest. Even if points of equivalent value were hazarded on different outcome formats, a tendency to spread wagers has implications for the trackability of consumers. The range of behaviours manifested by a consumer may be important (Battig 1979), as a consumer that spreads time or effort over a range of providers is potentially less trackable (Johnson et al. 2004). Even if brand switching may not be a stable trait (Bawa 1990), it may be indicative of search processes (Mann and Ball 1994). We have previously observed that moreinvolved consumers frequented a larger number of offline venues (Phillips and Ogeil 2011) and engaged in a wider range of activities (Phillips et al. in press). Enhanced consumer mobility poses problems for regulators, as the Internet allows a consumer to access services from multiple providers, requiring that some jurisdictions employ centralised databases or aggregation services to control problem behaviours.

The present study suggests that differences in the format by which outcomes are conveyed can influence the variety of a consumer’s responses. Such behaviour may cause problems for consumer support systems as recommender technologies tend to require information from a user or their peers to render appropriate assistance (the cold start problem) (Montaner et al. 2003).

Less direct or hesitant behaviour has been linked to a reduced likelihood of purchase on websites (Moe 2003, Kim et al. 2005, Kim and Yum 2011). In contrast, more direct and predictable user behaviour enhances the potential for an interface to anticipate user requirements (Phillips and Triggs 2001). Hence the directness or hesitancy of user behaviour could be used as a trigger for inducements or consumer warnings (Whitworth 2005, Moe 2006) and this could be important in determining consumer choice (Nisbet 2006, Lim et al. 2011).

Our behavioural measures also demonstrated dissociation between stated preferences and risk taking, with people disliking the pre-recordings but taking greater risk. Self-reports can be limited by insight, memory, and social desirability (Shaffer et al. 2010), and mismatches between trust and risk taking in the gaming sector have been noted (Haried 2009). Such mismatches are liable to be due to additional factors such as practicality (Frueh et al. 2004). For instance, although collocation may be preferred, other factors such as convenience have been cited as a major reason for the use of gambling technologies (Nisbet 2006, Gainsbury et al. 2011).

### 4.3. Limitations

The levels of risk employed were not commensurate with those experienced with actual gambling. Instead, participants merely hazarded their effort towards higher point totals and the 1 in 12 chance of winning an iPod, and so levels of arousal would not equate with those associated with gambling. Instead, our experimental task reduced risk-taking behaviour to its essential elements of values and odds. As such these procedures allowed a better degree of control and measurement than may be possible with surveys or naturalistic observations.

However, there may be concerns that by formally supplying the odds of success, a ludic fallacy has been perpetrated and that the effects observed in a simulated gambling task in a laboratory may not generalise to everyday Internet surfing behaviour. In everyday life, the odds of success are typically not posted, in a meaningful way (Cohen 1979). More likely a formal provision of the odds of success could indicate that the task was fairly represented (Blaszczynski et al. 2008), making decision-making more optimal in the present task. Indeed, any concern as to the formal availability of odds is liable to be reduced as reputation systems are being developed to redress this problem online (Kollock 1999, Riegelsberger et al. 2005).

The present data suggest that different outcome formats may influence consumer trackability if consumers hedge their effort. However, a reduction in the trackability of consumer behaviour will only occur if the consumer actually leaves a specific service provider. There is some intimation that this may occur (Johnson et al. 2004), but a change in the relative proportions of online to offline effort (the sparsity problem) will be harder to monitor.

### 5. Conclusion

Computer-mediated communication of outcomes may influence preferences and risk-taking behaviour. The present study found that people preferred to be in the physical presence of an event and preferred a live videolink to pre-recorded outcomes. However, changes in outcome format also influenced the range and intensity of risk-taking behaviours. When not physically present, people tended to their hedge bets in response to a remote outcome conveyed over a videolink, and spent more time in deliberation over the range a bet covered. Although a pre-recorded outcome was not preferred, it was associated with greater risk taking. The remote delivery of services can influence consumers’ response to risk and can have implications for their trackability and control.

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