Dishonesty and Social Presence in Retail

Abertay University

A thesis submitted for the degree of Doctor of Philosophy (PhD)

by

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Declaration

Candidate's declarations:

I, Susan Siebenaler hereby certify that this thesis submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy (PhD), Abertay University, is wholly my own work unless otherwise referenced or acknowledged. This work has not been submitted for any other qualification at any other academic institution.

Signed [candidates signature]..........

Date.......................................

Supervisor's declaration:

I, Andrea Szymkowiak hereby certify that the candidate has fulfilled the conditions of the Resolution and Regulations appropriate for the degree of Doctor of Philosophy (PhD), in Abertay University and that the candidate is qualified to submit this thesis in application for that degree.

Signed [Principal Supervisors signature]..

Date..

Certificate of Approval

I certify that this is a true and accurate version of the thesis approved by the examiners, and that all relevant ordinance regulations have been fulfilled.

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Abstract

The independent style of scanning and payment at self-service checkouts (SCOs) has resulted in areas for concern. The reduction of employee involvement may reduce the social presence perceived at a SCO. Social presence is when a user experiences the perception that there is another intelligence or entity within their environment (Short, William & Christie, 1976). If customers are not influenced by the social presence of the employees at a SCO then it may affect their behaviour. Using a mixed methods approach, with a combination of qualitative and quantitative data gathering, this thesis investigated dishonest behaviours at self-service checkouts and the effects of a social presence on consumer behaviour. The overreaching research question then guiding this dissertation is:

What effect does a social presence have on thefts at self-service checkouts and can social presence be effectively implemented via technology?

Three exploratory qualitative (Studies 1-3) and two empirical studies (Studies 4-5) were conducted to investigate issues surrounding thefts at SCO with reference to social presence. Study 1 consisted of in-depth observations of customers within supermarkets to gain an understanding of everyday behaviours associated with self-service checkouts. Both customers and staff seemed to be frustrated at the amount of times the technology did not work properly and the customer would appear disadvantaged when they required assistance. With an understanding of the salient factors and behaviours associated with self-service checkouts, Study 2 then explored SCO staff perceptions of thefts at self-service checkouts (Creighton et al., 2015). Qualitative semi-structured interviews were used to investigate the perceived influence of social presence at self-service checkouts by staff and its perceived effect on dishonest customer behaviour. Twenty-six self-service checkout staff took part in a series of semi-structured interviews to describe customer behaviours with self-service. With respect to actual physical social presence, such as the recognised presence of an employee, staff reported that more customer thefts occurred when the self-service checkouts were busy and their social presence was reduced.

To further explore social presence within a retail environment and validate the perceptions from SCO Staff, Study 3 investigated the role of the security guard in terms of their social presence and explored their perceptions of thefts at self-service checkouts. Interviews with 6 security guards were conducted to determine factors surrounding theft as their role is to monitor this type of dishonest behavior. There was an overall agreement from security guards that there were more thefts at self-service checkouts when the store was busy and that there were more thefts at self-service checkouts overall, compared to traditional manned checkouts.

The first empirical study (Study 4), consisting of 2 Experiments, considered the effects of a social presence within a self-service checkout interface on user behaviour. This study examined whether a social presence in the form of a computer designed onscreen agent at a simulated SCO, with design features varying in 'humanness', i.e. agents that displayed more or less-human-like features (eyes in Experiment 1, and human shapes in Experiment 2), would have an effect on opportunistic behaviour (cheating) in a simulated checkout scenario. Ninety-one participants interacted with a simulated SCO while their eye movements were tracked via a Tobii TX300 eye-tracker. Hypotheses that predicted a social presence would receive attention and result in fewer instances of theft when integrated within an interface were supported, suggesting that implementing an agent designed to suggest some level of humanness e.g. with eyes, within a SCO interface may reduce levels of theft as customers are likely to notice it. However, Study 4 showed mixed results for the effects of varying agent appearance alone. Research has shown that social presence can also be induced by varying agent behaviour (Burgoon et al., 2000). Study 5 thus varied interactivity (i.e. personal vs impersonal nature) of the agent via voice implementation on the SCO, using the same agent as in Study 4 (Experiment 2). The research highlights the need for the current designs of SCO to be updated to reduce operational issues which could be contributing to thefts occurring at SCOs. It is also concluded that further research is needed on the effects of interactivity and agent presence during a SCO interaction to explore dimensions of social presence and how they are being experienced by the user, which may ultimately lead to a reduction in thefts at SCOs.

Dedication

This thesis is dedicated to my big crazy family and my dearest friends. Without the good times, I would not have made it this far. Particularly to my husband Callum, who has seen me at my worst and continued to support me to be my best. Most of all I dedicate it to my daughter Bethany for providing me with the determination to continue and see this journey through to the end.

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List of Abbreviations

ANOVA A one-way Analysis of Variance test

CASA Computers as Social Actors

CSCW Computer supported cooperative work

ESA Embodied Social Agent

HCI Human-Computer Interactions

HSP High Social Presence

LSP Low Social Presence

NMQ Networked-Minds Questionnaire

NMSPI Networked minds social presence inventory

SCO Self-service Checkout

SG Security Guard

SNS Social Networking Services

SST Self-service Technologies

TAM Technology Acceptance Model

Glossary

Co-presence the degree to which the observer believes they are not alone (Biocca & Harms, 2002).

Dishonest refers to customers behaving in an insincere manner.

Experience "*Experience is defined as a person's observation of and/or interaction with objects, entities, and/or events in their environment; perception, the result of perceiving, is defined as a meaningful interpretation of experience*" (Lombard and Snyder-Duch 2013, p.58).

Opportunistic means customers taking advantages of opportunities that arise for them to behave in a dishonest manner.

Self-service allows customer to select their own products and pay for them entirely independent of the assistance of staff (Meuter et al. 2003).

Social Presence is as an experience that occurs when "users feel that a form, behaviour, or sensory experience indicates the presence of another intelligence," (Biocca, 1997).

Supermarkets are defined as "food-focused stores with sales areas of between 3,000 and 60,000 sq. ft." (IGD, 2015).

Situation crime prevention "*comprises opportunity-reducing measures that (1) are directed at highly specific forms of crime, (2) involve the management, design or manipulation of the immediate environment in as systematic and permanent way as possible, (3) make crime more difficult and risky, or less rewarding and excusable as judged by a wide range of offenders*" (Clarke, 1997 p.4).

Rational is defined as behaviour *chosen* to benefit the offender (Cornish & Clarke, 2014).

Rational Choice Theory suggests that behaviour occurs as a result of decisions and preferential choices made by and individual (Becker, 1968).

Telepresence often shortened to *presence,* is described as a psychological state or subjective perception in which part or all of an individual's perception fails to accurately acknowledge the role of the technology in the individual's experience with the technology and s/he attributes some form of intelligence with the technology (Lombard & Jones, 2015).

Virtual agents are defined as "automated programs that act in place of human agents" (Edwards, et al., 2014, p372).

Publications

Publications derived from this PhD research:

Creighton, S., Johnson, G., Robertson, P., Law, J. & Szymkowiak, A. (2015). Dishonest behavior at self-service checkouts. In *International Conference on HCI in Business* (pp. 267-278). Springer International Publishing. Paper was presented at HCI International, Los Angeles in August 2015. The research was based on the findings presented within Study 2.

Siebenaler, S., Szymkowiak, A, Robertson, P., Law, J. & Johnson, G. (2017). Social Presence and Dishonesty within Self-service: Perceptions from Security Guards. Paper to be presented at HCI International in Vancouver, Canada, July 2017. The research was based on findings presented within Study 3.

CHAPTER 1: Introduction

1.1 Self-service Technology

Companies have increasingly adopted new self-service technologies (SSTs) over the past two decades aiming to reduce costs and increase productivity. Examples of these technologies include self-service kiosks within airports, hotels, retailers, cinemas and more recently fast-food restaurants such as McDonalds. Research considering the influence of such technologies on customers have focused on the acceptance of these technologies within the framework of the Technology Acceptance Model (Dabholkar & Bagozzi, 2002), usability evaluation and user experience (Orel & Kara, 2014). However, little research has considered the opportunities for use and *misuse* when self-service technologies are introduced into retail. Customer *responsibility* may be increased with the addition of scanning tasks and processing the payment of their goods, however, these may reduce customer *accountability* when things go wrong during the process as they can argue that it was not their fault. This research will consider some of the issues that arise with the lack of supervision, or a social presence in relation to customer theft, whilst using self-service technologies.

1.2 Dishonesty

1.2.1 Levels of acceptable dishonesty

There are many instances of dishonesty within peoples' lives. A video from Ariely (2012) titled "The truth about Dishonesty" asks his audience the question of "who has been dishonest within the last year"? Almost all of his audience raise a hand. He then asks "who has been dishonest in the past month"? Again many audience members raise their hand. He then asks "who out of those who raised a hand believes that they are good, honest people"? Again almost all of his audience raise their hand. This then begs the question what makes a good honest person, behave dishonestly? This question has influenced the present research which will primarily focus on dishonest behaviours at self-service checkouts. Many people who steal at self-service checkouts do not steal because they have to, due to money constraints but because they can. Self-service checkouts not only provide opportunity to steal by giving customers control over the

scanning of their own goods, they also have a reduced social presence as customer no longer have to come face to face with a sales employ to buy their items.   This opportunity to steal has been abused by people who would perhaps never have previously behaved in a dishonest manner in a retail context. This thesis will consider theories relating to dishonest behaviours and the potential influence that a social presence may play on reducing thefts in a retail context when, interacting with self-service technology.

1.3   **The position of this thesis**

The introduction of self-service technology has highlighted an area within the consumer research that has yet to be fully examined. This area is primarily focused on the influence that self-service technologies can have on dishonest customer behaviours. The research presented within this thesis are predominately grounded within psychology, human-computer interaction and business, with implicit groundings in design, security, sociology, methodology and criminology. This thesis will draw upon research and theories associated with dishonest consumer behaviour and the influences of a social presence within environments. The research will highlight various aspects during an interaction with a self-service checkout in a retail environment, along with conclusions from both qualitative and empirical research that can be employed by retailers to reduce the likelihood of thefts at self-service checkouts.
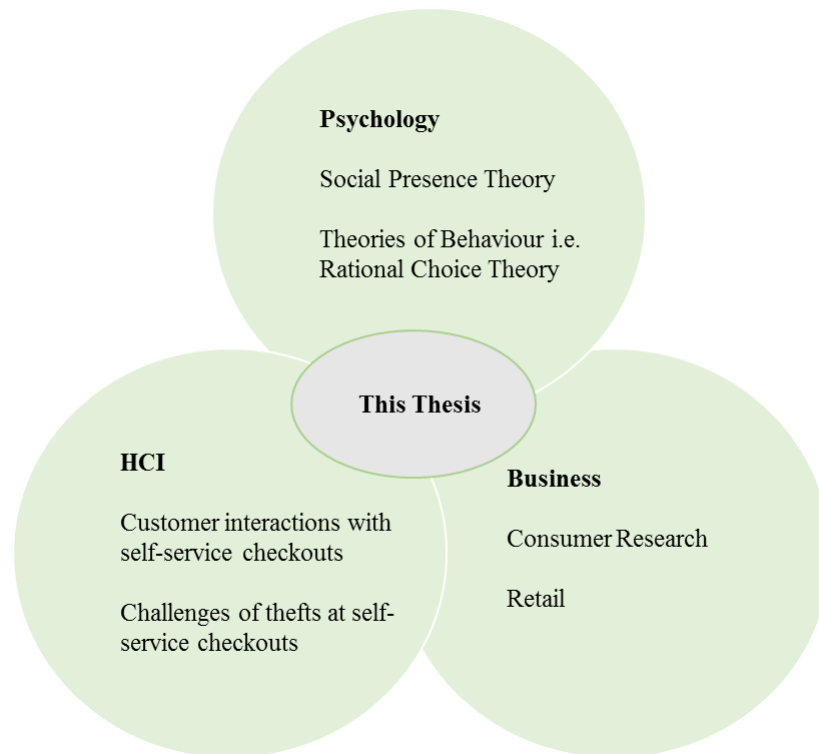
It is to be noted that this thesis does not focus on habitual shoplifters, whose motivations and intentions are researched in criminology (Clarke & Cornish, 1985; Cornish & Clarke, 1987) or on those who steal as a means of survival as they have no money. This research is primarily focused on the opportunistic thieves who steal because the opportunity arises whilst using a self-service checkout. This research is interested in the dishonest behaviours of everyday 'honest' people, for example, those who are tempted by the idea of a "victimless crime," where they believe no one gets hurt from their behaviour (Egan, McMurran, Richardson & Blair, 2000) when stealing at a self-service checkout or those who use rationalisations such as they deserve a discount for their work in scanning their products in order to pay for them.

1.4 History of self-service

The history of retail settings and market places goes back hundreds of years and has been an area of interest for social and economic researchers (Welch, 2005). The norm within a grocery store setting was initially for the customer to ask the sales employee for the items that they required, and the employee would then return with the items for the customer to pay and complete the purchase transaction (Shaw, Curth & Alexander, 2004). The behaviours associated with a shopping experience changed throughout the

years and in 1916 a new system of shopping was introduced by the American grocery store chain Piggly Wiggly (Shaw, et al. 2004; NCR, 2014). They were the first to introduce a new approach to shopping known as the "Self-service revolution" (Hancox, 2011), allowing customers to select their own items off the shelves, even allowing them to weigh certain items and then take them to a sales employee who then processed the items to be bagged and paid for (Shaw et al. 2004). The 1950s witnessed self-service developments in Britain and the creation of the Self-Service Development Association for the study and development of self-service in England in 1950 producing the journal *Self Service* (Curth et al. 2004). The method involving personal selection of items, was the original form of self-service within a supermarket setting and it is still the general norm to date to enter a shop and select your own items. Supermarkets are defined as "food-focused stores with sales areas of between 3,000 and 60,000 sq. ft." (IGD, 2015).

The introduction of this form of "self-service" brought about design opportunities and innovative packaging for products to stand out on the shelf and boost sales (Beck, 2015; Curth et al. 2004). Interest within the supermarket setting grew within research domains as it was suggested that customer behaviour could be maximised via the display of goods, store layouts and shelf layouts leading to increase in sales and profits (Beck & Hopkins, 2009). This "self-service" behaviour influenced customers to purchase more items and also reduced costs for retailers as they did not require paid employees to obtain the customers items for them. This form of self-service i.e. the selection of their own items, brought about uncertainties to supermarket staff as they were worried they would lose their jobs (Hancox, 2011). Customers also experienced anxieties within their new shopping environments, such as where to find their desired products, which were managed using a "hostess" to show them around the store (Hancox, 2011).

Nowadays many companies have introduced technologies to allow their customers to engage in transactions without any direct employee involvement (Meuter, Ostrom, Bitner & Roundtree, 2003), implementing the so called self-service technologies (SSTs) (Meuter, Ostrom, Roundtree, & Bitner, 2000), such as ATMs, automated phone systems, internet shopping and in-store self-service kiosks (Meuter et al. 2003). Self-service kiosks, such as self-service checkouts in supermarkets, not only allows customer to select their own products, but also to pay for them entirely independent of the assistance of staff.

1.5   **Self-service Checkouts in Retail**

Self-service checkouts (SCOs) were initially introduced within the grocery sector of retail in the 1980s. However, due to poor technology and lack of customer interest they did not become a popular method of payment until 2010 onwards (Beck, 2015). The increase of other everyday technologies including computers, smartphones and iPads, the ability to order items online (another form of self-service), has perhaps made customers feel more accepting and comfortable with the use of technology within a retail context, and thus, more accepting of self-service checkouts (Beck, 2015).

During a typical shopping experience with a SCO, customers scan and bag their items or use the scales to weigh items before scanning them, bagging them in a special bagging area, and paying for them. Self-service checkouts tend to have 2 weight areas, one for weighing items to be purchased, such as loose fruit and vegetables, and the other within the bagging area to measure whether scanned or weighted items have been bagged properly (see Fig. 2). There is an interface displaying the items that have been scanned and instructions for payments and product selection. Self-service checkouts also provide audio instructions throughout the self-service process and alert customers when something has gone wrong. The voice can be male or female depending on the company's design and preference. Lights above the self-service checkouts indicate the status of the checkout machine: green to show that they are available, amber when they are in use, and red if there is an issue, alerting the SCO assistant that the customer is in need of help, e.g. due to required approval of age on restricted produce, a fault with weights or other operational processes.

Figure 2 a NCR Self-service Checkout (NCR, 2016)

Some research suggests that younger customers have higher tendencies to use SCOs during their shopping in supermarkets than older customers, as they are also savvy with internet and technology use (Orel & Kara, 2014). However, research from NCR (2014) also shows high percentages of people aged 65+ are also using SCOs. Findings suggest that one of the biggest complaints about self-checkout lines were related to their difficulty of use, i.e., when more items were purchased and when the items did not have a bar code (i.e., produce or bulk) and needed to be weighed. Customer perceptions and attitudes towards self-service technologies can affect their usage (Orel & Kara, 2014), especially when the use of these technologies requires behaviour changes which can bring about anxieties. The experience of such anxieties is considered as "technology anxiety" which may involve confusion regarding the task to be performed (role clarity), decreased motivation levels, and a reduced perception of ability (Parasuraman, 2000; Meuter, Bitner, Ostrom, & Brown, 2005). This has been widely discussed in relation to the introduction of new technologies within an environment and specifically with the introduction of self-service as we know it today i.e. using self-service checkouts (Meuter et al. 2003).

1.5.1   Technology Acceptance Model

Self-service checkouts tend to have a member of staff present to assist customers should any operational issues arise. The availability of staff is aimed to reduce the stress

associated with using the technology and to show that help is on hand. Stress experienced by the customer when using new technology has been a significant trait considered within the Technology Acceptance Model (Meuter et al. 2003), as it affects the perceived ease of use of the technology. The Technology Acceptance Model (TAM see Fig. 3) proposes that the perceived ease of use and perceived usefulness of a technology can predict attitudes towards the technology that can then predict its usage (Dabholkar & Bagozzi, 2002; Davis, 1986; Lederer Maupin, Sena & Zhuang, 2000).
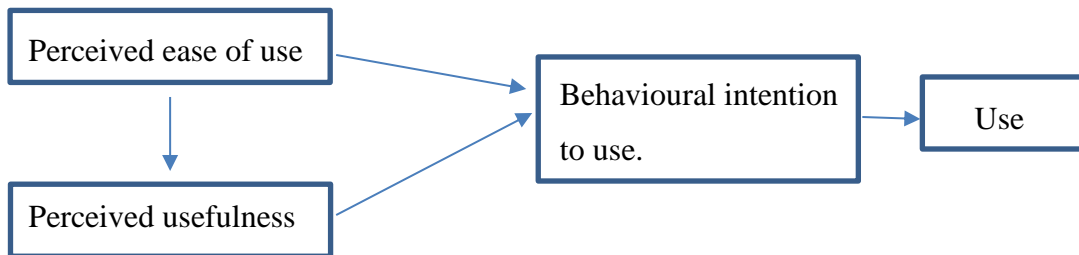
Figure 3 Displaying the TAM model

1.5.2 Self-service checkout advantages and disadvantages

Retailers benefit from SCOs in the form of reduced staffing needs, which leads to reduced personnel training costs (Dabholkar, Bobbit & Lee 2003). Companies who adopt SCOs are not only doing so to benefit themselves but also to benefit the customer. Providing payment options for customers and keeping up with the trends of other retailers are important in creating an appealing and enjoyable shopping experience. Customer research has shown that customers expect self-service options in shops and in providing options, shops provide a better service (Beck 2015). Self-service checkouts can offer a convenient method of payment for customers who do not want to talk to cashiers or wait in queues at manned checkouts (NCR, 2014). Customers also report liking the interaction with technology at SCOs and to feel in control of their purchase (NCR, 2014).

However, it is important for retailers to understand that introducing new payment methods within retail may cause confusion and delays, which may give the customers a negative shopping experience. Thus it is important to maintain a good service with the introduction of new technology. Like many interactions with technology, some consumers may experience times at self-service checkouts where they appear to not

work properly. This may be a result of the machine or of the customer not knowing what to do. This can have several relative disadvantages, one being its effect on a customer's intention to reuse which can be decreased if they have a negative experience with the technology. This can also be associated with the TAM where customers may then perceive the SCO to be difficult to use which would reduce its perceived usefulness to the customer, thus reduce their intention to re-use (Dabholkar & Bagozzi, 2002; Davis, 1986; Lederer et al. 2000). If customers have an experience that lives up to or better, over performs their estimations then they will be much more likely to reuse it. Beck (2015) states that having confidence in a system will increase customer appetite to interact with technology during their shopping experience. In addition to the disadvantages mentioned, SCOs can also result in increased customer thefts. These can occur as a result of honest mistakes made by the customer but also by opportunistic behaviours aimed at taking advantage of the self-service aspect of the machines. As innovative technology continues to increase it is likely that the inclusion of self-service technology (SST) such as SCOs will continue even with disadvantages associated with customer thefts as the gains from the reduction in staff are much greater than the loss from shrinkage (Beck, 2015).

1.5.3   Lack of staff presence at SCOs

Typically, there tends to only be one member of staff present at a SCO, supervising multiple checkout systems. This may negatively affect the customer's perception of ease of use if they assume that they may not receive efficient assistance when using a SCO, as staff may be busy with other customers should a technological issue arise at SCO. This would disadvantage supermarkets who have adopted SCOs in the hope that they would increase productivity by reducing the need for manned checkouts, as customers could avoid using SCOs if they perceive them to be difficult to use, or if staff are engaged elsewhere. The lack of social presence of staff at SCOs may also result in customers feeling that that they are not being monitored. This could then lead to customer perceptions that there is a lower risk of being caught stealing at a self-service checkout.

Giving customers more freedom to select and purchase items may reduce security within a retail environment and provide opportunity for people to steal. Beck (2015)

stated that as technology increases and the number of staff decrease within a retail setting, the perception of risk of being caught and the accountability from the customer reduces. The lack of a social presence at self-service checkout may remove the social influences that encourage customers to check their behaviours are in line with what is expected within the social setting of a supermarket. If there is nothing to influence this moral check on behaviour, does the analysis of whether a behaviour is right or wrong still occur? Or does lack of staff presence create an opportunist who will take a chance at stealing something, as s/he has not been socially reminded by the presence of a salesperson, that there are risks involved. This then questions what would be the influence of a social presence at a SCO. Could this reduce the likelihood of thefts? To examine these questions, theories of behaviour will be discussed within the following sections.

1.5.4   The Rational Choice Theory

The rational choice perspective is a framework that has been used to predict social and economic behaviour. The theory suggests that behaviour occurs as a result of decisions and preferential choices made by an individual. Identifying the contributing factors of behaviours can then provide a model for implementing change. Gary Becker (1962), a well-known researcher in criminology, noted using rational choice in an anecdote describing his struggles to park his car one day. He was running late for a meeting and had to park his car illegally. It was then that he realised he had considered the benefits of getting to his meeting on time compared to the cost of being parked illegally, thus making a rational choice. He then applied this cost-benefit analysis to instances of crime (Becker, 1962).

Within criminological research, the rational choice perspective sees criminal behaviour as the outcome of decisions and choices made by the offender (Becker, 1962; Clarke & Cornish, 1985; Cornish & Clarke, 1987). The model of the offender as a decision maker underlies much criminological work by psychologists, economists, and sociologists of deviance (Clarke & Cornish, 1985). The concept of "choice structuring properties, '' (Cornish & Clarke 1987 p.933), which refers to the constellation of opportunities, costs, and benefits attaching to particular kinds of crime, can provide a useful framework for analysing crime control policies. Applying this framework to thefts at self-service checkout could identify areas in which they are creating opportunities for thefts to

occur, such as having a reduced social presence at SCOs and failures in the SCO design which allow for dishonest behaviours to occur. Such faults in the design are arguably enabling customers to steal as they offer a reduced risk, reducing the perceived cost of dishonest behaviour at SCOs as customers can blame the machines for any discrepancies that may occur. This ultimately increases the benefit for customers if they attempt to steal at a SCO as they may get away with it, meaning monetary gain, or if they get caught they have an excuse. It's a win-win situation for a customer who is willing to pay but may also be willing to attempt an opportunistic act.

A closely related perspective to the rational choice theory is provided by Mazar and Ariely (2006) who discuss justifications of dishonest behaviours via The Rational Theory of behaviour. They describe this as the dilemma of being immoral and define it as wishful blindness when someone chooses not to see bad things that they may be doing. Mazar and Ariely (2006) use a matrix test which involves participants selecting two numbers within a matrix that add up to 10. Participants were asked to mark their own papers and to note down how many they had got correct. One group, the control condition, of participants were told to take their finished test paper up to the researcher to show how many correct answers they got and to receive payment of $1 per correct answer. The other group, the "shred" condition, were told to count how many matrices they got correct and then that they were to shred their test paper before informing the researcher how many they answered correctly, to receive payment. However, the shredder was modified to only shred the sides of the paper, leaving the test sheet visible for inspection afterwards by the researcher. Results showed that people in the "shred" condition tended to report that they had answered more questions correctly than those who handed their answer papers to the researcher. As the shredder had been tampered with to only shred the sides of the paper, the researchers were able to count how many they actually got correct. The findings showed lots of people lied "just a little bit" in the "shred" condition. Participants seemed to lie a certain amount but would not exaggerate to an extreme amount. Mazar and Ariely (2006) describes this as the *fudge factor* which appears to be the 'right amount of wrong', for it to be considered as okay by the individual.

This could apply to thefts at SCO as people are paying for some items but acting dishonestly with others (Taylor, 2016). Ariely (2012) proposed that cheating would

increase as the size of the reward increased. For example, people will steal more if they are likely to get more money from doing so, however, this was not the case. Everyone still cheated "just a little bit" i.e., participants would not exaggerate to an extreme amount but would lie a little to receive more than they were deserving of. Mazar and Ariely (2006) conducted another test to examine the effect of perceived punishment on dishonest behaviour and found that the probability of perceived punishment did not appear to increase the amount people would steal (as everyone in the shredder condition stole just a little bit and not by huge amounts). Thus, he concludes that it is not the reward or the punishment that drives dishonesty, but it is what the individual considers to be appropriate within society-what they can rationalise. In relation to SCOs, as there is the ability to "trick" the system and declare ignorance if caught stealing at the machine, this may then allow for rationalising processes to occur for opportunistic thieves as they can then state that it was the machines fault allowing such mistakes to occur. This highlights one of the disadvantages of SCO that supermarkets may experience, as it is difficult to differentiate between intentional thieves and those who have made an honest mistake, with the actions of both resulting in stolen goods.

1.5.5 The creation of SCO thieves

The introduction of self-service technologies within retail has seen a continuum of new techniques used by customers to steal. This has resulted in a surge of self-service checkout anecdotes from newspaper articles to YouTube videos reporting methods that are being used to steal at self-service checkouts. This begs the question of whether it is the same customers stealing who have always stolen from supermarkets or whether customers now take advantage of the gaps in security during the process of using a self-service checkout. Self-service checkouts may be encouraging customers to steal who perhaps would never have dreamt of stealing during a traditional shopping trip where a member of staff scans their items. McWilliams et al. (2016) states that the employees, who are in charge of watching the self-checkout machines, are now needing to be trained to recognise the signs of shoplifting customers to counteract the large losses the retail industry is feeling.

Finestone (1957) discusses the behaviours that go against our social morality and duty can be thrilling and "exciting" (p.4). Yet other research has suggested that dishonest behaviours may occur at self-service due to situational factors such as frustrations with

faults experienced during the SCO experience (Andrews, 2009). Other research also suggests that people maybe do not agree with having to scan their own items, acting as unpaid co-producers, and may feel somewhat owed by the supermarkets (Beck, 2011; McWilliams, Anitsal & Anitsal, 2016).

Consistent with this, Beck (2011) states that SCOs are creating the "justified offender". This process of justifying the dishonest behaviour is in conjunction with theories of neutralisation (Sykes and Matza, 1957) which underlies Beck's (2011) theory of the "self-scan defence" where customers who steal can portray ignorance to the fact that they have stolen and blame any wrong doings on the technology not performing as it should have. Thefts may also occur as a result of frustration when using a SCO, which may be encouraging a new type of offender who only steals as a result of frustration caused by either failures in the technology, or frustrations having to wait on assistance from an employees. Operational failures at a SCO may highlight an opportunity to steal at a SCO for instance if an item can be bagged without first being scanned. Once customers have successfully acted opportunistically i.e. taken goods that they did not pay for without being caught, this then may encourage the experience to occur again as customers have experienced more benefits than costs to their behaviour, in line with ration choice. According to Becker's (1962) rational choice theory, if the benefits outweigh the cost then the behaviour is likely to occur.

Customers have never really been *trained* in what is appropriate consumer behaviour when faced with a dilemma at a SCO arising from process failures and potential opportunity to get away with theft. They are expected to know how to behave in a supermarket setting and to be aware that any intentions of going into a shop and walking out without paying for items is a criminal offence. However, they are not necessarily skilled on how to deal with failures in technology of SCOs, especially if they had every intention of paying for their goods but a fault in the machine meant that they ended up with some kind of discount. Who is to blame in this kind of situation? What are the expectations of a customer who leaves a store and realises when checking their receipt at home that their item did not scan properly and they have not paid for it. No clear guidelines on accountability have been offered, to customers or staff, to confirm the outcome of such events occurring. Customers may have experienced this

and concluded that there were no negative effects of their behaviour which may encourage them to try it again.

1.5.6 Expectations of customer behaviour

Self-service checkouts have become an expected method of payment within our supermarkets and their popularity is expected to increase (McWilliams et al. 2016; Taylor, 2016). Despite the huge surge in popularity of SCOs and the known factor that customer steal from them as shown in previous findings (Beck, 2015; Creighton, Johnson, Robertson, Law & Szymkowiak, 2015; McWilliams et al. 2016; Taylor, 2016). Academic research focusing on thefts at SCOs remains minimal as many companies do not share their statistics on theft (Beck, 2015; Beck & Palmer, 2010). The notion that people can have a ready-made excuse for dishonest behaviours at self-service checkouts, by blaming the technology or pleading ignorance, has arguably created a new style of thief (Taylor, 2016). It could be debated that SCOs, like all technologies, are influencing customers' behaviours, maybe even encouraging deviant behaviours. Thefts may not be a result of bad intentions to steal or behave dishonestly but could have emerged by accident. Supermarkets with self-service checkouts assume that customers will take responsibility for the scanning of their products and the payment of these independent of employee involvement. If the customer recognises an opportunity that a failure, in either the system or in their scanning behaviour, has occurred, they may be coaxed into a personal test of "can I get away with it", which of course then can be described as intentional. Should customers be put under such a morality test or should technology be designed so that customers are not faced with the flexibility of such decisions? It would be nice to think that the former would be possible within our society. However, applying psychological principles such as reciprocity may be more likely to reduce thefts than just expecting customers to behave. For example, giving customers a loyalty store card with personalised benefits in order to use SCOs once they have completed SCO training, may increase customer satisfaction which has been linked to customer loyalty (Cyr, Hassanein, Head & Ivanov, 2007). Customers could receive loyalty recognition via store benefits for their purchases in the store. This may make them less likely to want to behave dishonestly as it could affect the benefits that they will receive. Having to use store cards at a SCO would also make customers accountable for mistakes as they will be able to be located via personal information if they have behaved dishonestly or forgotten to pay by mistake.

Within the present research to be discussed, customer interviews and observations suggested that many customers using SCOs were happy to be using the service provided to them. Statistics of the usage and uptake of self-service technologies suggest that customers like using SCOs. Nonetheless, is this apparent customer appreciation for the opportunity to use SCO systems associated with customer's accepting *responsibility* for using them and using them correctly? This aspect was never a choice for customers, simply an expectation. Perhaps issues surrounding these questions may influence attitudes towards customer behaviours when then faced with a challenge or a fault with the system (that they never chose to be responsible for). Supermarkets currently try to manage dishonest behaviour at self-service checkouts by having a member of staff present to assist with any difficulties experienced by customers but also to act as a form of presence to reduce behaviours such as theft at SCOs. However, if staff presence is perceived to be effective, this then raises the questions as to whether technological implementations of presence within the SCO may be effective also.

1.6 **Presence**

Lombard and Jones (2015) introduce *presence* (a shortened version of the term "telepresence") as a psychological state or subjective perception in which part or all of an individual's perception fails to accurately acknowledge the role of the technology in the individual's experience with the technology and s/he attributes some form of intelligence with the technology. Except in the most extreme cases, the individual can indicate correctly that s/he is using the technology, but at "some level" and to "some degree", his/her perceptions overlook that knowledge and objects, events, entities, and environments are perceived as if the technology was not involved in the experience (Lombard & Jones, 2015). Lombard and Snyder-Duch (2013) state that:

"*Experience is defined as a person's observation of and/or interaction with objects, entities, and/or events in their environment; perception, the result of perceiving, is defined as a meaningful interpretation of experience*" (p.58).

For example, presence may be experienced via a SCO if customers were to feel, to some extent, that a form of intelligence existed during the experience that they did not instantly put down to resulting from the technology. This may be in the form of a social

presence which has been considered by researchers within retail settings and associated with consumer behaviour including customer loyalty (Cyr, et al. 2007; Li, Daugherty & Biocca, 2002). However, none have considered the effect that a *social presence* could have on consumer behaviour if implemented within a self-service checkout.

1.7 Social Presence Theory

Social presence is when a user experiences the perception that there is another intelligence or entity within their environment (Short, William & Christie, 1976) or an experience of psychological involvement with something or someone (Biocca, Harms & Gregg, 2001) in both computer mediated and non-computer mediated environments. The Social Presence Theory states that relationships become less personal as social factors in the interaction decline (Whitty, 2002). For example, face-to-face interaction produces a greater sense of community and encourages cooperation in comparison to e-mail interaction (Frochlich & Oppenheimer, 1998). In the context of computer-mediated interaction, Walther (1992) defined social presence as "the degree to which users can feel others' presence in the result of interpersonal interactions during the communication process" (p. 54). Social presence has been widely considered within design of online retail environments, as it has been identified as a key influence of consumer behaviour. Research shows that adding a sense of human touch, warmth and a sense of security via logos increases the social presence of a website and influences user online trust, loyalty and online purchase intention (Botha & Reyneke, 2016), yet its role within security as a deterrent of dishonest behaviour has not been explored. Research by Han, Min and Lee (2016) on the use of social networking services (SNS) and the influence of a social presence on user behaviour showed that social presence is formed through machine interactivity, person interactivity, and self-disclosure. They also found that greater social presence increases users' perception of the usefulness of information and their trust in the company, and that increased in those utilitarian values contribute to SNS users' positive engagement in relationships with corporate SNS accounts.

The upsurge of virtual interaction in the early part of the twenty-first century encouraged a tremendous amount of research to examine the many ways social presence has impacted human behaviour (Lombard & Jones, 2015). Technological advances within the consumer industry could be viewed as reducing personal interactions between businesses and their customers, and thus may reduce the experience of social

presence which may then reduce customer satisfaction (Cyr et al. 2007). Han et al. (2016) focus on social presence, which has been shown to play an important role in providing satisfying interactions and relationship building in computer-mediated communication (Kreijns, Kirschner, & Jochems, 2003). They are also interested in social presence as relationship marketing researchers consider social presence a key factor in building relationships with consumers (Dabholkar et al., 2009; Dabholkar & Sheng, 2012). The positive engagement described by Han et al. (2016) in response to social presence may also promote positive social behaviours which could encourage honest behaviour. If this were the case then we could presume that a social presence within a SCO may encourage honest customer behaviour, thus, reduce thefts.

1.7.1 Creating a social presence

In their explanation of how social presence is manifested, Lombard and Ditton (1997) suggest that it is determined by the form features and content features of a given medium and by the characteristics of medium users (Han et al. 2016). Form features are described as the structural characteristics of media that serve to encourage or discourage social presence, and content features are the characteristics of the content delivered within the form or structure of media that do the same (Lombard & Ditton, 1997). Examples of form features that generate presence include visual display characteristics such as image quality, image size, and viewing distance; aural presentation characteristics; and interactivity (Han et al. 2016; Heeter, 1995; Steuer, 1995). Research has focused on the form features such as those that enhance sensory richness or vividness, such as a medium's number of sensory outputs, visual display characteristics, and interactivity (e.g., Heeter, 1995). This focus on form features as determinants of social presence implies that how well a medium engenders social presence depends on how well it offers real-world-like experiences by imitating the stimuli that exist in one's surroundings and the user's ability to influence these surroundings (Han et al. 2016). Although content features also attempt to imitate real-world experiences, studies of content features have focused on the content that is delivered within the form of a medium and how socially realistic, authentic, and plausible those are (Rice, 1992; Short et al., 1976). Lombard and Ditton's (1997) framework is consistent with Walther's (1996) basic elements of computer-mediated communication: form features are the specific materialisation of a channel element, content features represent the form of feedback that can be conveyed through the particular channel, and medium user

characteristics reflect the characteristics of senders and receivers. Han et al. (2016) state the central premise of social presence theory is that social presence is a quality inherent in a communication medium. Social presence in mediated communication leads people to experience that communication as non-mediated and personalised which derives from how sociable, warm, sensitive, and personal users perceive the communication medium to be (Short et al., 1976).

Implementing a social presence within a SCO may result in increased feelings of trust and loyalty to the supermarket if the experience was perceived as personal and interactive (Botha & Reyneke, 2016; Dabholkar et al., 2009). A social presence may also reduce the likelihood of thefts as customers may feel positive towards the social presence or feel aware of another intelligence within their environment which may increase perceptions of risk associated with stealing at a SCO (Becker, 1962; Han et al. 2016).

To summarise, a number theories informed the framework for the current study: Rational choice theory provides a framework for motivations for theft as the perceived benefits from stealing at a SCO appear to outweigh the potential costs as customers can blame the technology or plead ignorance if they are found to have non-scanned items in their bags. Social presence hints at how theft can be addressed as implementation within online environments such as online retailers and social media suggest that it can have a positive impact on user behaviour. In line with the provided framework, the aim of this work was to investigate to what effect does a social presence have on thefts at self-service checkouts and could this be enhanced via technology? The relevance of this framework will be revisited in more detail in the different sections of this thesis.

1.8 Methodological approach

The present research explored issues surrounding dishonest behaviours at self-service checkouts, using a mixed-methods approach, involving qualitative studies with customers, SCO staff and security guards, followed by empirical studies to address selected components in line with the theoretical framework presented earlier. The qualitative studies also allowed for inductive analysis to guide the later stages of the research. Both qualitative and quantitative methods were deemed relevant for this

research to gain a better understanding of the behaviours surrounding self-service technologies. Creswell (2013) stated that there is more insight to be gained from the combination of both qualitative and quantitative research than either form by itself. Qualitative research aims at capturing "subjective realities" from the perspectives of participants (Arora & Stoner, 2009). Quantitative research provides quantifiable measures attributed to specific topics and has been popular within social sciences thus a combination of both qualitative and quantitative methods helps to minimalize traditionalists concerns of one being more reliable than the other, whilst providing a comprehensive picture of a research topic (Srnka and Koeszegi, 2007; Arora & Stoner, 2009).

There has been a surge of popularity in the use of mixed methods approach as it is argued that their combined approach provides an expanded understanding of research areas (Tashakkori & Teddlie, 2010; Creswell, 2013). While the present research is based within Human-computer interaction (HCI), in order to answer the research question, it has to dip into the social and human sciences fields of research which have been supported and encouraged to use a mixed methods approach (Teddlie & Tashakkori, 2009). Retail and consumer research often uses a mixed method approach to gain richer perspectives of consumer behaviours and explore the impact of new technologies (Arora & Stoner, 2009; Bhattacharya, 2012).

Five studies were conducted within this dissertation in order to explore the research question of: *What effect does a social presence have on thefts at self-service checkouts and can social presence be effectively implemented via technology?* This research question was then split into research objectives which were then addressed by each study. Study 1 addresses research objective 1 (RO1) aimed at *understanding the consumer experience of using self-service checkouts.* Study 2 involves in-depth interviews with staff of self-service checkouts and addresses research objective (RO2), *investigate the nature of dis/honest behaviour with respect to* RO1 *and the perceived effects of a social presence*. Study 3 comprises additional qualitative research methods, interviewing Security guards of supermarkets to address research objective 3 (RO3) *explore and recommend improvements to SCOs in the light of* RO1 *and* RO2. Studies 4 and 5 empirically test the effects of a social presence in view with the findings from RO1, RO2 and RO3. Studies 4 and 5 address research objective 4 (RO4), *advance*

knowledge in theory and methodology within the field of: HCI; psychology; and business.

1.9 Contribution to Theory and Practice

1.9.1 Theoretical Contributions and Overview of Findings

This work is primarily situated at the nexus of HCI, psychology and business research. This research also considers and utilises theories within design, security, sociology, methodology and criminology. A framework focusing on the effects of a social presence on dishonest customer behaviour explores perceptions of, and engagement in, dishonest customer behaviour when interacting with self-service checkouts. Investigation of this framework provides theoretical contributions from each of the studies. Study 1 provides a context for this work, reflecting on theories of consumer behaviour with technology and the influence of situational factors on customer behaviours and perceived benefits of using the technology. The findings suggest that, in general, customers do not have negative attitudes towards SCOs. However, there are certain factors that influence customers in their decision to use SCOs, primarily their *convenience*. This is determined by a number of factors that can be managed by the supermarket, such as the number of available manned checkouts, the SCO layout and the clarity of who could use them, i.e. customers with baskets or trolleys. These findings provide information on factors that could be contributing to thefts within supermarkets at SCOs and areas that can be focused to encourage customer use of SCOs whilst reducing thefts occurring via frustrations with the customer experience in store.

Study 2 contributes to research regarding perceptions of staff within a retail environment. Staff perceptions are under researched in terms of the effects of introducing new technology and its influence on customer behaviours. The interview method used allows for real life views and opinions to surface to influence practice and inform both technical side of technology but also inform social aspects involved with working with a technology within a retail environment, with a view to address theft.

Study 3 provides a detailed understanding of the roles of a security guard within a supermarket environment and provides insight into the personal and professional effects of policies on performance. The findings suggest that security guards perceived more

thefts occurring at SCOs when the store was busy and that there were more thefts at SCOs overall, compared to traditional manned checkouts. All security guards stated that it was easier to steal using SCOs due to their only being one member of SCO staff generally present at the SCOs. Their perception that the lack of supervision at the SCOs provides support for the theory of a social presence being an effective deterrent of theft, if implemented within a SCO.

The four and fifth study provide empirical testing of the theory of social presence within a SCO setup, but also derive suggestions for the design of technological interfaces. Psychological theories of behaviour are linked to the findings from the empirical research to guide strategies that can be implemented within the design and use of new technology. Together the studies highlight the potential benefits of-and need for further research on the effects of a social presence within a self-service environment.

1.9.2 Practical Contributions

This research highlights areas within a retail environment, involving self-service checkouts that could potentially be managed to reduce opportunities for dishonest customer behaviours. Actionable insights for practitioners are discussed and could potentially save companies millions whilst positively influencing consumer/staff relations with the retailer. The findings provide new ideas that can guide strategies for reducing and dealing with dishonest customer behaviour. Customers are currently able to rely on the "grey areas" (see Appendix 14) of responsibility within self-service use, to excuse their dishonest behaviour which leaves companies losing money via thefts. It is also arguable that security guards are subjected to store policies that do not allow for realistic apprehensions of thieves. The research also suggests that whilst CCTV is an important tool for conformation of thefts it does not act as an effective deterrent of thefts thus additional measures should be implemented via technology to induce the social presence effects of surveillance and potentially decrease dishonest behaviours.

1.10 Thesis structure

Chapter 1 presents an overview of literature on dishonesty, self-service checkouts and the social presence theory and provides a rationale for the research. This is then followed by Chapter 2 which examines key theories used within the research

framework. Chapter 3 consists of a qualitative study examining the customer journey and the factors which influence SCO use and potential causes for dishonest behaviours. Chapter 4 includes a research study exploring SCO staff perceptions of thefts at self-service checkouts. Chapter 5 investigates the role of the security guard in terms of their social presence and explored their perceptions of thefts at self-service checkouts. Chapter 6 considers the effects of a social presence within a self-service checkout interface on user behaviour. Chapter 7 examines perceptions of the voice at SCOs and the effects of the interactivity of a social presence within a SCO. Each investigative method (Chapters 3-7) is structured to introduce literature associated with the aim and investigation of that Chapter, followed by the Method, Results, Discussion and Conclusion. Chapter 8 will discuss the previous studies within the research, to create a comprehensive understanding of thefts at SCO using triangulation of data from both qualitative and quantitative research methods.

Chapter 1: Introduction

Presents an overview of the research rationale and design which lead to the development of the research questions and propositions relating to thefts at SCOs.

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Chapter 2: Literature Review

Presents the key theories of relevance to this research and related findings.

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Chapter 3: Study 1 Observations and Customer Journey

Examines customer journeys and their attitudes towards using self-service checkouts. Aspects of the customer journey which can lead to frustrations are also identified.

↓

Chapter 4: Study 2 Interviews with staff on their perceptions of thefts at SCO

Considers staff perceptions of thefts at SCOs.

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Chapter 5: Study 3 Interviews with security guards on their role and perceptions of thefts at SCOs

Examines the role of the security guard and their perceptions of thefts at SCOs.

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Chapter 6: Study 4 Empirical Study examining levels of Social presence within a SCO interface.

Two experiments examining the effects of a social presence, via an agent with varying levels of humanness, on dishonest behaviours at a simulated SCO.

$\downarrow$

Chapter 7: Study 5 Examining The Voice and Interactivity of a Social presence within a SCO

Empirical study focusing on the effects of an anthropomorphic agent and interactivity on dishonest behaviours when interacting with a simulated SCO.

$\downarrow$

Chapter 8: Thesis Discussion, Interpretations and Future Research

Triangulation of findings from the research studies.

Figure 4 Summary of thesis structure

The purpose of this Chapter was to introduce the primary research literature which outlines the research rationale within this thesis. The theoretical and practical implications of the research were subsequently summarised and the thesis structure was laid out. Chapter 2 will present the theoretical underpinning for the research within this thesis.

2 CHAPTER 2 Literature Review

The design of self-service technologies that encourage the customer to perform roles that were once specific to an employee such as scanning and paying for their shopping at a self-service checkout, have been of huge interest within retail and marketing research, as they can increase productivity by reducing the outgoing costs for staff (Dabholkar, 2015; Orel & Kara, 2014). Many businesses have found that self-service applications lead to a reduction in operating expenses while improving customer satisfaction (Kasavana, 2008). However, the reduction in social interaction with these technologies in comparison to the tradition methods with a sales employee may be linked to an increase in opportunistic and dishonest behaviours. Customers may take advantage of the freedom of having the *decision* to behave honestly. This may affect levels of customer thefts whilst using self-service technologies.

2.1 Dishonesty

2.1.1 Forms of Everyday Dishonest Behaviours

Mazar and Ariely (2006) discuss various forms of dishonest behaviour that occur day-to-day within the home, within employment, within our society and across economic sectors. For example, brokers receive commission based on the volume of business they produce. According to Davis (2004) the commission system can tempt brokers to choose personal gains over their client's interest, for example, encourage clients to buy deals that will give the most commission to the broker rather than the best service to the client. Knutson, Adams, Fong and Hommer (2001) investigated issues surrounding intellectual property (IP) theft, such as music on the Internet, and it is estimated that IP theft cost American companies $250 billion a year (Mazar and Ariely, 2006). Tax deception is another dishonest behaviour which occurs all over the world on a daily basis (Speights and Hilinski, 2005). Mazar and Ariely (2006) highlight figures from the IRS which state that the difference between what the IRS expects taxpayers should be paying to what they actually do pay is between $312 billion and $353 billion per year. Mazar and Ariely (2006) highlight these incidents as examples of everyday dishonest behaviours that are socially accepted by many within our society. Together these behaviours contribute to economies losing billions of pounds/dollars in tax revenues, wages, investments, and hundreds of thousands of jobs per year (Mazar and Ariely,

2006). Thus, research considering ways of reducing such behaviours can potentially save millions and support our economy.

Further research on insurance fraud was reported by Accenture (2003) who found that nearly 25% of U.S. adults felt that overstating how much they were due to claim from insurance companies was acceptable, and more than 10% suggested that putting in false claims for lost or damaged items was acceptable. Accenture (2003) further states that this dishonest behaviour is estimated to account for 10% of all claims that are paid out within the property and casualty industry, equalling around $24 billion per year. Such behaviours may result from people feeling that they are deserving of money from insurers, as they tend to pay regular payments to insurance companies and there are not likely to be large consequences from claiming, as dishonesty may be difficult to prove.

2.1.2 Retail thefts

Shoplifting occurs on a daily basis (Farrington, 1993) within supermarkets from both customers and staff (Beck, 2011). The majority of major supermarkets are knowingly observed with CCTV, yet it appears to do little in deterring shoplifters. Consumers are aware that CCTV runs in supermarkets, but there is always a chance that they are not being observed. CCTV within supermarkets generally requires someone to be watching it to identify customer behaviours, which may not always be the case. Therefore, perpetrators may not feel that there is a social presence, in the form of surveillance, as there is no direct face-to-face contact or confirmation that they are being watched.

Speights and Hilinski (2005) state that according to the National Retail Federation, "Wardrobing," i.e. the return of used clothing, came at an estimated cost of $16 billion in the U.S. in 2002. This is an example of a dishonest behaviour that occurs frequently that people may not consider as a form of fraudulent behaviour. Farrington (1993) conducted research looking at ways to reduce levels of shoplifting within supermarkets. In his research Farrington (1993) explained that situational factors will influence an individual's motivation to steal i.e. some may steal because they have no money for food whilst others may do it for excitement.

The brief review on theft suggests that - whatever the motivation - the drivers for dishonest behaviour may vary, ranging from financial need to financial gain, or even

excitement. Theories regarding what drives dishonest behaviours will now be presented within this Chapter.

2.2 Theories behind Dishonest Behaviours

2.2.1 Nature versus Nurture

Goodenough and Decker (2009) state that the nature/nurture debate can be applicable to behaviours such as stealing. The nature theories suggest people steal as a result of innate motives that encourage them to enhance their property; the nurture theories suggest that people learn social behaviours, moral values and laws and it is their learning that influences how they behave. If the nature theories were correct that would mean that all people have the urge to steal and as it is in their nature, nothing can be done to control it. If the nature theory were correct then it would suggest that all people would steal, which does not appear to be the case. This then suggests that nurture theories do play a part of behaviour as only some people steal as the majority of consumers have learned from others social behaviours that it is not accepted and they choose to abide by the laws. Many theorists who discuss the Nature versus Nurture debate in relation to crime state that it is important to consider both an individual's environment and genetics as contributors to their behaviour (Cornish & Clark, 1987; Goodenough & Decker, 2009).

2.2.2 Economic theory of dishonesty

Smith (1999) discusses economic theories regarding the effect of external incentives and states that the economic human is a rational, selfish human being who is interested in maximising his/her own payoffs. The decision to be dishonest depends on the external benefits and external costs that the individual will experience from behaving in this manner. This suggests that maximising the external costs to outweigh the benefits, will reduce the likelihood of dishonest behaviour occurring. This theory relates to Mazar and Airely's (2006) suggestion of increasing the magnitude of punishment for dishonest behaviour as a method of reducing dishonesty. However, how this compares with the experiences of (financial) gain also needs to be considered. According to the rational choice perspective, if the benefits outweigh the costs then a behaviour is likely to occur, conversely if the costs outweigh the benefits it is likely that the behaviour will

be supressed (Becker, 1968). Customers may be influenced by the potential to benefit financially from theft a SCO, increasing the risks associated with stealing at a SCO such as limiting the ability to deny any wrongdoing, may increase the cost of the behaviour.

Zhou, Vohs, and Baumeister (2009) conducted research looking at the symbolic power of money. Humans, for example, show significantly increased striatal activity during the anticipation of monetary gains (Knutsen et al. 2001). The findings suggest that money may be a substitute for social acceptance, as it may produce similar internal benefits that are experienced from being high up in the social system. Their research found that participants reported that holding money in comparison to paper reduced distress over social exclusion and diminished physical pain from putting their hand in hot water. Zhou et al. (2009) explained their findings as being a result of money providing people with a confidence that a problem can be solved and individual needs can be met. They conclude that money may be a social resource that can manipulate the social system to benefit the individual. This suggests that the probability of monetary gains at a SCO may influence dishonest behaviour as the power of money has internal benefits that will be rewarding to the individual.

2.2.3 Deception and perceived wealth

The perceptions individuals have with respect to which extent others can be harmed by their behaviour may influence the extent of dishonest behaviour. Gneezy's (2005) research on deception using a deceptive game with simulated employers and employees, highlights how individuals are influenced by their personal gains, but that they are also wary of the effect that their gain has on their co-players. Gneezy's (2005) research showed that difference of perceived wealth between the player and their co-players had an effect on the amount of deception that occurred. For example, more deception occurred between an employee and their employer than between employees. This finding suggests that people will be more deceptive to wealthier counterparts, as the costs to them appear to be lower. It could be argued that this may be an underlying motive for theft occurring in supermarket self-checkouts, as people who steal are stealing from a corporation rather than an individual, thus, they are less likely to see the cost to their behaviour as harming an individual than if they were stealing at a manned checkout. Customers may also feel that they are deserving of some discount on their

items as they have worked to pay for them. They have taken on the role of an employee by scanning their items and it was a role that they never signed up to do nor do they get paid for it. This may encourage customers to behave opportunistically to receive what they feel they have earned.

2.2.4 Equity theory

Adams (1965) developed the equity theory originally when working as a Workplace and Behaviourist Psychologist. Adams (1965) stated that employees seek to maintain equity between the inputs that they bring to the job, and the outputs they receive from it, against perceived inputs and outputs of others. Steenhaut and van Kenhove (2005) state that people are motivated by fairness and that if individuals feel they are getting a fair deal they are likely to behave in appropriate ways. Their theory may be related to dishonest behaviours at self-service checkouts if people believe that they are required to use more effort to scan and pay for their products than they feel is beneficial to them. People at self-service checkouts may feel disadvantaged at having to serve themselves and if they are faced with a problem such as an item not scanning then they may feel like the process has been challenging, therefore, they deserve to be rewarded. If customers feel disadvantaged then it could motivate them to steal to achieve equilibrium and satisfy their input and output beliefs (Adams, 1965). This theory is closely linked to the theory of neutralisation which has been linked to criminal activity as a method of rationalising behaviours.

2.2.5 Neutralisation

Research on rationalisations of criminal offences explore theories in an attempt to explain deviant behaviour and understand the cognitive aspects of such behaviours. Sykes and Matza (1957) developed the theory of neutralisation to justify delinquent behaviours in order for the offender to protect their self-concept whilst behaving unethically. Delinquency is defined as a criminal act or offence which Sykes and Matza (1957) explored in juvenile delinquency and their underlying values. Matza and Sykes (1961) considered two major types of explanations which included: one idea that "juvenile delinquency is seen as a product of personality disturbances or emotional conflicts within the individual; on the other hand, delinquency is viewed as a result of

relatively normal personalities exposed to a "disturbed" social environment-particularly in the form of a deviant sub-culture in which the individual learns to be delinquent as others learn to conform to the law" (p.712). Sykes and Matza (1957) state that research shows that many of the juvenile delinquents know what society considers as "honest" behaviours yet they justify reasons why the cannot conform to these. They argue that delinquents are likely to adhere to the idea of moral norms but consider them unfit for practice according to their attitudes and perceptions which serve to neutralise checks on delinquent behaviours. They have the knowledge of what is right from wrong but justify their delinquent behaviour by denying personal responsibility for controlling such behaviours, freeing them from social control (Matza & Sykes, 1961). Sykes and Matza (1957) state that delinquent behaviours are learned and like most social behaviours they are learned social interactions. Justifications used such as "others get away with it," show disregard for the likelihood of apprehension for committing a crime thus will reduce the sense of risk associated with committing an offence (Sykes & Matza, 1957). Neutralisation techniques have been considered as providing justifications and excuses for delinquent behaviours and have been discussed in relation to shoplifting, particularly at SCOs, as a method of protecting ones self-concept whilst committing delinquent acts (Taylor, 2016). According to the rational choice perspective, this perception of reduced risk associated with committing an offence, is likely to influence the behaviours to occur as the cost is perceived to be less than the benefit of the behaviour.

2.2.6   Rational Choice Theory

Rational choice Theory involves people weighing up the pros and cons of their behaviour, as if on a set of scales- if the positives outweigh the negatives then the behaviour is likely to occur (Becker, 1962). The idea of rewards and punishments of behaviour choices has been considered within various disciplines associated with human behaviour including psychology, sociology, economics and law (Cornish & Clarke, 2014). "Rational" is defined as behaviour *chosen* to benefit the offender (Cornish & Clarke, 2014). It has been popular in psychological perspectives of decision making and has largely focused on the characterisation of how criminals rationalise their behaviour. The book *The Reasoning Criminal* by Cornish and Clarke (2014) states that rational choice perspective (RCP) occurs when offenders choose to commit a crime with the expectation of a resulting benefit. Critics of the perspective argue that it was

developed to enhance punishment for offenders and ignores social issues underlying reasons behind offending such as poverty. However, Cornish and Clarke (2014) state that the theory was created to provide theoretical underpinning for situational crime prevention. It would make sense to consider the rational choice perspective in relation to retail settings and self-service technologies in order to prevent thefts by reducing the perceived benefits of stealing, reducing opportunities to steal and enhancing the perceived personal risk.

One way in which the costs could outweigh the benefits of theft would be by increasing the sense of risk associated with stealing at SCOs, such as, for example, by increased social presence of surveillance. RCP as a theory of criminal decision making is associated with theories of shoplifting and research from Carroll and Weaver (1986) state that it is rational for someone who has experience shoplifting, to evaluate a reduced risk of being caught. This suggests that once someone experiences successful theft they may be more likely to do it again as the sense of risk is reduced (negative) and the likelihood of getting the product for free is increased (positive). This is consistent with research from Beck (2011) who states that thefts at SCO are more likely to occur by those who have already done it, even if their first experience of stealing at a SCO was by mistake. Identifying the opportunities for customers to steal at SCO will provide an initial framework to implement strategies that reduce opportunity and enhance risk. This can then be applied to encourage change to dishonest customer behaviours. Behaviour change strategies like the one described can apply frameworks such as the theory of reasoned action framework to encourage behaviour change.

2.2.7   Theory of Reasoned Action

The Theory of Reasoned Action (TRA) was developed by Fishbein and Ajzen (1975) and has been a popular model in research predicting behaviours. TRA considers behaviour intent and attitudes and influences surrounding those behaviours which can then be applied in behaviour change strategies (see Fig. 4). Behavioural intentions are considered to be the immediate antecedents to behaviour and they occur in the belief that the behaviour will lead to a specific outcome (Madden, Ellen & Ajzen, 1992). Behavioural intention is said to be influenced by the individual's attitudes and the subjective norms of a behaviour. Attitudes toward the behaviour are described by Bailey (2006) as being determined by a person's beliefs that the behaviour leads to certain

outcomes and the person's evaluation of those outcomes, favourable or unfavourable. Subjective norms are presumed to derive "from the person's perceptions of what relevant others, such as family, friends, or co-workers, are likely to think about the behaviour, as well as the extent to which the person wishes to comply with those relevant others." (Bailey, 2006, p.804). Attitudes and subjective norms combined influence an individual's intentions to engage in a behaviour.
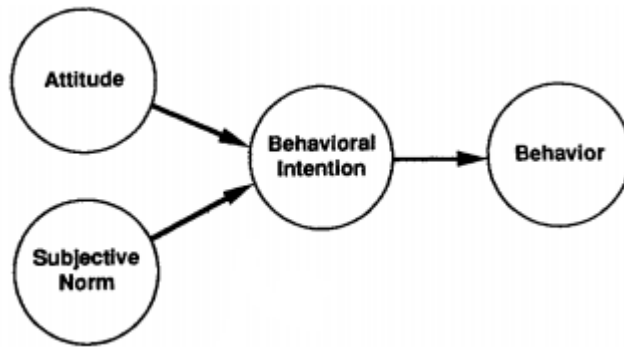
Figure 5 Path model for the Theory of Reasoned Action (Madden et al. 1992)

Theory of Reasoned action has been found to be a reliable model of predicting behaviours in situations where the individual has the choice of behaviours and can commit to their choice, i.e. volitional control (Madden et al. 1992).

2.2.8   Theory of Planned Behaviour

An extension of TRA is Ajzen's (1985) theory of Planned Behaviour, which includes the perception of behaviour control in relation to opportunities to perform a given behaviour (see Fig. 5). Behavioural control refers to how easy or difficult an individual perceives behaviour to engage with (Bailey, 2006). The theory of planned behaviour has been applied within research which considers employee thefts in retail (Bailey, 2006) and consumer shoplifting (Tonglet, 2002) to identify ways in which perceived control can be reduced by reducing opportunities. Madden et al. (1992) states that the more opportunities individuals think they have, the greater they perceive control of a behaviour. This may relate to customers who act dishonestly at SCOs in order to steal. Whether thefts occur intentionally or as a result of a fault with the machine which led to theft, the exposure of the situation increases a sense of opportunity of theft which thus may increase intention to behave in a similar way in the future. This then may make the customer feel more in control when committing a crime of theft at a SCO as they may expect that they will either not get caught, as previously experienced, or they can blame

the machine as they are now aware that there are system faults. Bandura, Adams, Hardy and Howell's (1980) empirical study and theory of self-efficacy shows that people's behaviour is strongly influenced by their confidence that they have in their ability to perform a behaviour. This confidence then provides motivation to conduct behaviours as they expect to succeed in them. This concept is in agreement with the theory of planned behaviours prediction that perception of control will influence the behaviour displayed. Applying the theory of planned behaviour to thefts at SCO may explain why there has been a perceived increase of thefts at them (Beck, 2011; Beck & Hopkins 2016; Taylor, 2016; McWilliams et al. 2016), i.e. people who have conducted dishonest behaviours at a SCO, and succeeded or perceived it to be easy, may be more likely to try it again as they perceive to be in control of the outcome of the behaviour. Reducing opportunities to steal at SCOs would be likely to reduce individuals feeling like they are in control of the behaviour. Research considering opportunism highlights the relationship between opportunity and misbehaviours (Felson & Clarke, 1998).
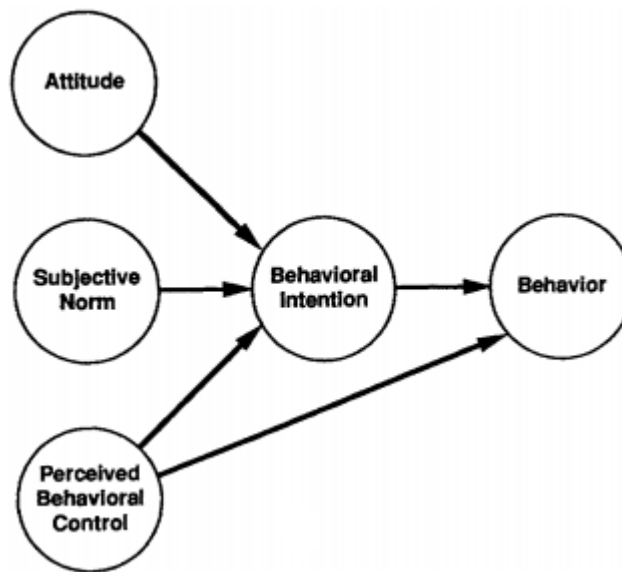
Figure 6 Path model for the Theory of Planned Behaviour (Madden et al. 1992)

2.2.9 Opportunism

Felson and Clarke (1998) state that "opportunity makes the thief". Mayhew, Clarke, Sturman and Hough's (1976) *Crime as Opportunity* states that opportunities may somewhat encourage the idea of entitlement. One of the basic principles behind situational crime prevention is to reduce the opportunities for criminal behaviour to occur (Cornish & Clarke, 2014). Research from Beck and Hopkins (2016) and Taylor

(2016) highlight various ways that customer can take advantage of opportunities for theft at SCOs. For instance, if an item has not been scanned at a SCO and is not recognised when placed in the bagging area as additional weight, then opportunists may take advantage of this and attempt to replicate this in order to steal. Learned behaviour can transpose into planned behaviour and once an opportunity has been experienced that resulted in a positive outcome, then it is likely to reoccur (Becker, 1968; Beck, 2011). The reality is that there are always going to be people who shoplift- the challenge is then to remove opportunities that may be encouraging customers, who would not usually steal, but are being tempted by the opportunity. Nature theories such as Bernasco and Nieuwbeerta's (2005) "optimal forager," may come into play for these types of customers who are stealing as a result of the opportunity given to them. They may experience evolutionary biological triggers that are grounded within humans to encourage them to benefit one's self, such as innate triggers to enhance their property (Goodenough and Decker, 2008). Addressing design features that allow for such opportunities to occur may be likely to reduce thefts as customers will not feel that thefts are easy to commit via a SCO. Addressing such design faults will also increase the customer experience for those who witness such failures of the machine, and then have to wait for a member of staff to come and fix the problem. Opportunities to steal at SCO may also be a result of the reduced social interaction with a sales employee that they promote. Reducing interactions with a sales employee within a retail environment may also reduce the sense of risk associated with taking items without paying for them, as they may feel that they are less likely to get caught if no one is watching them. Increasing perceptions of social presence within social environments has been associated with positive social behaviours (Zhao, 2003). As social interactions are reduced at SCO between the customer and a member of retail staff, perhaps increasing the perceived social presence from the SCO may positively influence customer behaviours and reduce opportunistic behaviours.

2.3 Addressing dishonest behaviours

A number of authors have researched how non-social behaviour can be addressed by focussing on the perceptions individuals have in relation to themselves and their environment. For example, theorists have explained dishonest behaviours as a result of individuals having reduced focus on themselves and more on a situation. If customers are focusing on perceptions of an injustice of having to work at a SCO without reward,

then their self-awareness may be reduced and they behave in ways that are not in line with their moral beliefs.

2.3.1   Self-focused Attention

The theory of human behaviour known as Self-focused Attention refers to an individual considering their internal standards and making sure that their behaviour is consistent with these standards (Beaman, Klentz, Diener & Svanum, 1979). Beaman et al. (1979) explored this theory by conducting an experiment at Halloween whilst children were trick-or-treating. In the experiment the children were asked to take only one sweet and they were then left alone in a room with the sweets. It was found that the children who had been asked personal questions including their name and address were more likely to take only one sweet and were even more likely to do so when there was a mirror placed behind the sweet bowl compared to children who had not been asked personal information. Asking the child's name and address increased their self-awareness, which has been suggested to lead to more honest behaviour. The addition of the mirror was thought to increase their self-awareness further, as they were able to see their reflection. This may have also increased their sense of social presence if it created the perception that they were not alone in the environment.

Mazar, Amir and Ariely (2007) conducted research that considered the effects of increasing self-awareness, and its effect on honesty. In their experiment they asked participants to write out either as many of the 10 commandments as they could remember (to increase self-awareness for moral behaviour) or they were to write down the name of 10 books that they had read (as a control). Both groups had 2 minutes to do the task and then they were given a math test which involved them finding as many number sequences that added up to 10, on a test paper that contained 20 grids containing numbers. Participants were then asked at the end of the test to recycle the test form by placing it into the paper bin, and write on a separate slip how many questions they had solved correctly. Participants were told that they would receive 50 cents for every question solved correctly. Mazar et al. (2007) were able to look at the test sheets which had been placed in the paper bin and found that the participants who were asked to write out 10 commandments claimed to have solved fewer questions than those who were in the control group. They concluded that increasing self-awareness reduced the likelihood of dishonest behaviour occurring. Similar results were also found when

participants were asked to sign an honour code before taking part in the math test. Their research provides a simple commitment device that can easily be adopted by schools, companies or the government, as stated by Mazar et al. (2007). This suggests that self - awareness may be increased at SCO's if they were to ask the customer some demographics, for example, age, gender or postcode. This may reduce the likelihood of dishonest behaviour occurring.

2.3.2 Personal responsibility

Research looking at the effects of changing an individual's sense of responsibility has found similar results on behaviour to the effects of increasing an individual's self-awareness. Harmon-Jones and Mills (1999) found that creating a sense of personal responsibility results in people modifying their behaviour to align with their attitudes. Mueller and Dweck (1998) found that inducing the belief that behaviours are a result of innate traits affects behaviour. They observed 10-year old children completing three sets of tasks using Raven's Progressive Matrices. On the first task, children were either told that their success was a result of their intelligence or their hard work. The second test was well beyond the children's performance level and was designed in order for them all to fail. The third test showed that the children, who were told that their earlier success was a result of their intelligence, put less effort in and reported enjoying it less than those who were told they had succeeded as a result of their own efforts. It was concluded that the children in the condition involving them being told their results were due to their intelligence, stopped trying as they believed that they were not smart enough to perform well and thus resulted in them enjoying it less than those in the other condition. Mueller and Dweck (1998) highlighted that if the dismissal of causation of behaviours were to be advocated then it may result in undesirable behaviours increasing. If people believe that deviant behaviours are a result of innate traits, such as those suggested by Goodenough and Decker (2009), then it may reduce personal responsibility. If people do not feel responsible for their behaviours then they will be unlikely to modify them (Harmon-Jones and Mills, 1999). If customers do not take responsibility for their behaviours then it could negatively impact dishonest behaviours at SCO.

2.3.3 The belief of freewill and dishonesty

In a related context, Vohs and Schooler (2008) conducted research looking at the belief of predetermined behaviour and its effect on behaviour. They hypothesised that participants who were prompted to believe that human behaviour is a predetermined force that cannot be controlled would cheat more than those who were not prompted. The experimental condition involved participants reading a script that stated free will is an illusion and does not exist (anti-free-will condition). Their control condition involved participants reading a script about consciousness. Participants then completed an arithmetic task on a computer where they were presented with a series of numbers which were either to be added or subtracted from one another and then they were to provide the answer. Participants were told they would receive a small payment for each calculation they answer correctly. Both participant groups were then informed that there was a fault with the system causing the answer of the sum to appear on the screen, to remove this they were to press the space bar when the sum was presented. Participants were informed that, although the experimenter would be unaware whether or not they pressed the space bar, they were to try to answer as honestly as possible. The computer was set up to record the number of space bar presses that were made by participants with fewer presses representing increased levels of cheating. As predicted, it was found that participants in the anti-free will condition, pressed the space bar less than participants in the control condition. It was concluded that participants in the anti-free will condition cheated more. Vohs and Schooler (2008) conducted a second task that involved participants having to *actively* cheat as the first task suggested the occurrence of cheating when there was a failure to press the space bar, which may not have been a true representation of cheating. Participants in one condition had to give the experimenter their answer sheet to receive payment, in the other condition, they had to mark their own answer sheet, then shred their answer sheet and pay themselves according to the number of correct answers they had calculated. An average of how much participants paid themselves was calculated and it showed that the average payment was higher in the self-paid condition than in the experimenter paid condition. The self-paid condition also involved participants reading statements on predispositions of behaviour compared to the experimenter paid condition which involved unrelated statements being read. Vohs and Schooler's (2008) findings showed that reducing beliefs of free-will resulted in increased levels of cheating. Vohs and Schooler state that these findings may have been a result of the anti-free will passage leading participants

to feel less accountable for their actions; therefore, if they cheat they may feel less guilt about their behaviour as it is out-with their control.

Vohs and Schooler's (2008) findings imply that deceiving participants by implying that there will be no record of his/her honest/dishonest behaviour may encourage dishonest behaviour as they will believe they are not being monitored. This may explain dishonest behaviours at SCOs as they involve people being in control of their own payment. The opportunity to act dishonestly in order to result in more money may occur as customers may believe their behaviours are not being recorded as there is no social presence integrated within an SCO to reduce dishonest acts.

2.3.4 Being honest about dishonesty

Halevy, Shalvi & Verschuere (2014) discuss research routed in social psychology, decision making, and economics which provides support to the claim that ''everybody lies.'' This growing literature, focuses on situational factors, such as the ability to benefits oneself (Mazar et al., 2007), reading a text encouraging a deterministic beliefs (Vohs & Schooler, 2008), or inducing the belief that behaviours are a result of innate traits affects behaviour (Mueller & Dweck, 1998) can all encourage people to lie. Such situational factors can be implemented to an environment such as those presented by Mazar et al. (2007) who found that increasing self-awareness would reduce dishonesty, or work from Beaman et al. (1979) on increasing self-focused attention by requesting demographics. Serota, Levine and Boster (2010) conducted research considering the frequency in which people admit to telling lies within their daily activities. Findings revealed that people who frequently attempt to achieve positive outcomes (rather than to avoid negative ones from happening) are more likely to lie due to their reduced fear of the risks involved in such behaviours (Halevy et al. 2014). This finding is consistent with the rational choice theory which states that a behaviour with benefits that outweigh the costs are likely to occur and the risks associated with the costs are minimised by the perceived positive outcomes (Becker, 1962). The research presented within this sections suggests that increasing consumers' self-awareness, sense of responsibility and sense of being monitored are all situational factors that could reduce dishonest behaviours. One way of implementing these situational factors to a SCO environment may be by

addressing what influence a social presence, within a SCO, could have on consumer behaviour.

2.4 **Social Presence**

Social psychology is the study of how people's thoughts, feelings, and behaviours are influenced by the actual, imagined, or implied presence of others within both technology-mediated and non-mediated social interactions (Allport, 1985; Swinth & Blascovich, 2002). The presence of others can result in a host of responses from "affective (e.g., feelings, preferences, prejudices), cognitive (e.g. attributions, impressions, attitudes, beliefs, stereotypes, social categorization), and behavioural (e.g., performance facilitation or inhibition, discrimination, conformity, compliance, obedience, helping, aggression) social responses" (Swinth & Blascovich, 2002, p.12). The notion of presence is much more difficult to describe due to their being a lack of consistency in its definition. Waterworth, Waterworth, Riva and Mantovani (2015, p. 36) note, "Terminological and other confusions about what comprises presence, and what does not, have impeded progress in the field. At the current time, no unifying theory of presence is possible, because the word 'presence' is being used differently by different researchers." Lombard and Jones (2015) state that the "concept of presence has become the focus of an increasing amount of attention in both academic and public forums, however, scholars have developed divergent and overlapping definitions of the concept, which threatens to inhibit our progress in understanding presence phenomena" (p. 13). Presence research has been utilised across many disciplines examining virtual environments and the social experience (social presence) of agents and other intelligent entities (Lombard & Jones, 2015). Due to this difficulty in definition there is little coherent instruction to determine the design of a social presence and which technological aspects can enhance it. Lombard and Jones (2015) recognise that part of this difficulty in defining social presence come with the interdisciplinary community of researchers interested in it. Researchers from psychology, philosophy, medicine, engineering, communication, and various other areas introduce their own theoretical and methodological approaches to the study of social presence (Lombard and Jones (2015). The study of presence within HCI and computer mediated communication (CMC) research areas convey their own definitions, including the definition that will primarily be referred to within this thesis from Biocca (1997), who defines social presence as an experience that occurs when "users feel that a form, behaviour, or sensory experience

indicates the presence of another intelligence. The amount of social presence is the degree to which a user feels access to the intelligence, intentions, and sensory impressions of another". Social presence research has identified social presence as comprising of various dimensions including awareness, connectedness and co-presence. The following section will explore research to further define them and their relationship with social presence.

2.4.1 Associates of Social Presence

2.4.1.1 Awareness

The concept of awareness has been explored in various ways within HCI and computer supported cooperative work (CSCW). Like social presence, it has generated a number of definitions within the literature. Rettie (2003) defines awareness as being another term for consciousness and that in order for there to be a perceived social presence there must be an awareness of another within an environment. In her meta-analysis on awareness research, she provides 4 separate categories of awareness as discussed by Christiansen and Maglaughlin (2003), including; workplace awareness, which relates to knowledge of tasks *within* the environment; availability awareness, which is the availability of people and objects; group awareness which promotes feelings of belonging to a group; and contextual awareness. The present research is associated with contextual awareness which includes awareness of a physical, social and mental context: "Awareness is both the perception of users of a system and an aspect of a system that facilitates perception" (Rettie, 2003 p.2). Dourish and Bly (1992) define social awareness as the knowledge of who is "around" and who is interacting with whom, which can then influence the interactions and behaviours that occur. Beck's (2011) research on thefts at self-service checkouts suggests that raising "would-be thieves'" awareness in a different context, such as raising the awareness of being watched, should reduce the likelihood of thefts. Raising the awareness of being watched is likely to increase the associated risk of being caught stealing at SCO which may then reduce the likelihood of behaviour according to the theory of rational choice (Becker, 1968).

2.4.1.2 Connectedness

Connectedness is a concept closely related to awareness and social presence and has been widely discussed in psychological research (Adler & Brett 1998; Rettie, 2003;

Nowak & Biocca, 2003). Social psychologists discuss connectedness in relation to the need for an individual to belong to a social group to promote social relationships and mental health (Adler & Brett 1998; Smith & Mackie, 2000). The concept of connectedness has been used widely within research promoting positive social behaviours Guerra and Bradshaw (2008) consider the psychological effects of connectedness and its influence on the psychological state of belonging. This sense of connectedness involves both feeling cared for and care for the social environment (Guerra and Bradshaw, 2008). If this can be achieved within a self-service checkout experience then it may reduce the risk of people taking advance of opportunities to steal. Creating a sense of connectedness within an environment has been closely linked with creating a sense of co-presence.

2.4.1.3 Co-Presence

Biocca and Harms (2002) define co-presence as the degree to which the observer believes they are not alone. Zhao (2003) defines it as consisting of both a mode of being with others and a sense of being with others. Lombard and Jones (2015) highlight that co-presence is a type of presence, or a dimension of presence. The sociologist Erving Goffman defined co-presence as a variant of presence in his 1959 book, *The Presentation of Self in Everyday Life* (Lombard & Jones, 2015), suggesting that co-presence is a situation in which humans are co-located, i.e., together, face to face, and "accessible, available and subject to one another" (Goffman 1959, p. 22). For full co-presence, "persons must sense that they are close enough to be perceived in whatever they are doing, including their experiencing of others, and close enough to be perceived in this sensing of being perceived" (p. 17). Increased levels of co-presence in computer-mediated communication (CMC) have been associated with increased social interactions and positive user experiences (Garau et al. 2003; Nowak & Biocca 2003). Co-presence has been of interest to research- on deviant behaviours (Jacobs, 2012; Jolley, 2010) and behaviours in public, where it states that "persons must sense that they are close enough to be perceived in whatever they are doing" (Goffman, 2008, p. 17). If a *sense* of co-presence can be achieved at a SCO increasing positive social interactions, then this may lead to an increase of feelings of trust and loyalty (Botha & Reyneke, 2016; Dabholkar et al., 2009) ultimately reducing the likelihood of thefts. Research attempting to apply a social presence within CMC has considered the effects that

computer agents can have on user behaviour. Findings suggest that users can be positively influenced by the use of agents within a computer mediate interaction.

2.5   Virtual Agents and Social Presence

Computer software can act as an agent with which users can interact. While chatbots (programs that verbally interact with a user) can be classified as agents, often agents are visualised in human form, i.e., as a character on the interface the user is interacting with. Computer agents come in many forms and are of increasing use as technology advances. For example, within commerce product recommendation agents (RAs) may simplify consumers' research and improve decision-making on the selection of products (Xiao & Benbasat, 2007; Zhu, Chang, Luo & Li, 2014). RAs refer to "software agents that elicit the interests or preferences of individual users for products, either explicitly or implicitly, and make recommendations accordingly" (Xiao & Benbasat, 2007, p.13). There are also pedagogical agents (Yung & Pass, 2015) to facilitate student learning. Pedagogical agents are onscreen characters, sometimes human-like, that interact with a user via gestures, gaze, speech, or combinations of those modalities (Yung & Pass, 2015). Recent research has focused on the importance of virtual agents, defined as "automated programs that act in place of human agents" (Edwards, Edwards, Spence & Shelton, 2014, p372) and their influence on social interaction in online environments. According to Zhao (2003) automated programs "differ from other types of computer programs in that they are specially designed to communicate with humans in place of humans…[and] can be grouped into two categories: instrumental or communicative" (p. 448). Instrumental agents are commonly used when a simple automated response or assistance is desired (e.g., Google Maps), whereas communicative bots are interactive and actually engage with people by mimicking human communication e.g., Apple's Siri (Edwards et al. 2014). Research considering the positive effects of computer agents on social behaviours has been topical with the continuous development and adoption of new technologies as part our everyday surroundings. Researcher have focused on theories such as The Media Equation by Reeve and Nass (1996), which argues that the psychology behind observable behaviour changes in the presence of others extends to interactions between a computer and user, especially if the computer displays human-like features (Payne, 2014). Methods of increasing social interactions between the user and computer agents have considered the aspects of the social agency theory, which states that users approach computerised contexts differently dependent on whether

social cues are utilised (Kim & Baylor, 2016). Social cues have been considered within research associated with promoting a sense of social presence within computer-user interactions, for example, within social media where social presence relates to the need for users of technology-based communication to perceive each other as real people (Kear, Chetwynd & Jefferis, 2014).

2.5.1 Agents and social presence

Human-computer interaction research has become increasingly interested in the use of agents and robots within environments by considering and applying knowledge of human cognition, emotion and behaviour to technology (Cassell, 2000; Broadbent, 2017). The field of social robotics aims to develop intelligent agents that can communicate and interact with people within a variety of settings (Leite, Martinho, Pereira & Paiva, 2009). These settings have included teaching environments (Kanda et al. 2004), universities as a "roboceptionist" (Gockley et al. 2005), and health care environments to reduce patient loneliness and encourage conversation (Broadbent, 2017). One of the main issues found from human agent interactions is that the novelty of initial responses soon wears off and humans lose motivation to interact with them. This has been associated with the level of social intelligence and awareness that the agent possesses. Leite et al. (2009) were interested in ways of establishing social relations between agents and humans over long periods of time. Leite et al. (2009) focused on the role of a social presence in human robot-interactions, focusing on factors that could keep the interest and motivation of the user, to interact with a social robot over long periods of time. They hypothesised that feelings of social presence towards a particular agent motivates the user to maintain the interaction, evaluating users' perceived social presence towards a particular agent over time would provide some indicators about what intelligent agents require to engage in long-term interaction. Leite et al. (2009) used the "iCat, the Affective Chess Player" system, in which a social robot plays chess against a human opponent on a real chessboard (Leite, et al. 2009). Social presence was measured using Biocca and Harms (2003) networked minds social presence inventory (NMSPI) questionnaire examining six dimensions of social presence. Five hours of video footage per participant was also collected to examine user behaviour in relation to social presence along with the questionnaire. Their results suggest that social presence decreases after 5 weeks of interaction on 3 specific dimensions of social presence: attention allocation, perceived affective understanding

and behavioural interdependence. This research highlights conditions where social presence effects may diminish as a result of repetitive interaction with a technology. There is little available research into what are effective *and* lasting levels of a social presence, and more research needs to be conducted in this area. However, a number of researchers continue to examine what effective levels of a social presence are, particularly focusing on the effects of anthropomorphism on social presence and social behaviours.

2.5.2 Anthropomorphic agents and social presence

Laurel & Mountford (1990) state that psychologically, we are skilled at communicating with other people. They state that we apply this ability to communicate when interacting with non-humans and animated objects through the process of anthropomorphism. Anthropomorphism research has been abundant within the development of robots and computer agents. The application of anthropomorphic features such as arms, legs and facial features (Haxby, Hoffman & Gobbini, 2000) has been found to result is positive social behaviours that replicate those that occur when humans interact with other humans (Grange & Benbasat 2017; Lombard & Jones, 2015; Reeves & Nass, 1996). This can also increase levels of perceived social presence between communicators (Lee, Choi & Kwak, 2015). Social responses to computing technology is described as an evolution-based default behaviour (Reeves & Nass, 1996) which occurs as users make human-like, as opposed to computer-like attributions to computer technology. This is known as the model of "Computers as Social Actors (CASA)" (Marakas, Johnson & Palmer, 2000).

Verhagen, Nes, Feldberg & Dolen (2014) consider the influence that an anthropomorphic agent (one with human-like features) within an online retail environment has on consumer social behaviours. Online service providers have adopted traditional tools to encourage communicative interaction between the computer and user via tools like frequently asked questions, live chats, customer communities, and social media (Verhagen et al. 2014). They effectively and efficiently supply customers with sought-for information or solutions to problems, however, the majority of such tools lack in the two characteristics that are traditionally labelled as being key in delivering successful service encounters. These include feelings of social presence and a sense of personalisation (Verhagen et al. 2014). Yoo and Alavi (2001), define social presence

within this context as referring to the feeling of personal, sociable, and sensitive human contact conveyed through and within a medium while sense of personalisation refers to the extent to which a customer feels the content offered is appropriate, based on personal information and tailor-made to one's needs (Lee & Park, 2009). Due to the distant nature of computer-mediated interactions of the Internet, feelings of social presence and a sense of personalised approach have been difficult to achieve online (Verhanger et al. 2014). Empowered by developments in self-service technology, the rise of virtual customer service agents (VCSAs) seems to provide new perspective on this issue (Verhanger et al. 2014). Verhanger et al. (2014) state that VCSAs are computer-generated characters that are able to interact with customers and simulate behaviour of human company representatives through artificial intelligence (Cassel, Sullivan, Prevost, & Churchill, 2000). Social response theory states "the more computers present characteristics that are associated with humans, the more likely they are to elicit social behaviour" (Nass & Moon, 2000 p.97). Building on this, scholars have put forward that VCSAs can fulfil the role of service representatives and substitute tasks historically performed by human service personnel (Meuter et al. 2000). Therefore, Verhanger et al. (2014) maintain that VCSAs are an exemplary tool to address the lack of interpersonal interaction recognised in online settings and to elicit feelings of social presence.

2.6 **Chapter Summary**

This Chapter introduces self-service technology and the problems that can occur with their adoption, in particular dishonest behaviours. Everyday thefts that occur within our society were presented including retail theft. Shoplifting within retail is a known issue to retailers and understanding social and psychological theories related to dishonest behaviour can inform SST design and practices for stores introducing self-service technologies. Theories behind what drives human dishonest behaviour and decision-making were presented, followed by a discussion on factors that can support honest behaviour, such as attention and self-awareness. A discussion of social presence and associated theories was provided. Research focusing on the use of computer agents within CMC highlighted that they can be adopted as a form of social presence to enhance the user experience, with a potential to address dishonest behaviours. Recent innovations in self-service technologies and agent technology would enable retailers to

explore agents as personal assistants. The study of social presence and dishonesty provides the background to this work. Before the empirical investigation into the relationship between these two concepts, three qualitative studies were conducted to explore issues surrounding SCO use, with an increasing focus on dishonest behaviour from the perspective of stakeholders interacting with SCO, i.e. the customer, SCO staff and security guards, respectively.

The next Chapter describes the first study, i.e. the exploration of the customer journey within retail, with a view to identify possible situational variables which could act as antecedents of dishonest behaviours. Theories of behaviour will be discussed in relation to the findings.

3 CHAPTER 3 Study 1 A focus on the Customer Journey and use of self-service checkouts

The use of self-service technology is an established way to conduct purchasing transactions for consumers, independently of staff assistance, with research showing that customers expect there to be an option for self-service within supermarkets (Beck 2015; NCR, 2014). Reduction of the social presence from a sales employee has been associated with an increase in opportunistic behaviours from customers and staff within supermarkets (Beck & Hopkins, 2016; Taylor, 2016). This Chapter will examine customer perceptions of using self-service checkouts and aspects of a customer journey which may affect the use of a SCO, and help identify potential antecedents for theft. The Chapter starts with a review of previous research that has explored customer use of self-service technology and factors that influence attitudes forming toward them. The potential importance of a social presence within a customer interaction and its influence on customer behaviours will be discussed. Ultimately, the use of self-service checkouts will be influenced by customer attitudes and behaviours towards them, thus it is important to consider aspects that can influence customer perspectives and identify what benefits they will receive from using them. Identifying reasons associated with customers either using or not using a self-service checkout will provide insight that can be applied to the design or marketing of them to encourage use and inform business strategies.

3.1 Introduction

There has been a proliferation of self-service technologies (SSTs) across the services sector in the past decade (Salomann et al., 2007; Wang, Harris & Patterson, 2012; Zhao, Mattila & Tao, 2008). Customers can experience a self-service option across a number of public service venues such as ATM machines at banks, check-in machines at airports, ticket machines at movie theatres and self-checkout lines in supermarkets (McWilliams et al. 2016). Self-service technologies within retail enable customers to engage in a shopping experience independent of assistance from staff (Meuter et al. 2000). For example, customers using a self-service checkout (SCOs), in supermarkets, scan and

bag their shopping goods and are also expected to correctly pay for their items, without human interaction from a member of staff, unless required. The role of staff is to provide ad-hoc assistance on an 'as needed basis', such as approving age restricted purchases or guiding a customer through a challenging transaction. This reduction in staff presence at SCOs, in comparison to a traditional method of paying for goods in stores, may change the way customers perceive the social presence of staff. Staff are typically only providing temporary, infrequent assistance which may encourage opportunistic i.e., dishonest- behaviours from some customers.

NCR placed the "first self-service checkout at Ball's Food Stores in Kansas City in 1998" (Anand, 2011, p.1). Their intention was for the machines to have "shoppers scan and bag their own goods, pay with cash or plastic, and get out of the store without so much as an insincere 'Have a nice day'," while also allowing companies to spend less money on cashiers in the long run (Lake, 2002, p.1; McWilliams et al. 2016). The cost was about $17,000-$20,000 per self-checkout, or $125,000 for a pod of them, compared to the typically much higher annual rate required to pay actual cashiers (Anand, 2011; Lake, 2002; McWilliams et al. 2016).

Whilst this method of purchasing goods provides freedom to customers who do not want to interact with members of staff, it can also pose difficulties for store managers to ensure that SCOs are being used by customers and that staff are well positioned within the store (Wang et al. 2012). The allocation of resources within the store will influence their productivity, however, it will also influence the customer experience (Wang et al. 2012). It is important to understand what influences customer use of self-service checkouts rather than the traditional personal service option, to better assist store managers in their distribution of resources, i.e., where employees should be allocated to enhance the customer experience and store productivity. Research considering customer perceptions of SST, highlight the effects of situational factors, such as employee assistance. Findings suggest that employee assistance can be a key influence on consumers deciding to use SST options (McWilliams et al., 2016).

3.1.1 The importance of the customer perspective

Bitner and Zeithaml (2003) state that satisfaction is the customer's evaluation of a product or service, in terms of whether that product or service has met their needs and expectations. Although some of the main motivations of the supermarkets for offering self-service checkouts are cost cutting, speed, and convenience, supermarkets are also assuming that these services would enhance customer experience, satisfaction, and ultimately customer loyalty (Orel & Kara, 2014). However, empirical evidence is needed to better understand customer expectations of SCO service quality and how technology based service quality impacts retail patronage. Therefore, Orel and Kara (2014) examined the service quality of supermarket/grocery store SCOs and its impact on customer satisfaction and loyalty in an emerging market, in Turkey. Orel and Kara (2014) state that "it is imperative to examine the customers' shopping experiences and service quality expectations of self-checkout systems' (SCS) in order to accomplish improved retailer service performance, customer satisfaction and loyalty" (p.118). The results of their study showed that SCS service quality positively influences loyalty when customers also experience satisfaction during their interaction with a SCS. Customer engagement has also been associated with enhancing user loyalty and satisfaction (Bowan & Chen, 2001). Service quality determines the likelihood of customer satisfaction, thus it is an important factor to consider for retailers.

3.1.1.1 Service quality

Traditionally, service quality has been conceptualized as the difference between customer expectations of a service to be received, and perceptions of the actual service provided (Orel & Kara, 2014; Parasuraman, Zeithaml & Berry, 1988). A number of different conceptualisations have been put forward in the literature. Parasuraman et al. (1988) conceptualized service quality as a construct with five dimensions (reliability, responsiveness, assurance, empathy and tangibles). Orel & Kara (2014) measured perceived service quality using a SST service quality measurement instrument which has been offered as a global assessment of SST service quality across contexts (Lin & Hsieh, 2011). Orel and Kara (2014) highlight that service quality is closely related to customer satisfaction (Akbar & Parvez, 2009; Brady & Robertson, 2001; Sureshchandar, Rajendran & Anantharaman, 2002) and customer loyalty. Cronin and

Taylor (1992) included loyalty as one of the important outcomes of service quality models (Orel & Kara, 2014) whilst Caruana (2002) showed that service quality is an important input to customer satisfaction. It is important for supermarkets to recognise and apply efforts in understanding how their customers evaluate their self-checkout systems and identify the factors that might influence customer satisfaction/ dissatisfaction with their use of such systems. These factors could influence design, store layout and store management to encourage a positive customer experience, increase customer loyalty and hopefully encourage honest behaviours.

3.1.2   Customer loyalty

Customer loyalty is positively influenced by customer satisfaction when using self-service checkouts (Orel & Kara, 2014). This is consistent with previous research from Zeithaml et al. (1996) who note that when customers are happy with the services provided, certain behaviours are displayed including: customer loyalty; willingness to pay higher prices and a reduced likelihood that customers will complain about the company to others. These arguments were supported in a study that confirmed the positive relationship between service quality and repurchase intentions (Boulding, Kalra, Staelin & Zeithaml, 1993). Orel and Kara (2014) state that in general, it appears that research results point towards a significant link between customer satisfaction and customers' behavioural intentions, both in traditional and technological contexts. Cronin and Taylor (1992) revealed that consumer satisfaction has a significant effect on purchase intentions. Wu (2011) also found this positive effect in the e-commerce industry. If this is the case, then by ensuring a positive customer experience for SCO users, it may increase customer loyalty, satisfaction and potentially encourage honest behavioural intentions, thus reducing the likelihood of thefts. This could be done via positive store interactions with employees and SCO technology, reducing the likelihood of system failures to ensure customers have positive attributions towards the use of SCOs.

3.1.3   Attributions and self-service checkout use

Nijssen, Schepers and Belanche, (2016) state that many customers feel innovations such as self-service technology are introduced by service providers to cut costs rather than

extend customer service levels, which may influence decisions to use SCOs. Nijssen et al. (2016) aimed at drawing upon attribution and relationship marketing theories to inform their conceptual model, for customer use of SSTs that includes benefit and cost attributions, their antecedents and consequences. They conducted their research within a supermarket in the Netherlands who had recently adopted self-scanning technology for customers. Survey data were obtained from 110 customers revealing that attributions mediate the impact of SST performance on relational value, i.e. usefulness to the customer. This value was highest for customers with high-benefit and low-cost attributions; customers with low-benefit and low-cost attributions exhibit detrimental effects on the exchange relationship with the supermarket. Prior experiences and perceived performance represented important antecedents of customers' attributions to the SSTs. Perceived SST performance involves an overall evaluation of the SST's functional reliability and accuracy, from a customer experience perspective (Dabholkar and Bagozzi, 2002). As described by Lin and Hsieh (2011), functionality refers to the characteristics of the self-checkout including ease of use, responsiveness and reliability. Enjoyment captures the perception with the use of the system. Design refers to the overall system and assurance portrays the confidence and competence of the retailer (service provider). Finally, convenience is related to the accessibility of the checkout service offered. Njssen et al.'s (2016) study has important implications for service managers responsible for communicating technological innovations to customers. Research suggests that customers will be much more willing to participate in co-creation experiences when companies are transparent in their aims (Prahalad & Ramaswamy, 2004). Prahalad and Ramaswamy (2004) suggest that there is a perception that "Firms have traditionally benefited from exploiting the information asymmetry between them and the individual consumer" (p.9). Retailers should provide transparent reasoning for the introduction of SCOs i.e. to benefit the customer and the store. This is likely to then generate positive customer attributions and prevent ambivalence towards their use. In addition to customer attributions, research suggests that situational factors are just as likely to influence customer behaviours (Wang et al., 2012).

3.2   Situational factors and consumer behaviours

Wang et al. (2012) conducted a study to explore the situational influences on customer's actual choice between self-service and personal service, with a sales employee, and examined the impact of past experiences on self-service technology, attitudes and behaviour. Using a mixed method approach they observed and interviewed customers of SCOs and regular checkouts, within five Australian supermarkets. Their focus for the observations was on observable situational factors such as shopping conditions (e.g. type of items purchased, time spent at the checkout) and store conditions (e.g. length of queue at both the regular checkout and the self-checkout). Wang et al.'s (2012) findings showed that perceived waiting time, perceived task complexity, and companion influence are the three situational factors that impact on a customer's actual choice between self-service and personal service. Past experiences, such as delays or operational faults, influence SST attitudes and behaviour in a more complex manner than SST characteristics and other individual difference variables. By understanding what factors affect a customer's choice, better strategies can be developed to manage and coordinate multiple service delivery options (Wang et al. 2012). Their findings also highlight the importance of preventing frequent failure and providing speedy recovery in the SST context.

3.2.1.1 Reasons for customers using SCOs

The following paragraphs are largely based on research by McWilliams et al. (2016) whose meta-analysis discusses customer versus staff perceptions in relation to the implementation of self-service checkouts within grocery stores and their use. They state that several factors influence customer choices to either use or avoid self-service checkouts.

3.2.1.1.1 Demographic factors

Demographic factors including age, gender, education level and income have been suggested as influencing customer choices. Research findings are inconsistent with respect to gender differences associated with SST use, as some suggest that SCO are more popular with women (Meuter et al. 2000) , whereas other research states that men are more likely to adopt technologies (Lee, Cho, Xu & Fairhurst, 2010). Both Meuter et al. (2000), Lee et al. (2010) agree that most users are of a younger age because they find technology easier and faster to use than older people, who did not grow up being able to use as many technologies. However, research from NCR (2014) shows high percentages

of people aged 65+ are also using SCOs. Education and income have been suggested as also influencing decisions to use SST as individuals with high levels of education and income are thought to experience less technology anxiety and more technology innovativeness (Lee et al. 2010).

3.2.1.1.2 Reliability

Reliability has also been suggested as a factor that influences customer decisions to use SST. McWilliams et al. (2016) states that when customers choose to use self-checkouts, they want to have a feeling of consistency and dependability that the machines will work for them now and in the future (Pedroso, 2014). Elliot, Hall and Meng (2013) state that if a consumer knows that a machine is going to be reliable, their attitude towards self-checkout will be affected in a positive way. McWilliams et al. (2016) highlight that there are a large number of risks involved in the assessment of whether to use SST or not, including "financial, performance, physical, psychological, social, or convenience loss" (Jacob and Rettinger, 2011, p. 4). In order to get past the fears that surround the uncertainty, one must be reassured of the reliability of these machines, and that he or she will not have his or her private information stolen, will be capable of operating the machine, will not be embarrassed if a failure occurs, and will save precious time that would have been lost otherwise (McWilliams et al. 2016). Trust is an important asset when thinking about reliability and can lead to a greater amount of customer loyalty (Kelly, Lawlor & Mulvey 2010; McWilliams et al. 2016).

3.2.1.1.3 Control

Another area highlighted by McWilliams et al. (2016) as influencing the use of self-service technology (SST) is control. When given the chance, customers appreciate the opportunity to be able to choose how to scan and bag their own items (Pedroso, 2014). Having control over how a customer "unload[s], scan[s], weigh[s], purchase[s], and bag[s] the items selected," can bring a customer a certain joy while grocery shopping and can lead to more favourable views towards self-checkouts (Anitsal and Schumann, 2007, p. 349; McWilliams et al., 2016). Many consumers have positively noted an increased amount of service quality on the basis that they are able to decrease their dependence on employees and be more in control of the checkout process (Anitsal and Paige, 2006), with the downside being that a system failure will put them in the position

of having to depend on an employee to fix whatever the problem is (McWilliams et al., 2016). This perceived risk causes customers to use the traditional cashiers, so they are then at the cashier's discretion of how fast the experience will go and have officially lost control over the situation (Jacob and Rettinger, 2011; McWilliams et al. 2016).

3.2.1.1.4 Speed and efficiency

One of the main features of SSTs that is attractive to customers is the speed and efficiency of using them. One thing consumers always hope for when grocery shopping is for it to go by quickly (McWilliams et al., 2016). Customers are being prompted to think that SCOs provide a better use of their time rather than waiting in line at a cashiers till. They will have an expectation of how long it should take to scan the amount of items they have, and more often than not, employees have a hard time living up to that high standard (Pedroso, 2014). When a consumer positively perceives how long the checkout process should take them at a SCO, many of them are inspired to use them which overall provides benefits of personal and skills development (Anitsal and Schumann, 2007). However, if this expectation is not achieved as a result of operational failures, it may result in frustration for the customer and result in a negative experience.

3.2.1.1.5 Ease of use

Another consideration given to the use of SST is the perceived ease of use (McWilliams, et al., 2016). One definition of perceived ease of use is the "degree to which an individual expects the target system to be free of effort," (Kim, Kim, Moon & Chang, 2014, p. 258) As a common rule, people want to pick the easiest option, so if the SST is perceived as hard to use, customers will avoid using them. So in order for consumers to be more willing to sacrifice the energy to scan their many items, they must believe that the self-checkouts are on the same level of ease as standing in line for a typical cashier, or at least, an option that is more worth their time (Jacob and Rettinger, 2011). However, this factor may also depend on other factors, including the number and type of items they have as more items or items that require age approval will make the process appear more difficult.

Retailers' main goal should be to make the SST appeal to consumers by making its use appear enjoyable (McWilliams et al. 2016). That aspect would motivate the customers

to choose this option more often (Pedroso, 2014). It appears that consumers would rather be doing the scanning than standing and watching an employee do the same thing because they get bored quickly, have more fun when participating, and expect certain benefits when using these machines—"saving time and effort" (Kim et al., 2014, p. 258). These benefits could also include emotional rewards and the opportunity to "play" cashier for the day, which give customers the opportunity to see what it would be like. Table 1 provides a summary of the factors associated with SST use.

Table 1 Reasons consumers use SST

Factors influencing consumer use of SSTs	
Reliability	Consumers have to trust that the machines will work for them
Control	Consumers like to scan their items in the order that they want
Speed and efficiency	Consumers do not like wasting time and choose SST for a faster transaction
Ease of use	Consumers do not want things to be harder than they have to be
Enjoyment	Consumers think scanning their own items is more fun than standing in line watching someone else do the scanning
Adapted from McWilliams et al. (2016)	

3.2.1.1.6 Number and types of items

A customer will take into account the number of items that they are purchasing and the specific type of items when deciding whether to use a self-checkout or a regular checkout (Anitsal & Schumann, 2007). Sixty percent of shoppers (see Table 2) who used SST did not use shopping trolleys or baskets and purchased an average of four items while forty percent of the people who frequent regular checkouts purchased about eleven items (McWilliams et al. 2016). If one out of those four items was fresh produce, customers would be more likely to switch to a regular checkout, since some fresh produce has no barcode to scan and therefore requires proficiency with self-checkouts to complete the task. Wang et al. (2012) noted that customers did not use regular checkouts more frequently than self-checkouts. The decision is more of a spur of the moment choice, depending on the length of the lines and the possibility- of wasted time.

Table 2 Positive influences on customers making choices between regular checkouts and SCOs.

Regular checkouts vs. self-service checkouts		
Factors	**Regular Checkout**	**Self-service Checkout**

Length of queue	All lines are long or short	Regular checkout lines are long
Number of items	11 or more	Less than 11 (usually around 4)
Trolley or Basket	Trolley or basket	Basket or none
Type of items	More produce and unpackaged items	Mostly smaller items with easy-to-scan barcodes
Shopping Companion	Children, elderly	Friends, no one
Technology Ready	No	Yes
Typical Demographics	Older, less educated, lower income, more in need for personal contact	Younger, more educated, higher income, less in need for human interaction
		Adapted from McWilliams et al. (2016)

3.2.1.1.7 Problem Solving

A critical aspect of deciding to use SST is knowing that if a problem does occur, the solution will be fast and effective (McWilliams et al., 2016). When something goes wrong, customers are often times at fault, but twenty-two percent refuse to cite themselves as the issue (Zhu, Nakata, Sivakumar & Grewal, 2013). Therefore, consumers who are less familiar with this technology will be less likely to want to use it because they do not know how to solve issues when they occur and probably do not have the patience to wait for someone to come and help them fix it (Reinders, Frambach & Kleijen, 2015). If not handled correctly or fast enough, customers will become exasperated to the point of having negative emotions when thinking about self-service technologies, meaning service recovery is an important requirement in customer satisfaction (Hilton, Hughes, Little & Marandi, 2013; McWilliams et al. 2016).

3.2.1.2 Why customers decide not to use SCOs

The research presented within the previous section displays several elements that influence customer use of SCOs, however, McWilliams et al. (2016) highlight that there are also factors that impact customer decisions not to use them. Identifying these factors will provide opportunities for service providers to apply changes to these to minimise the negative influence they have on customer decisions. According to Njssen et al.'s (2016) conceptual model (that includes benefit and cost attributions, their antecedents and consequences as indicators of behavioural intention), if the negative factors affecting use of SCOs are reduced, this will diminish any negative antecedents

influencing decisions not to use the SCO. The following sections will discuss four key factors that influence the disuse of self-service checkouts within supermarkets.

3.2.1.2.1 Technology failure

Anyone who uses technology on a daily basis knows that the odd system failure can be expected. This is generally a frustrating experience when it is our own technology, for instance if your phone will not connect to the internet, your computer crashes or your microwave were to stop working. However when a technology failure occurs in public, such as at a SCO, it is likely to produce negative attributions to that technology. For example, if a self-service checkout will not recognise an item that has been scanned and publically announces that there is "an unexpected item in the bagging area", this may cause embarrassment for the customer and frustrations as s/he has been unable to complete the task at hand due to an apparent technology impasse. The name "self-service" indicates that customers should be able to complete the task on their own and when they are unable to do this it may leave a sour taste in their mouth. They may have chosen to use the SCO as it suggests a quicker service and when they experience a technology failure, the time that they expected to save is wasted. Wang et al.'s (2012, p. 9), research within supermarkets in Australia found that many customers, when asked, would side with a statement made by a customer who was interviewed, "Each time [using the self-checkout], some problems come up. We'd have to get help. That kinda affected my choice to use it again. Just felt easier to watch someone else to do it I suppose." This suggests that many customers have experienced a technology failure at a SCO which may result in customers feeling anxious towards them.

3.2.1.2.2 Technology anxiety

Secondly, some customers lack the technological skills to use the SCO machines which cause them to have high levels of anxiety surrounding the experience (McWilliams et al. 2016). According to Lee et al. (2010), this factor applies specifically to women and the elderly even more so than others. Research presented by McWilliams et al. (2016) states that neither of them has high confidence concerning self-service technology options, or even technology in general. In line with TAM (see section 1.5.1 p. 47), anxiety will likely increase the perceived difficulty in using a technology. In terms of SCO

customers, those who have witnessed a delay either as a result of a failure in the system or by their inexperience may then perceive them to be difficult to work. The TAM suggests that the perceived ease of use and perceived usefulness can predict attitudes toward technology that can then predict the usage of that technology (Dabholkar & Bagozzi, 2002). Therefore, customers should be encouraged to take their time and be shown how to work the SCO in order to increase their confidence in using them. This will then increase the perceived ease of use which will encourage use of the technology according to the TAM (Dabholkar & Bagozzi, 2002).

3.2.1.2.3 Lack of personal interaction

Thirdly, the limited amount of human contact bothers particular individuals, especially the elderly who are more likely to already be lacking in interpersonal interactions (Hilton et al., 2013; McWilliams et al. 2016). One older interviewee in a study by Jacob and Rettinger (2011, p. 10) claims that "personal conversation, being face-to-face, talking with each other [is the] most important," so she and many others would be unlikely to sacrifice that feature of their checkout.

3.2.1.2.4 Coproduction issues

Lastly, consumers associate self-service technologies with a certain "coproduction intensity," a phrase coined by Haumann, Gunturkun, Schons and Wieseke (2015), which often negatively affects customers' views of self-checkouts in terms of requiring too much effort and not enough economic value. This relates to the equity theory of behaviour which states that individuals aim to maintain equity between their performance inputs and the gained outputs. Customers may feel that they are being disadvantaged by having to scan and bag their own products when they could get it done for them, or at least get some of it done for them by letting an employee scan their goods. This notion can also relate to the theory of rational choice which states that people weigh up the pros and cons of a behaviour, as if on a set of scales, and if the positives outweigh the negatives then the behaviour is likely to occur (Becker, 1968). If customers feel that they have to input more than what they will gain from a behaviour then they may be less likely to perform the behaviour as the negatives will outweigh the positives. These ideas are shown in Table 3.

Table 3 Negative influences on customers making choices between regular checkouts and SCOs.

Factors influencing consumer disuse of SSTs	
Technology Failures	Consumers expect the machine to work flawlessly, if not it is time wasted
Technology Anxiety	Consumers have an amount of social pressure, especially if they do not use this technology often
Human Contact	Consumers do not always want to avoid small talk with employees
Coproduction Intensity	Consumers are asked to provide too much effort for little gain
Adapted from McWilliams et al. (2016)	

The factors that have been presented as both positive and negative influences on customer decisions, to either use SCO or use a traditional checkout, highlight areas for retailers to consider. Customers may only be aware of the negative aspects of using the technology, perhaps from a negative experience. Promoting the positive aspects of SCO to customers will increase their awareness of these.

The research discussed highlights the importance of situational factors on customer attitudes to using SCO in store, however, there is still little consideration given to the situational factors that may lead to thefts occurring at SCO. In the next section, studies pertaining directly to theft at SCO will be discussed.

3.3   Types of SCO Thieves

Using recent market surveys which state that up to a third of customers regularly steal at SCOs, researchers have been interested in the types of theft that occur at SCOs. For instance, Taylor (2016) outlines the causes for a new strain of shoplifters named SWIPERS. Taylor (2016) identifies 4 types of SWIPERS including: Accidental, Switching, Compensating and Irritated/frustrated. Accidental refers to those who claimed to have accidentally stolen due to a fault in the system either not registering a scan or not scanning at all. Research suggests that even those who have stolen once are more likely to do it again even if it had occurred accidently the first time (Beck & Hopkins, 2016). This behaviour could be linked with Fishbein and Ajen's (1975) TRA and rational choice theory as the risk associated with thefts will have been lowered as they were not punished for their behaviour and received benefits such as saving money and perhaps experienced feelings of excitement which would then be a positive influence for the behaviour to reoccur.

Another type of theft that has been reported to occur at SCOs is passing off (Silmalis, 2012) or switching (Taylor, 2016). A supermarket in England found that individual shoppers were scanning through all of their shopping items as carrots (Harding, 2012). Silmalis (2012) reported that supermarkets were discovering that many higher-value items were being passed off as loose vegetables such as onions. This type of theft is interesting as customers chose to cheat the system rather than outright steal the product by concealing the item. This suggests that the thief has learned how to "trick" the SCO which is consistent with research from Beck and Hopkins (2016) who state that those who know how to trick the machines use them more often to act opportunistically. This finding is also consistent with research from Mazar and Ariely (2006) whose findings from research on dishonesty showed that lots of people lied 'just a little bit'. They stated that participants seemed to lie a certain amount but would not exaggerate to an extreme amount. Mazar and Ariely (2006) describes this as the *fudge factor* which appears to be the right amount of wrong, for it to be considered as okay by the individual. Perhaps those who commit "Switching" theft at a SCO consider a *fudge factor* as they are able to cheat and get a reduced price but still they have not completely stolen an item. They may also perform "switching" rather than outright theft as they can rely on the fact that they can claim ignorance to the fact that misbehaviour has occurred and either say they did not know or blame the technology, i.e. apply Beck's (2011) self-scan defence.

Some customers may feel that they are owed a discount price on their items as a payment for them having to scan them. They may feel that they have performed an unpaid labour. Justifications such as those described can remove a sense of accountability and blame from the act of stealing much the same as it does with the act of "cheating" rather than stealing. Theories such as that described within the neutralisation (see section 2.2.5 p. 68) of behaviours suggest that individuals justify their behaviours in order to protect their self-concept whilst behaving unethically.

Customers experience technology failures at SCOs which can impact on the likelihood of her/him using them (McWilliams et al., 2016). However, when failures occur during a transaction it can cause frustrations for the customer as they have been unable to achieve their expectations of a self-service checkout i.e. independent, speedy service. This may lead to customers not paying for their items as they have been unable to scan

them properly, or they have gotten fed up waiting on assistance to rectify an operational issue. It is difficult to distinguish between customers who set out to steal at a SCO and those who steal as a result of frustrations at SCOs. Additionally, some customers may steal as a result of kleptomania or thrill seeking behaviours. People who seek out such thrill-seeking experiences may be influenced by the attractive opportunities presented by a SCO machine. They can play out their thrill-seeking behaviour, such as committing a theft, for relatively a low risk. They may experience a sense of power if they "get away" with it such as suggested by Holbrook, Chesnut, Oliva and Greenleaf (1984) who found that paying a reduced price for an item may make a consumer feel proud, smart or competent. The potential for a limited interaction with a member of staff when using a SCO may present itself as an opportunity to steal for those who steal for excitement. Felson and Clarke (1998) state that "opportunity makes the thief". Mayhew et al.'s (1976) *Crime as Opportunity* states that opportunities may somewhat encourage the idea of entitlement. One of the basic principles behind situational crime prevention is to reduce the opportunities for criminal behaviour to occur (Cornish & Clarke, 2014). This is also closely related to research from Hayes and Cardone (2006) who propose the "theft triangle" when referring to variables that lead to a theft. They highlight that identifying these variables can allow for them to be managed in order to reduce theft. Hayes and Cardone (2006) report that the variables involved in a theft include the motive behind the theft, the perceived level of personal risk and the level of opportunity. One way in which the opportunity to steal could be reduced would be to influence customers to still feel that they are interacting with an employee or another form of intelligence. Research suggests that a social presence can influence behaviours, even when a social presence is via technology (Han et al. 2016).

3.4 Social presence and behaviour

Customers may experience times at a SCO when they are faced with having to make an unprovoked decision. For example, as a result of the technology not working properly, they may be presented with an opportunity to cheat. Customer may have to ask themselves at times should I "do the right thing" and scan all of my items correctly and pay the full amount-or should I benefit myself by behaving dishonestly. Research from Hoffman et al. (2015) was particularly interested in real life situations in which humans need to "do the right thing" against their own benefit. They predicted that a social presence implemented via a robot, would encourage honest behaviours,

similarly to the presence of other humans. Hoffman et al.'s (2015) empirical study involved participants performing a perceptual task which was structured so as to allow participants to earn more money by not complying with the experiment instructions. Three conditions included participants being in a room alone completing the task; completing it with a non-monitoring human in the room and completing it with a non-monitoring robot in the room. Results showed that participants cheated in all three conditions, but cheated less when there was a human or robot in the room compared to when they were alone. This research suggests that a social presence can be implied by a robot and does not necessarily have to come from a human to be able to influence how people behave. This suggests that social presence may then be able to be introduced via a SCO if design features were implemented to suggest another level of intelligence was present in the system (Han et al. 2016), for example, via anthropomorphic agents. This could potentially influence consumer behaviours at SCO.

3.4.1   Social Presence via technology

Research which considers the use of a social presence via technology has been of interest within e-commerce studies such as online retail. Online retail research is of interest as it is a method of self-service and it also involves a reduced social presence similar to SCOs, as customers are generally not interacting with a sales employee face-to-face. Research suggests that a social presence online can positively influence customer interactions. For instance, Gefen and Straub (2004) state that a social presence can induce feelings of user trust with a website which leads to greater purchase intentions. Botha and Reyneke (2013) define social presence within websites as features incorporate within the site to create the perception that sociable, personal and sensitive human contact is present on a website. They also consider social presence within a website as providing a tool to access information about a product, which could be in the form of a virtual assistant to an online expert, which has also been linked with trust (Dash & Saji, 2008). Botha and Reyneke (2013) found that social presence has an influence on online purchase intentions and online trust. Higher levels of social presence and feelings of trust were associated with greater levels of online purchase intentions. If a social presence can induce feelings of trust by offering information on a product, leading to an increase in the likelihood of that product being bought in an online environment

then perhaps this can transfer to self-service technologies within a retail setting such a supermarket. User trust has also been linked to customer loyalty (Botha & Reyneke, 2016; Dabholkar et al., 2009). If this can be implemented within a SCO then it may enhance the user experience, making customers more likely to use SCOs, but perhaps also increase positive social behaviours. Research suggests that humans are less likely to act in an antisocial manner to those that they trust, as feelings of trust increases feelings of attachment, therefore, customers may be less likely to steal if a social presence were implemented within or associated with SCO design (Thau, Crossley, Bennett, & Sczesny, 2007). Current methods of social presence within supermarkets include formal surveillance; such as CCTV, the presence of security guards and staff, or informal surveillance, such as physical features e.g. mirrors or lights, to maximize visibility and encourage positive social interaction (Reynald & Elffers, 2009). However, thefts are occurring at SCOs despite the current methods of social presence which suggest that there is a need for further research on additional methods for SCOs.

3.5 Present research

The research discussed explored customer use of self-service technology and factors that influence attitudes towards using them. Recent research highlighting the types of thefts that occur at SCOs was presented and the potential influence of a social presence within a SCO, on customer behaviours was also discussed. In order to progress with an investigation into the possible effects of a social presence within a SCO it is important to firstly examine current customer behaviours, to either support the findings presented by previous researchers or to highlight additional areas that may contribute to either the use or non-use of SCOs. This research aims to determine customer decision points within a shopping journey, which may guide the choices made by customers on how they will pay for their items i.e. by SCO or via a traditional checkout. A qualitative approach will be adopted to examine customers' natural behaviours within supermarkets. Identifying reasons associated with customers either using or not using a self-service checkout will provide insight that can be applied to the design or marketing of them to encourage use. This study is therefore exploratory in nature. The findings from the present study fall within the research area of customer behaviour science, marketing and design. These findings may enhance knowledge of the nature of

dishonest behaviour with respect to SCOs, by identify contributory factors to their use, and inform improvements to self-service checkouts in light of the information gathered.

3.6 Method

3.6.1 Participants

All participants that were asked to take part in the study said yes. In total, 7 customers (5 females and 2 males, aged between 26 and 64) were involved in a customer journey during which observations of customer behaviour and interviews were conducted. Customers purchased between 7 and 39 items. The study took place in one of the UK's major supermarkets during June 2015-December 2015. Eligible participants were those who shopped at this particular supermarket regularly and had experience in using both the regular checkouts and the SCOs. This was to ensure interviewees had sufficient prior experience to allow them to provide accurate perceptions on their choice between the self-service and the personal service. Participants were recruited by convenience sampling by asking customers of the supermarket in question, if they would be happy to arrange a time for a customer journey to take place. Those who were happy to take part in the research scheduled a time to meet the researcher, which was generally within 2 weeks of being asked to take part. Participants were told that the purpose of the research was to investigate customer experiences within a supermarket rather than being focused on SCO use. This was to initially reduce any influence or bias this may have had on customer choice of shopping method, which in itself is informative.

3.6.2 Setting

A qualitative approach was used to observe customers whilst they shopped. Pivot head spy glasses that recorded the shopping journey from the participant's perspective were originally to be worn during the customer observations to allow for later analysis of footage, however, these were discarded after the first two customer journeys, as it was found that surrounding staff appeared to be reacting to the glasses worn by the participants, thus, natural behaviours may have been affected with continued use. Participants were all asked questions relating to their specific behaviour throughout their journey, and during and after payment of their goods in the supermarket to allow for an inductive approach to the findings. A customer journey-map was developed and

used to prompt questions (Appendix 1). All participants were interviewed using a semi-structured interview (Appendix 2) to explore attitudes towards SCOs, CCTV, and staff assistance at SCOs. A voice recorder was used during the interviews to allow for later thematic analysis. The store was located in a town centre and was 67,000 square feet. It had one self-service checkout area containing ten SCOs located near the main door.

3.6.3 Procedure

Before conducting the customer research, Ethical Approval was granted from Abertay University's Ethics Committee, and the supermarket store manager gave permission for the research to take place in store. All volunteering participating customers for the customer journey were asked to read and complete an information and informed consent form (Appendix 3 & 4) before observation of the customer journey began. Customers were met in the store carpark and then followed from the carpark of the supermarket into the store. Participants were asked to conduct their shopping as they normally would. They were then followed throughout their entire shopping journey, being asked specific questions in relation to their behaviours, for example, "Were there any reasons why you lingered in front of the self-service checkouts before payment"? Or "At what point did you decide you were going to use a traditional checkout"? Customers were also asked to complete a semi-structured interview after their shopping journey, which took place either in the researcher's car or in the participant's car and was recorded via an audio recorder for later transcription. Customers were asked questions in relation to SCOs, their behaviour, perceptions towards SCO staff and CCTV. For example they were asked "Do you know when you enter a store, what method of payment you will use: Traditional or SCO"? And "Have you ever experienced a SCO not working properly"? Or "Have you ever been tempted to steal at a SCO". The semi-structured interview was influenced by the actual choices that the customer had made within their customer journey, i.e. whether they selected self-service checkouts or traditional, staffed, forms of checkout, thus, memory error or bias was minimal. All participants were debriefed at the end of their shopping journey and received £5 for taking part in the study. Customer journey observations and interviews lasted on average 45 minutes. All interviews were then coded to identify recurring themes.

3.7 Results

3.7.1 Key findings

3.7.1.1 Method of payment used

Six out of the 7 participants, used traditional staffed checkouts involving a cashier for various reasons. Six of the participants stated that they decided on the method of payment (SCO or traditional checkout) when they had completed their shopping and were heading to the front of the store, which typically homes both SCOs and traditional checkouts. The seventh participant stated that she generally always used a traditional checkout when in that store as she shopped there for her weekly shopping which generally consisted of a large purchase as she had a family of 6. She stated that she "never use[s] self-service to pay for larger shops" (Female, 37).

3.7.1.2 Questionnaire findings

3.7.1.2.1 Decision point for payment method

Within the questionnaire, customers were all asked if they knew when entering a store what method payment they would use. When asked when they make their decisions they typically stated, "*When I go to pay*" (Male, 26). Apart from the customer mentioned, all of the other participants suggested that they didn't have pre-existing decisions towards using SCOs. They did not generally decide on whether or not to use a SCO or a traditional checkout until the end of their shopping journey. This may not be the case for an opportunistic thief as they may aim to use a SCO if they are aware that there may be an opportunity to steal.

3.7.1.2.2 Factors influencing use of SCOs

It appeared that the decision as to whether they used a SCO or not was mainly down to situational factors of which a full list can be found within the appendices (Appendix 18). These key factors are associated with the *convenience* of the payment to customer. This was the most reoccurring theme influencing the use of either a SCO or a traditional checkout. The convenience would entail, for example, the accessibility and availability of the payment options. One customer stated that "*if there is no queue at a normal* [traditional] *checkout then I will just go to that for quickness*" (Male 36). This was stated as being relevant for both traditional and SCOs, and customers generally felt that

if the SCO had appeared quicker, i.e. if the traditional checkouts were not available with no queue, or if the SCO had a smaller queue than traditional checkouts, then they would have chosen to use a SCO. Customers who are then faced with having to wait for a SCO or for assistance in using a SCO, due to an operational failure may experience frustrations which could potentially lead to a theft.

Although queue size and availability were the most reoccurring answers to the use of SCOs or traditional checkouts, other factors influencing decisions were also identified from the questionnaire answers. The purchase size or number of items being purchased also appeared to strongly influence the method of payment chosen by the customer, "*I decide* [what checkout to use] *based on how much I'm going to buy*" (Male 26). When asked why they used traditional checkouts over SCOs the general answer implied that if a staffed checkout was available when the customer was going to pay, it was less effort for the customer to use them, than to use a SCO. If customers have a large shopping and plan to use a traditional checkout but have to use a SCO as there are no traditional checkouts available, then it could lead to dissatisfaction with their experience. Customer satisfaction have been linked to customer loyalty (Orel & Kara 2014), thus, reduced customer satisfaction could lead to thefts.

3.7.1.2.3 Factors influencing the disuse of SCOs

Customers stated that they would generally avoid SCOs if they knew they would require assistance, for example if they had alcohol or something with a tag and would require assistance to proceed with their payment, "*If I know there's something that's going to require someone to step in and do something with it then I will maybe sometimes go to a manned checkout*" (Female, 25). Similarly, when another participant was asked if there were any items that they would take to a SCO they stated, "*alcohol because if you are buying alcohol it's easier to just go to a till because if you go to self-service you have to wait on someone to come and check it for you*" (Female, 64). This was not deemed as a negative attitude towards SCO staff but rather related to the possibility of having to wait on assistance if they are busy. If customers have to wait on assistance at a SCO in order to proceed with their purchase it could result in reduced customer satisfaction and may lead to frustration which has been associated with thefts at SCOs (Beck, 2011; Taylor, 2016).

3.7.1.2.4 Customer perceptions of SCO staff

Answers relating to perceptions of SCO staff found that customers appreciated staff presence at SCOs when they required assistance, but stated that there is always a risk they will have to wait on assistance if the staff member is occupied. If they go to a staffed checkout they are guaranteed assistance and they know what to expect, "*Most staff are pretty good and helpful, if there are like 10 or 12 self-service checkouts and there's one member of staff and you have to wait you are better going to a manned checkout*" (Female, 37). All customers stated that they had an experience where a SCO had not worked properly and they had required assistance to fix it, "*Oh yes, when it doesn't recognise what I just scanned*" (Female 55). If customers have the perception that a SCO will be a quicker experience but are then held up due to operational failures that require staff assistance this could lead to frustrations. Operational failures may make customers aware of opportunities to blame the SCO for potential thefts and may encourage opportunistic behaviours.

3.7.1.2.5 Customers and SCO theft

Questions relating to whether or not customers had ever thought about stealing at a SCO were generally answered with an initial awkward laugh and then a comment like "*No…not at all*" (Male, 36) or "*No, I would be too afraid that I would get caught*" (Female, 64). All participants answered "*No*" in relation to being tempted to steal from a SCO.

3.7.1.2.6 Customer attitudes towards CCTV

Attitudes towards CCTV were generally that it was not an annoyance and it is socially accepted for surveillance. Customers did state that they knew CCTV would be present in a store but did not tend to feel "*aware*" of it, "*I'm never really that aware of it I think it's become so common that you are under CCTV wherever you go that you kind of forget about it almost*" (Female, 55). When asked if they felt an onscreen camera within the SCO would increase awareness, all customers stated that they would be more aware of CCTV. Current levels of CCTV are accepted but do not appear to deterring thefts as customers are not feeling aware of the surveillance within supermarkets.

3.8 Discussion

The present research aimed to examine customer decision points within a shopping journey, which influenced the choices made by customers, regarding how they paid for their items i.e. by SCO or by a traditional checkout. A qualitative approach was applied to allow for natural customer behaviours to be examined within a supermarket environment. The findings from the present study fall within the research area of customer behaviour science, marketing and design. These findings may enhance knowledge of the nature of dishonest behaviour with respect to SCOs, by identifying contributory factors, and inform improvements to self-service checkouts in light of the information gathered. They may also enhance knowledge regarding theories relating to social presence and theft.

The key points highlighted from the customer journey observations and interviews were that participants did not have pre-existing negative attitudes towards self-service checkouts. Their decision on whether to use them or not predominately came down to situational influences which determined the perceived convenience of either method of payment, to the customer (SCO or traditional checkout). This finding supports the research presented by McWilliams et al. (2016) and Wang et al. (2012) who state that statistically, regular checkouts are not chosen more than self-checkouts by customers and vice versa. The decision is more of a spur of the moment choice depending on the length of the lines and the possibility of wasted time. Similarly to their suggestion, the present research found that the convenience of the payment method had the strongest influence on method of payment, which was determined by situational factors relative to their experience. Queue size and availability were the most reoccurring answer to the use of SCOs or traditional checkouts. If a traditional checkout was available with no or little queue then customer tended to use it. Customers may have applied rational choice theory (RCT) to weigh up the pros and cons in relation to using a method and if the apparent positives outweighed the negatives, then it would encourage the choice (Becker, 1962).

Purchase size (number of items purchased) influenced customer decisions on where to pay as some customers felt that it was easier to purchase large numbers of items at traditional checkouts compared to SCOs. In relation to RCT, if customers had many

items and they viewed a traditional checkout that had little or no queue, the benefits of using it compared to a SCO could be: assistance in scanning their items, a larger area to put items to be scanned, a larger area for bagging and a cashier that is in control of the transaction thus if anything goes wrong they will be to blame. Specific shopping items were also found to influences customer decisions on where they should pay. For instance, items that would require assistance from a member of staff to either remove a tag or approve a sale were items that would encourage some customers to use a traditional checkout over a SCO. This again can be described in relation to the RCT as the potential negatives, such as having to wait on assistance, are difficult to determine thus they will outweigh the positives associated with SCO such as speed and efficiency as they will not be achieved if a customer has to wait.

The findings from this small sample size would suggest that the decision to use SCOs or traditional checkouts is a spur of the moment choice, however, further research using a larger sample size would be needed to generalise this finding. This finding is consistent with the "Spontaneous processing model" (Fazio, Sanbonmatsu, Powell, & Kardes, 1986), which centres on "spontaneous activation of the attitude upon mere observation of the attitude object" (p.232). This is the opposite to Fishbein and Ajzen's (1975) theory of reasoned action which describes decisions that are controlled and driven by existing attitudes. According to Curran and Meuter (2005), marketers would prefer consumers to act upon their attitudes i.e. controlled/reasoned action, thus have positive attitudes towards their products in the first place and have a clear vision to interact with this product.

Retailers would prefer customers to use self-service checkouts as they are more cost effective to the retailer than staffed checkouts, however, negative experiences at SCOs may reduce the likelihood of customers wanting to use them. For instance, customers stated that they would avoid using a SCO if they knew they would require assistance, for example, if they are purchasing an item with a security tag or alcohol which requires approval from a member of staff. This causes a degree of uncertainty associated with the current SCO experience as there is a possibility that the customer may have to wait on assistance from a member of staff if they are preoccupied. Customers having to wait longer than originally expected may cause frustrations which have been associated with thefts at SCOs (Beck, 2011; Taylor, 2016). If this uncertainty were to de diminished, for

instance customers' can complete their transaction on their own, then it may encourage customers to plan ahead for using SCOs, rather than it being a last minute decision influenced by convenience. Models such as the Theory of Reasoned Action (TRA), which states that attitudes and subjective norms combined influence an individual's intentions to engage in a behaviour, may be more likely to be applied by customers for use of the SCO, if they are aware of the type of service they will receive and their expectations can be managed in relation to the perceived experience. Processes that could be incorporated with the SCO experience to encourage use and reduced the level of uncertainty may include allowing customers to de-tag after payments have been made or to have age approval technology within the SCO somewhat similar to a self-service passport check at airports, which simply takes a photograph and scans the identification

The questionnaire question relating to perceptions of staff at SCOs found that customers generally welcomed assistance where it was required, however, the risk of having to wait on assistance had a negative impact on their perception of the ease-of-use of the SCO. The technology acceptance model states that use of a technology is influenced by its perceived ease-of-use and the perceived usefulness of the technology to the individual (Dabholkar & Bagozzi, 2002). If customers perceive that they may be delayed at a SCO by a failure in the technology or the requirement for approval then it is likely to reduce their perceptions on its ease-of-use and usefulness and ultimately reduce use of the technology. Retailers should be aware of the importance of promoting both the ease-of-use and the usefulness to the customer in using SCOs. However, it is important to consider the influencing factors of SCO use for those who are opportunistic users. If opportunists are able to see that SCO are busy and that the member of staff is likely to be occupied helping others, it could encourage them to use a SCO in an attempt to steal. Addressing common operational SCO failures that tend to draw the SCO staff member away from providing an effective level social presence, is likely to deter SCOs appealing to an opportunist.

Participants were asked if they had ever experience a SCO not working properly to which they all replied that they had and provided an example of when this had occurred. If this finding were to be replicated within a larger sample it suggests that customers are aware that there an instances that the SCO may not work properly, potentially highlight opportunities for theft. If customers have recognised this to be the case then it could be

the underlying reason behind customers using what Beck (2011) calls the self-service defence. The experiences mentioned by participants in the present research were mainly associated with errors in relation to weights within the bagging area, with some spontaneous examples of "unexpected item in the bagging area." All participants answered "No" in relation to being asked about temptations to steal from a SCO. This finding can be interpreted in two ways: one is that the participants had genuinely never considered stealing at a SCO; and the other is that they would not admit it to a researcher. The present research was well aware that participant would be unlikely to admit to potential thefts because not only would this be illegal, research shows that people want to be perceived in a positive manner when in the presence of others (Reynald & Elffers, 2009). Thus, they are unlikely to admit to something that is socially unacceptable. In respect of this the present research was mainly interested in aspects of the customer journey that influenced the use of SCOs and situational factors that influenced their decisions, to highlight potential areas influencing dishonest behaviours.

Customer attitudes towards CCTV primarily suggested that it did not bother them as it was socially accepted as a method of surveillance. However, customers did state that they knew CCTV was in stores, but they tended not to think of it and did not feel that they were being watched when they generally went into supermarkets. When asked if they felt an onscreen camera would make customers more aware of CCTV in store, they all stated that they believed it would. Additional themes (Appendix 18) highlights aspects of the customer journey which can be considered by retailers to increase customer perceptions associated with the *convenience* of using a SCOs.

Previous research from McWilliams et al. (2016) highlighted negative factors that may discourage the use of SCOs for instance the lack of personal interaction. Whilst this may discourage some customers to use SCO, it may encourage those who may try and steal i.e. SWIPERS (Taylor, 2016). Adler's and Brett (1998) theory of social interest states that social relationships can be enhanced by inducing connectedness, a psychological concept closely related to social presence. Adler and Brett (1998) states that connectedness underlies social behaviours and promotes social relationships. An awareness of another's presence whether it is needed for interaction or not has been discussed as being important for users of instant messenger to maintain a feeling of connectedness with others (Nardi et al 2000). This is similar to theories relating to mobile

phones as research from Townsend (2001, p.70) states that they are *"a pacifier for adults – it makes you feel connected, that you are not alone in the world"*. If companies induce a feelings of connectedness via technical methods, such as a personalized welcome message or an agent welcoming them, it could induce feelings of a social presence and have positive outcomes for users' and their relationship with the retailer –and potentially enhance pro-social behaviours (e.g. reduce theft). Customers may be more inclined to use SCOs and less likely to act opportunistically as they may feel that there is another intelligence that is aware of their behaviours.

One way in which a social presence has been implemented within ecommerce is via a recommender system. Recommender systems are able to identify products that may be of interest to customers by using information from their previous purchase history. Social presence in this sense is defined as the degree to which a medium allows the user to establish a personal connection with other users and has been shown to be an important factor in influencing attitudes of online customers (Kumar & Benbasat, 2006). Kumar and Benbasat (2006) showed that providing recommendations and customer reviews increased both usefulness and social presence of Web site for online shopping. Including social cues in the form of customer reviews and recommendations are said to contribute to feelings of comfort with the site and other users and adding a social presence to a recommender system is important for creating credibility and user trust in online shopping environments (Gefen & Straub, 2004; Kumar & Benbasat, 2006). Adding a recommender system to a SCO may produce similar effects on customers resulting in positive social interactions and reducing the likelihood for thefts at SCOs.

Social presence has been incorporated within technology via computer agents (Botha & Reyneke, 2013; Gefen & Straub, 2004). Computer agents come in many forms and are of increasing use as technology advances. For example, product recommendation agents (RAs) are there to simplify consumers' research and improve decision-making (Xiao & Benbasat, 2007; Zhu, Chany, Luo & Li, 2014). RAs refer to "software agents that elicit the interests or preferences of individual users for products, either explicitly or implicitly, and make recommendations accordingly" (Xiao & Benbasat, 2007, p.13). Social cues have been considered within research associated with promoting a sense of social presence within computer-user interactions for example within social media

where social presence relates to the need for users of technology-based communication to perceive each other as real people (Kear, Chetwynd & Jefferis, 2014). Social presence in mediated communication leads people to experience that communication as non-mediated and personalised which derives from how sociable, warm, sensitive, and personal users perceive the communication medium to be (Short et al., 1976). Therefore, if an effective level of social presence were to be incorporated within a SCO, then customers may experience feelings of warmth from the interaction. This is likely to enhance perceptions of the experience and influence use of them, according to the TAM (Daholkar & Bagozzi, 2002).

3.8.1 Limitations

One limitations of the present research that may be considered is the small sample size, however, due to the nature of the research being qualitative, the focus was on the in-depth analysis of customer experiences. Qualitative findings generally entail lengthy periods within the field which are also linked with lengthy periods of data analysis. The time to build a relationship with the supermarket was a lengthy process involving several meetings with the supermarket in order to make them fully aware of the research aims and objectives. This relationship building was necessary for the present qualitative research and explains the time scale associated with the research discussed. The research aimed at introducing aspects associated with SCO use and a typical customer journey which was achieved within the sample size used. Another limitation that is recognised is that the customer may have been influenced by the experimenter's presence throughout their shopping journey. Measures, such as withholding the true nature of the research, were taken to reduce their effect on customer behaviours by disguising the key objectives of the research i.e. the use of SCOs. The observations were overt in order to achieve participant consent, therefore, although this is a recognised limitation, measures to reduce the influence were acknowledged and applied to reduce potential effects.

3.9 Conclusion

The present qualitative study aimed at exploring the retail environment to gain insight into the use of SCOs and the factors that influenced thefts at them. The key findings from the customer observations and interviews suggest that customers may not have

pre-existing negative attitudes towards SCOs and the determining factors of their use of them can be a result of situational factors, affecting perceived convenience of either a SCO or a traditional checkout. Situational factors may also be influencing the likelihood of thefts such as, customer frustrations (Beck, 2011; Taylor 2016) reduced customer satisfaction (Orel & Karea, 2014) and reduced interaction with staff. All customers stated that they had experienced a situation where the SCO did not work properly and they had to receive assistance from a member of staff which could lead to frustrations and potential thefts. The potential role that a social presence could play within a SCO was also discussed. Current surveillance measures including CCTV appear to be discounted by customers. Customers are aware of staffs limited ability to monitor all of the SCOs as they highlighted that having to wait on assistance can be a deterrent of SCO use, if the machine does not work properly.

3.10 Summary of Chapter

This Chapter provides an introductory overview of customer perceptions in relation to SCOs. The Chapter examined research relating to customer perceptions of using self-service checkouts and factors which influence their use (McWilliams et al., 2016). Research from Taylor (2016), Beck (2011) and Beck and Hopkins (2016) was presented to introduce in detail the issue surrounding thefts that occur at SCOs and the types of thefts that occur. Qualitative research identified areas associated with customers either using or not using a self-service checkout and potential influences of dishonest customer behaviour. The findings suggest that retailers can influence the use of SCOs via the management of certain situational factors such as convenience. The importance of reducing operational failures which may be highlighting opportunities for theft was also discussed. SCO staffs' apparent inability to assist all of the SCOs may be deterring some customers, however, it may also attract opportunists who will take advantage of reduced social presence in order to steal. These findings fall within the research area of customer behaviour science, marketing and design. Identifying contributory factors to the use of SCOs can inform retailers of ways in which they can increase their use, whilst reducing the likelihood of thefts at them. In order to gain further insight into behaviours that may lead to thefts at SCOs, it is important to consider the perceptions of staff who work at them. The following Chapter will aim focus on staff perceptions of thefts at SCOs.

4 CHAPTER 4 Study 2 Staff Perceptions of Dishonest Behaviour at Self-service Checkouts

Self-service technology could be argued as creating less personal transactions when compared to traditional checkouts involving a sales assistant. The previous Chapter examined research relating to customer perceptions of using self-service checkouts, factors which influence their use and factors which may influence dishonest behaviours. Research was presented to reveal the issue surrounding thefts that occur at SCOs, the types of thefts that occur and the effects of limited staff presence (social presence) at SCOs (Beck, 2011; Beck & Hopkins, 2016; Taylor, 2016). This Chapter will consider self-service checkout staff perceptions on customer use, and misuse, of SCOs. The aim of this Chapter was to investigate the perceived influence of social presence at self-service checkouts by staff and its perceived effect on dishonest customer behaviour. Twenty-six self-service checkout staff took part in a series of semi-structured interviews to describe customer behaviours with self-service. With respect to actual physical social presence, staff reported that more customer thefts occurred when the self-service checkouts were busy and their social presence was reduced. Staff also reported that *perceived* and *actual* social presence is likely to reduce thefts. Future research will elaborate to which extent the perceived social presence via technological systems might support staff in their task to assist customers and reduce dishonest behaviour.

4.1 Introduction

As already discussed in Chapters 1 and 2, the wide implementation of self-service technology in retail provides a growing area of interest to assess social and psychological effects on consumers and staff. Retailers are replacing many traditional service delivery positions, usually conducted by a sales clerk, with self-service technology (Lee & Yang, 2013) that enable customers to engage in service transactions independent of direct employee involvement (Chen, 2005). Self-service technologies can assist consumer transactions Refer to 1.1 p. 42., and can reduce costs and raise productivity, as they utilize the consumers as co-producers (Hilton, et al. 2013). Self-service checkouts (SCOs) within supermarkets (see Fig. 6) typically involve a customer scanning or weighing their selected items, bagging them and paying for them, without

the assistance of a store employee. Supermarkets within the UK tend to have designated areas for self-service terminals, usually within close proximity to the store exit, containing between 4 and 10 self-service terminals and one member of staff supervising them. In the following sections we briefly review the role of SST use, followed by a discussion of the role of social presence in technology and a brief review of theories of dishonest behaviour, before describing our study.

4.1.1   Consumers and SST

Consumers are assumed to benefit from SST with marketing features of a reduced checkout time, faster service, and perceived privacy/anonymity (Hsieh, 2005). However, research suggest that additional factors influence their use. Kallweit et al. (2014) investigated why customers choose to use SSTs within retail, focusing on the technology acceptance model (TAM) (Davis, 1989). An essential component of TAM is the notion that the perceived usefulness and perceived ease of use influences customer decisions to use technology, which, in the case of SST, is associated with perceived service quality (Anitsal & Paige, 2006). Kallweit et al. (2014) found that perceived service quality of SST partially mediates attributions given to them, and the intention to reuse. The perceived likelihood of requiring assistance in the absence of staff is a critical variable influencing perceived service quality and has an effect on customer attitudes towards using or the intention to use SST (McWilliams et al., 2016). Convenience perceptions, defined as the perceived time and effort to complete a transaction, are the strongest influence on the potential use for users and non-users of SSTs according to Collier and Kimes (2013). This finding was also supported within the previous study. If customers' perceptions and expectations are not met when using SST then they will be less likely to use them in the future (Collier & Kimes, 2013). This theory is consistent with the Resource Matching Perspective, which suggests the expected resources needed to complete a transaction must be met during execution in order for the behaviour to reoccur (Anand & Sternthal, 1990; Collier & Kimes, 2013). As customer benefits are crucial to technology acceptance (Kinard, Capella & Kinard, 2009; Kallweit et al. 2014), it is important for retailers to promote the convenience that the SSTs can provide, which may include quicker transactions with easy to use interfaces that employ well-known control elements and gestures.
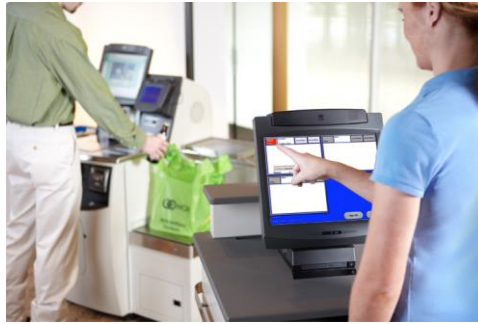
Figure 7 Showing Self-service Checkouts (SCOs) designed by NCR

While many studies have focused on the identification of factors that influence consumers' use of SSTs, such as convenience, ease of use and satisfaction (Collier & Kimes, 2013; Lee & Yang, 2013), there is a dearth of research on the perceptions of employees who work with the SST.

4.1.2 Employees and SCOs

Pietro, Pantano and Virgillo (2014) noted that employees and consumers are the effective users of SSTs, thus, it is important for research to consider both perspectives. Using a qualitative approach, Pietro et al. (2014) investigated employees' views on the use of self-service technology; self-service checkouts (SCOs) were reported to have resulted in an increased number of sales, and do a faster job than the traditional checkout, which enhances the service for the customer. Staff also reported enjoyment with increasing their knowledge and personal skills associated with the use of the technology, resulting in better support of customers in their interactions, which in turn provides benefits for the quality of the final service. This is also consistent with the work by Meuter et al. (2005) who described staff's personal growth in their abilities as intrinsic motivation, resulting from the use of SST. Interacting with customers at self-service checkouts is a good way of maintaining the personal interaction that was a fundamental part of the traditional sales clerk role. However, if self-service checkouts are busy, then this might affect how employees can interact with customers. This may result in reduced customer service and/or reduced level of social presence – a variable which may influence customer behaviour at self-service checkouts.

4.1.3 Social Presence

Social presence is a sense of being with another Biocca, Harms & Burgoon (2003) and creates the illusion in the mind of the perceiver that another intelligence, be it human or

artificial, exists within the environment (Romano, Sheppard, Hall, Miller & Mia, 2005). A review of the research literature suggests that the presence (real or imagined) of others could elicit thoughts that one is being evaluated (Miller & Leary, 1992). Bateson, Nettle and Roberts (2006) explored the effects of social presence on behaviour by alternating a picture next to an honesty box in which office staff placed money for tea and coffee. In the high social presence condition there was an image of a pair of eyes presented next to the box; in the low social presence condition, an image of a bunch of flowers was shown next to the box. High social presence induced people to behave less dishonestly compared to the low social presence condition: there was three times more money in the box when the poster with the eyes was shown compared to when the poster of a bunch of flowers was shown next to the box. Thus, even a perceived social presence in the form of eyes on a poster is sufficient to modify behaviour and it is reasonable to suggest that this effect might transfer to interaction with technology, as people treat computers as social actors (Reeves & Nass 1996), i.e., as if they were human. The perception of social presence can enhance human computer interaction and is especially important for technology that is designed to have limited human contact, while still maintaining a high standard of customer service (Kang & Gretzel, 2012). The quality of quasi-social interactions is often measured in terms of perceived social presence, which may modify an individual's behaviour (Zhao,2003) to, for example, communicate a positive self-impression (Baumeister, 1982). Thus, customer perceptions of social presence may be a useful way for reducing potential dishonest behaviours occurring at SST.

4.1.4   Dishonest Behaviour

Goodenough and Decker (2009) discuss theories behind what makes good people steal with respect to the nature/nurture debate. They suggest that emotions, such as empathy, play a part in the consideration of property, as we foresee how we would feel if our property were to be taken from us. Wispé (1987) described empathy as "the process whereby one person feels her/himself into the consciousness of another person" (p42). Lower levels of empathy have been linked to an increase in dishonest behaviours such as vandalism and theft (Jolliffe & Farrington, 2007). There is also a vast amount of research which suggests empathy is an essential component within customer service (Parasuraman, Berry & Zeithaml, 1991; Korczynski, 2001; Siddiqi, 2011). However, it is not clear whether the customer experiences empathy when using SST, especially when

perceived social presence of the technology (or staff) is low. This may impact on dis/honest behaviours at self-service checkouts.

Harmon-Jones and Mills (1999) suggested that creating a sense of personal responsibility results in people modifying their behaviour to align with their attitudes. Customers may feel less accountable for dishonest behaviour at SCOs, as they are not interacting with a sales assistant (a social presence), but instead are relying on technology to confirm they have paid for their shopping. Mohr, Cuijpers and Lehman (2011) state that there must be a social presence in order for there to be accountability; thus, incorporating a social presence within self-service technology may reduce the likelihood of dishonest behaviours occurring, as social presence may induce similar feelings to those experienced during a typical sales assistant interaction, i.e., personal responsibility for payment.

4.1.5   Self-service checkouts and dishonest behaviour

Beck (2011) explored the relationship between retail loss and self-scan checkouts to try to better understand the risks for retailers. As part of his research he evaluated staff awareness and perceptions of abuses associated with self-service checkouts. Store staff who had witnessed and been asked what the most common methods of theft at SCO's were, responded saying that customers not scanning items was the most prevalent form of abuse/theft at SCOs with 62% of respondents stating it. This was then followed by customers purposely selecting wrong items to get a cheaper price such as carrots when they have apples, followed by scanning and not paying. Beck (2011) also noted that one third (36% of 336) of SCO supervisors had caught someone stealing at a SCO. Staff stated that this occurred in various ways with most relating to the non-scanning of items with excuses including forgetting items in own bags or prams or scanning one item when there were four. Other forms of stealing had included walking without paying, stating either the machines had not worked properly or that it said the transaction was complete. Other methods which abused the use of a SCO system included entering codes to retain a cheaper price and putting reduced stickers from one item onto another to get a product for a much lesser price (Beck, 2011). When asking staff how easy they felt it was to steal at self-service checkouts Beck (2011) reported that 58% felt that it was not easy or it was difficult to steal at them. This was compared to 42% who felt it was easy or very easy to steal at SCOs. Those who thought it was not easy spoke of their ability to be vigilant and responsive to SCO alerts. Those who thought that it was easy to steal at SCO's felt that

they were unable to be consistently vigilant in supervising all checkouts whilst helping other customers. Beck's (2011) findings also suggested that there was a link between those who felt theft at SCOs was easy, and those who had previously witnessed thefts occurring, compared to those who felt it was difficult, who had not witnessed a theft at a SCO. This finding suggests that supervisor exposure to criminality may alter the perception of vulnerability of this technology. It also suggests that customers who have successfully stolen may be more likely to do it again once they have experienced the ability to do it.

4.1.6   The current study

A second qualitative study was conducted to assess staff perceptions on dishonest behaviour and also the role of social presence, as staff are at the forefront of having to deal with dishonest customers. We were particularly interested in how staff perceive their own presence and its effect upon customers, but also how supported staff would feel in their ability to supervise checkouts with the incorporation of an additional social presence, for example, induced by technology. Specifically, the aim of the present study was to investigate the perceived influence of a social presence at self-service checkouts by staff, and its perceived effect on dishonest customer behaviours.

4.2   Method

A qualitative approach was adopted involving prolonged immersion within four supermarkets. Interviews (Appendix 8) with self-service checkout staff explored their views on the effect of actual and perceived social presence on customer behaviour. Responses were grouped into two categories, i.e. regarding actual, physical staff presence at self-service and perceived social presence as created by technology, e.g., via cameras. Ad-hoc observations were made to create a fuller picture of behaviours at self-service checkouts.

4.2.1   Participants

Twenty-six self-service checkout staff, with an age range of 18-63 (8 male, 18 female, with 7 years to 6 months experience in supervising SCOs) from four supermarkets in the UK were interviewed during June-September 2014. Staff were recruited via convenience sampling, i.e., the staff that were available on shift on the days that research was conducted, were asked to sign up if they would like to part in the research.

4.2.2 Setting

The supermarkets, were situated within two town centres (with an average size of 68,000 square feet). Each store had at least 10 SCOs (with the most being 14 in one store). Two of the stores had one area positioned at the main door for all of their SCOs. The other two had two areas, one at the main door and the other nearer the back end of the store, both containing at least 6 banks of SCOs at each.

4.2.3 Materials

An Olympus VN-713PC Voice Recorder and an Olympus LS-20M HD Recorder were used to record participants' responses. A semi-structured interview was used to guide the interview. Verbatim transcription of all interviews was conducted enabling detailed inductive analysis. The supermarkets had designated self-service checkout areas, positioned in a rectangular layout.

4.2.4 Procedure

Ethical Approval was received from Abertay University's ethics committee. Before conducting the study, store managers from four major supermarkets within the UK were contacted via telephone, to request permission to access their store for the research to take place. Several meetings took place with various members of staff including personnel, managers and supervisors in order to explain what the research was about and permission to interview self-service checkout staff was granted. In the actual interviews, participating staff were also given the opportunity to pose questions to the researcher to explore the context of the study. All volunteering participating staff were asked to read and complete the information (Appendix 6) and informed consent forms (Appendix 7) before being interviewed. Participants were initially asked about general customer behaviours at self-service checkouts for example, "What are the most common mistakes made by customers at self-service checkouts" or "Do you feel self-service checkouts have affected customers at all"? Specific questions on dishonest behaviour were then asked such as "Have you noticed whether or not people steal at SCOs?" and "Do you feel various factors affect the likelihood of thefts occurring at SCOs?". Interviews took place in staff rooms, medical rooms, store cafes, and customer service desks or areas within their works premises-in line with the qualitative approach, collecting data within the setting of our group of participants. Interviews were paused if customers approached the area where the staff member was being interviewed. Participants were debriefed at the end of the interview.

With the permission of participants, interviews were recorded; a typical interview lasted about 20 minutes.

4.3 Results

The findings are described in relation to actual (physical) and perceived social presence in relation to dishonest customer behaviour. The findings for generic questions relating to customer behaviour at self-service are to be reported elsewhere. For each category, the relevant questions are listed in the graphs with frequencies of mentions by staff and shop.

4.3.1 Physical Social Presence

Fig. 2A shows responses to the question "Have you noticed whether people steal at self-service checkouts"? The majority 69%, of the staff had noticed people stealing even when there is an actual social presence of the staff member. Most staff spontaneously added that busyness at SCOs is one major component for the likelihood of thefts occurring. Typical comments were that staff are "*too busy watching other checkouts*" (male, 25), and that it was "*too hard for one person to watch all self-service checkouts when it is busy*" (female, 52). Another participant stated "*only one member of staff present at the self-service checkout, it can be hectic and can affect theft because you can only look after 2 at most*" (male, 65). This indicates that staff feel the task attention demanding, and are aware of the gap in customer supervision – or lack of social presence - related to the likelihood of thefts occurring.

A Have you noticed whether people steal at Self-service checkouts?

B Do you feel various factors affect the likelihood of thefts occurring at SSCOs?

C In what ways do people steal?

■ No. of counts
■ No. of shops mentioned in
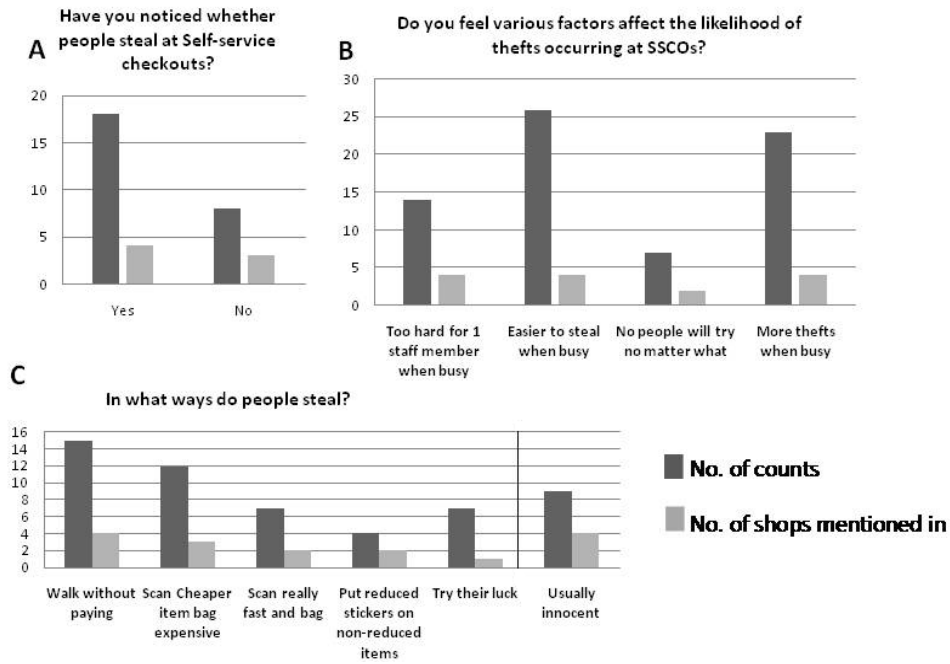
Figure 8 (A, B, C) Clustered Bar Charts showing the number of counts of themes from staff and shops, to questions regarding actual social presence

When asked "Do you feel various factors affect the likelihood of thefts occurring at self-service checkouts"? The majority of responses reflected busyness as the most critical factor (Fig. 7B), consistent with the answers to the previous questions. All staff interviewed said that it was "*easier for customers to steal when the shop is busy*" even when there was an actual social presence and most stated that "*more thefts occur when it is busy*". It was suggested that it is "*too hard for one person to watch all of the self-service checkouts when it is busy*" (male, 23). Staff also reported feeling pressured when the SCOs are busy as their attention is engaged elsewhere, for example, when helping an individual customer, thus, they are unable to watch for potential thefts occurring and this "*creates opportunity for theft*" (female, 22). One member of staff stated that the prevalence of thefts would be affected by the worker that was on as some of the "*part-time students didn't care if people stole*" (female 36).

We also wanted to explore the observed methods customers applied to steal items at self-service (Fig. 7C). However, the last bar on Fig. 7C titled 'usually innocent', points to thefts occurring without intent from the customer, suggest that operational faults may be responsible. Fig. 7C shows that the most common reported method of stealing was customers walking away without paying for their items. It was reported that many of the customers walking away without paying have initially put their payment card in the card terminal within the SCO, either in an attempt to pay or to deceive the staff member into

thinking they were paying. Staff reported being distracted by other customers and state that it is "*impossible to watch them all at the same time*" (male, 45). The second most common method of theft reported by staff was customers scanning cheap items but bagging expensive items in their place. Customers were reported to be scanning items really fast in attempt to steal items so that their weights would not be detected. Customers also put reduced stickers from one item onto a more expensive item that has not been reduced. Additionally, staff reported that some innocent mistakes were made by customers in relation to weighing products at SCOs; for example, one comment indicated that stealing was committed "*not on purpose - it was caused by weight issues*" (female, 24).

4.3.1.1 Physical social presence key findings

To summarise, three major components are reflected in the data: staff perceive most but not all customer thefts as intentional, even in the actual presence of staff; staff are aware that attending many customers imposes attentional limitations on their ability to meet the supervisory or customer assistance demands, due to a lack of social presence; and finally, staff perceive a grey area (see Appendix 13 &14) where customers are not intentionally stealing; instead their behaviours are explained as being a result of the SCO's technological setup.

It could be suggested that identified attempts to steal items with intent suggests that customers do not feel they will be accountable, which is consistent with the various theories (Dooley, Pyzalski & Cross, 2009; Mohr, Cuijers & Lehman, 2011) on the occurrence of dishonest behaviour that explain thefts, not only at SCO, but also during traditional sales interactions (Jolliffe & Farrington, 2007). It is noteworthy that staff acutely perceive that their actual presence is insufficient to deter thefts.

Staff were also asked "Do you feel you can tell when someone is going to steal at a self-service checkout"? This highlighted some behaviours shown by customers which staff associate with an increased likelihood of thefts occurring. For example, some staff members reported certain customers' "*body language is an indicator*", as people can "*become shifty, looking around the SCOs*" (female, 26). Some staff members stated that

if a customer were to go to the furthest checkout away from the staff member that it would make them more aware of that customer's behaviour, and more likely to keep a closer eye on them. Customers who state that they no longer want an item after there has been a weight issue, due to an item not being scanned properly and then bagged, were reported by staff to have been likely to have been trying to act dishonestly. Staff reported that they can ask to check customers' shopping bags if they suspect dishonest behaviour, however, if the customer has not left the shop with an unpaid item then it is not considered to be theft and they cannot be prosecuted without clear evidence of intent to behave dishonestly.

4.3.2   Perceived Social Presence

In order to gauge how staff would assess the effect of a perceived social presence on customers they were initially asked "Do you feel that if customers felt they were being watched it would have any effect on the likelihood of thefts occurring?" (Fig. 8A).
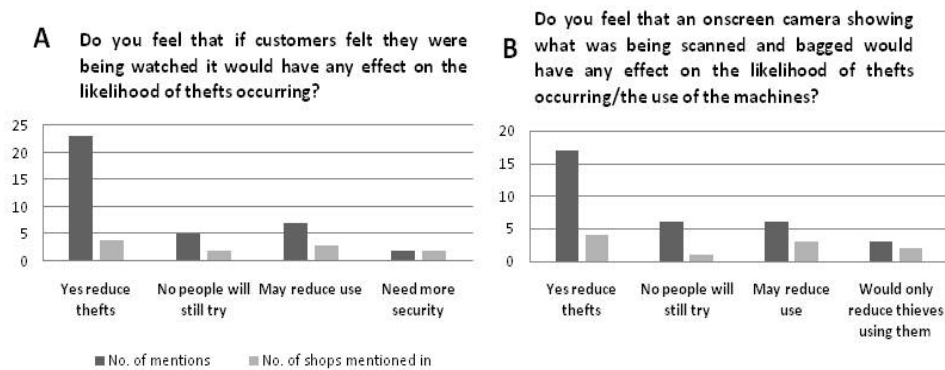
Figure 9 (A, B) Clustered Bar Charts showing the number of counts of themes from staff and shops to questions regarding perceived social presence

The majority of staff reported that this might likely reduce thefts. More specifically, staff reported that if customers felt they were being watched then it would reduce thefts occurring as they would feel "*less likely to get away with it*" (female, 46) or "[they] *would feel paranoid they will get caught*" (female, 26). This suggests that these staff perceive customers' perceptions of being watched effective in reducing the likelihood of thefts occurring, and raises questions as to how this social presence can be induced – either by the presence of more staff, or via technological implementations.

To explore the latter, staff were asked "Do you feel that an onscreen camera showing what was being scanned and bagged would have any effect on the likelihood of thefts

occurring?" (Fig. 8B). The majority of staff reported that they felt an onscreen camera would reduce thefts at SCOs, which was illustrated by the comment that "*if customers could see it and were more aware they were being watched it definitely would reduce thefts*" (male, 53).

4.3.2.1 Perceived social presence key findings

To summarise, there were two major components reflected in the data: staff believe that the general perception of being watched (social presence) can modify behaviour to reduce the likelihood of thefts occurring; staff also perceived a potential for the technological implementation of social presence at SCO to be helpful, for example, via an onscreen camera.

4.4 **Discussion**

The present research was conducted to explore staff perceptions on social presence, as perceived social presence appears to be a critical factor in customer behaviour. There was a particular interested in how staff perceive their own presence and its effect upon customers, but also how supported staff felt in their ability to supervise checkouts with the potential integration of an additional social presence, for example, induced by technology. Specifically, the aim of the present study was to investigate the perceived influence of a social presence at self-service checkouts by staff, and its perceived effect on dishonest customer behaviours.

Although there is always an actual social presence with a member of staff at SCOs, the present study found that staff perceive themselves to be limited in their capacity to create the same sense of social presence when SCOs are busy, which they perceive leads to a greater risk of thefts occurring. This finding is consistent with research from Beck (2011) who found that some staff reported being unable to be as vigilant when it was busy. Staff also reported feeling under pressure when self-service checkouts are busy as they are impaired in their ability to watch for thefts and customer problems, maintain a high level of social presence at the same time as assisting customers. Pietro et al.'s (2014) study found staff reporting feeling more satisfied at work when working with SCOs as they could provide a "better" final service. This may not be possible if staff are feeling pressured due to the perceived high risk of thefts at SCOs when they are busy. Implementing a social presence within a self-service interface may increase the sense of

social presence but also maintain a high level of customer service, as the customers can feel supported throughout their transaction by it providing the impression that help is at hand. This may also enhance the likelihood of staff feeling satisfied with their work and increase levels of employee job performance, as they may feel supported in giving assistance to customers. Beck (2011) found that staff who had more checkouts to supervise felt less able to effectively supervise them. He found that 54% of those supervising 4 checkouts stated they could effectively supervise them, 37% supervising 6 SCOs, and only 18% with 8 or more SCOs to supervise. Becks (2011) findings suggest that staff begin to struggle if having to monitor more than 4 SCOs, especially at busy times. This is consistent with our findings as staff feeling unable to create an effective level of social presence when monitoring SCOs when the shop is busy. It should be noted that none of the supermarkets within the present research involved a member of staff supervising less than six SCO at one time; therefore it could be argued that they are constantly under pressure of not being able to effectively perform their role.

Most staff agreed that theft would be reduced if customers felt they were being watched generally. This is consistent with Baumeister's (1982) theory which stated feeling the presence of others can lead individuals to alter their behaviour in a manner that communicates a positive self-impression. This view was underlined when the majority of staff agreed that an onscreen camera on SCOs would reduce the likelihood of theft. Thus, staff perceive that they could be assisted by a social presence implemented in technology. It is noteworthy that a social presence may be created via closed-circuit television (CCTV) in stores and, thus, should already be perceived by customers. However, only two members of staff made references to CCTV in relation to the question "Do you feel that if customers felt they were being watched it would have any effect on the likelihood of theft occurring?", although all participating stores in this study used CCTV supervision. This sample suggests that most staff do not perceive CCTV to induce an effective social presence on customers. There is considerable research to suggest that CCTV has become over-familiar to customers and that it no longer upholds its crime reduction effects (Beck & Willis, 1999). An onscreen camera at self-service checkouts may be a more effective way of reminding people that they are under direct, i.e., one-to-one, surveillance and create an effective sense of social presence to result in less theft occurring.

Within this context it is also important to point out that the perception of one's own presence can affect behaviour. The self-focused attention theory (see section 2.3.1 p. 74) refers to an individual considering their internal standards and making sure their behaviour is consistent with these standards (Beaman et al., 1979). The findings suggest that increasing self-awareness, and perhaps sense of social presence, via use of a mirror, encourages them to behave in an honest manner (Beaman et al., 1979). An onscreen camera at SCOs displaying the customer's interaction with the SCO via its interface may likewise enhance customers' self-awareness and sense of social presence.

Staff reported that some thefts were actually innocent mistakes made by the customer due to the interactions with the SCO, mainly weighing items. Genuine mistakes can happen when using SCOs, perhaps due to lack of experience with the system, thus clear instructions on how to use SCOs may prevent this from happening. According to TAM if customers have a negative experience with self-service technology it can influence their reuse of them. However, the potential for faults or a challenging transaction process at SCOs may be encouraging opportunists to use them as the customer can blame any un-scanned items on the technology, masking their intention to steal, and reducing the feeling of responsibility. As highlighted within the previous study, frustration may be experienced by the customer if the SCOs are not operating in a straightforward manner, which may lead to dishonest behaviour such as bagging un-scanned items. This is consistent with the "frustration factor" (p.14) stated by Beck (2011) and is recognised by staff in the current study as a potential reason for thefts. It is reasonable to assume that frustration potentially provides the customer with a reason to justify their dishonest behaviour, which Beck (2011) defines as the "self-scan defence" (p14). Customers may apply neutralisation techniques to their behaviour to justify reasons for committing a theft if they have had a negative experience, i.e. I didn't pay for the item as the machine would not let me scan it. It could be argued that customers who do not pre-plan to act dishonestly at self-service checkouts, but may be influenced by frustration, would be likely to be influenced by a social presence, as it would encourage them to behave in a socially accepted manner, reducing the likelihood of thefts (Harmon-Jones & Mills, 1999). A social presence in the form of an onscreen camera at SCOs may result in customers feeling accountable for their actions, as social presence induces a sense of accountability (Mohr et al., 2011) and increase self-awareness (Beaman et al., 1987). Future research will

address the aspects of social presence and possible manifestation in the context of technology.

4.5 Conclusions

The findings from this study suggest that the effect of social presence on customer behaviours deserves more exploration. Actual staff presence should consistently induce a sense of social presence, however, this is not perceived by staff to be sufficient within self-service. The present study found that the presence of numerous customers increases the perceived likelihood of theft. Arguably, it can be suggested that a greater number of staff members would reduce the likelihood of thefts occurring. Therefore, the effects of staff density and perceived identity (staff or customer) within a SCO area on social presence require to be further investigated. There is also uncertainty as to whether or not customers are intentionally stealing at SCOs or whether thefts occur due to aspects of the technological setup, providing justification for dishonest behaviours via neutralisation techniques (Sykes & Matza, 1957). Future research will elaborate to what extent the perceived social presence via technological systems might support staff in their task and will explore customer views. This may benefit future interactions for the retailer, staff and customers, and encourage businesses to obtain SST to enhance their productive potential.

4.6 Chapter Summary

This Chapter introduced staff as both users of SCOs and as a form of social presence at them. Difficulties that staff experience in promoting an effective level of social presence were presented and methods of customer thefts were highlighted. As there is generally only one member of staff watching over several SCOs, they reported to feeling limited in their ability to promote an effective level of social presence. Supermarkets tend to apply additional methods of social presence as a form of surveillance via security guards and CCTV. The following Chapter will present literature relating to the loss or "shrinkage" that retailers experience as a result of thefts. Perceptions of CCTV as a deterrent of theft will be discussed accompanied by qualitative findings from interviews with security guards in relation to their perception of thefts at SCOs.

5 CHAPTER 5 Study 3 Social Presence and Dishonesty: Perceptions from Security Guards

The use of self-service, due to its nature of reducing social interaction between customers and staff, has been implicated in creating opportunities for thefts to occur. However, the perception of social presence, such as induced by surveillance, induces customers to show more pro-social behavior. As security personnel are at the forefront to deal with dishonest customers, this Chapter will introduce research discussing measures of surveillance and the impact that thefts can have on shrinkage. The research includes semi-structured interviews with security guards in two major supermarkets in the UK to assess factors surrounding theft, with a view to identify operational or technological opportunities to address theft. Findings show that the perceived motivational and situational factors contributing to theft are complex. This study concludes that surveillance in its current form does not appear to provide a sufficient social presence to prevent potential theft at Self-Checkouts (SCO). The findings suggests that future research could focus on additional surveillance measures to induce social presence, such as technological implementations in the SCO itself.

5.1 Introduction.

Self-service technologies have been increasingly adopted over the past two decades (refer to 1.1 p. 42). The main driver for this is to offer speed and convenience to the consumer. Within retail, self-service checkouts (SCOs, see Fig. 9.) enable customers to scan, bag and pay for their items, often without assistance from staff. For convenience, SCOs are usually located near to the shop exit, as their use typically represents the completion of a customer's shopping. Retail staff involvement at the SCO area is limited to assisting customers, for example, to approve the purchase of age restricted items, such as alcohol, or to help with any technological issues. The effects of this overall lack of interaction with a member of staff (social presence) at SCOs is of growing interest to criminology and consumer behaviour researchers, as it opens new avenues of conduct for customers (Beck, 2011; Dabholkar & Bagozzi, 2002). Leading theories from social psychology have previously influenced the social setting within a retail environment from opportunities of interaction with staff to awareness of security to the proximity to other customers (Harrell,

et al., 1980; Nicholson, Clarke & Blakemore, 2001; Stoltmant, Morgan & Anglin, 1999; Uzzell, 1995; Willis 1990).

Figure 10 Showing Self-service Checkouts (SCOs) designed by NCR

However, the introduction of technology to the retail sector has been implicated as creating opportunities for theft (Beck, 2011). Nevertheless, there is little research available regarding the prevalence of theft or shrinkage in stores who adopt self-service compared to those that do not (Beck & Hopkins, 2016), and many companies do not share their findings (Beck, 2011; Beck & Hopkins 2016). However, a recent Home Office (2015) survey has shown that stores that use SCO are more likely to experience theft than those that do not. Given the increase in the use of self-service technology globally, the benefits of self-service far outweigh its costs. At the same time, and for the benefit of retailers, there is a need to understand potentially novel forms of dishonest behavior arising from the use of new technology. The following section will introduce the issues relating to shrinkage and present one of the motivations for research focusing on reducing retail thefts.

5.1.1 Shrinkage

Shrinkage or "shortage" is usually measured in the value of stock loss as a percentage of the retail turnover (Beck & Palmer, 2010). Shoplifting is a big threat to the retail industry along with internal thefts, processing failures and intercompany fraud (Beck & Palmer, 2010). Specific research on loss directly generated by thefts at SCOs is difficult to obtain as many companies do not share their statistics on it (Beck, 2015). Beck and

Peacock (2009) gathered available data and concluded that globally, shrinkage is costing the retail industry $278 billion a year, or 1.65 per cent of retail turnover (Beck, 2011). Beck (2011) states generally the key cause of shrinkage has been viewed as a result of external thieves although global estimates vary. He provides an average across recent surveys suggesting that external theft accounts for 35 % of shrinkage with the remainder being a result of internal theft (33%), process failures and inter-company fraud making up the remaining 32%. The National Retail Survey estimated that 35.9% of retail loss was due to shoplifting (Hollinger & Adams, 2009). Getting reliable statistics on loss is challenging as retailers have to guess where their shortage has gone therefore the percentage applied to external thefts may be much higher and remains the main encourager in the loss-prevention agenda (Beck, 2004).

5.1.1.1 Self-service checkouts and shrinkage

Beck (2011) also suggests that SCOs provide an attractive opportunity for deviant behaviour, yet the technology is unable to monitor this. Self-service checkouts are unable to identify the non-scanning of items or the false declaration of certain items such as weighted goods. This reduced the risk of being caught stealing at a SCO may be appealing for professional thieves or an opportunistic customer if they apply the Theory of Rational Choice which states that if the behaviour results in benefits that outweigh the costs then the behaviour is likely to occur (Becker, 1968). Until SCO are able to identify dishonest behaviours retailers still rely on security guards and staff to detect thefts at SCOs. The introduction of SCOs within a retail environment is aimed at reducing the costs for retailers in the long run. Since staff and security guards are still required to detect when thefts are occurring, these objectives in relation to staff savings cannot be met fully until they are independently able to detect when deviant behaviours are occurring. Thefts will also affect other customers' shopping experiences by increasing the likelihood of items being out of stock (Beck & Palmer, 2010). More recent research from Beck (2015) suggests that the SCO impact on shrinkage is neutral, however, losses that were traditionally found at staffed checkouts are now occurring at SCOs. Furthermore, SCOs provide more opportunities for theft than the traditional staffed checkout as a result of the lack of surveillance from a member of staff which generally occurred at a traditional checkout. One of the basic principles behind situational crime prevention is to reduce the opportunities for criminal behaviour to occur (Cornish & Clarke, 2014) which has been associated as a factor that can lead to

crime (Hayes & Cardone, 2006). Therefore these must be identified and managed efficiently to reduce the risks of theft at SCOs. Store managers could instruct security guards and staff to watch specific locations in their surroundings, rather than them all trying to watch everywhere, as they will be unlikely to give effective levels of attention to a large location to identify dishonest behaviours.

Taylor (2016) discusses Beck and Peakcock's (2009) research on retail shrinkage of $119 billion annually, associating shrinkage with four main types of theft including: external theft (theft by customers), internal theft (theft by employees), internal or administrative errors, and inter-company fraud. The *Global Retail Theft Barometer* (2015) found that shoplifting was the key cause of shrinkage in Europe, the Asia Pacific and Latin America in 2013/14 and 2014/15, while in North America, dishonest employee theft was the main contributor" Taylor (2016, p3). Similar to Taylor (2016) the present research is focused on external thefts by customers, such as "shoplifting" defined as "theft from the selling floor while a store is open for business" (Francis, 1979:10). Taylor (2016) discusses recent research on from the British Retail Consortium's Retail Crime Survey which indicated the annual number of customer thefts per 100 stores had increased by 5% from the 2012 rate and that 2013 had the highest number of shop thefts in the past 9 years (British Retail Consortium, 2014). This statistic may be a result of increase in occurrence of customer thefts - it could also be interpreted as a growth in the number of offenders being prosecuted, and therefore may just be a measure of an increase of recognised thefts. It may also be due to offenders stealing more valued items or it could be an increase of offender's altogether. This could be a result of the steady increase of SCOs which has steadily increased over recent years. The exact impact of SCOs on shrinkage remains unclear (Taylor, 2016; Beck, 2015). Some research states that it increases the chances of theft by 5 times when compared to traditional checkout transactions (Krasney, 2012) whereas other research states that it has little effect (Beck, 2011). Then there is the dismissal of "sweethearting-the unauthorised giving away of goods without charge to a friend, co-worker or family member-has been estimated to cost the industry nearly $80 billion dollars annually" (Taylor, 2016 p.13). SCOs could potentially diminish the ability for sweethearting to occur if they are able to perform on their own without the need for staff assistance reducing the ability for staff to "allow" customers to steal. In-depth knowledge regarding statistics of shoplifting is unclear due to its nature and the fact that only a

small number of shoplifters are apprehended and prosecuted (Bamfield 2012; Krasnovsky & Lane 1998). Customers of SCO, who attempt to steal and get caught, can say that it was a mistake or blame the technology for not working properly which can be difficult to evidence as intentional thus they are more likely to receive a warning than get apprehended by police (Beck, 2011).

Research from the UK Home Office (2015) displayed findings from the Commercial Victimisation Survey (CVS) which included a section on SCO revealing that supermarkets with self-service tills were significantly more likely to experience shoplifting than those without. Taylor (2016), highlights that 86% of supermarkets with self-service tills were victims to shoplifting compared to 52% of those without SCOs. This finding suggests there is a positive correlation between SCOs and increased levels of shoplifting. The research discussed suggests that SCOs increase thefts by customers and, in particular, they increase thefts from customers who would not normally steal by any other means (Taylor, 2016). Taylor (2016) describes this new type of shoplifter, created by SCOs, as the SWIPERS. SWIPERS are those who act maliciously at SCOs, such as deliberately not scanning items, but are also those who are non-malicious but may incorrectly scan items or sit an un-scanned product in the bagging area due to a confusion or frustrations. In the following sections, we will briefly review the research on customer dishonesty, the effects of surveillance and social presence, followed by a description of our study.

5.1.2 Customer Theft

Recent estimates suggest that customer theft accounts for 35% and internal theft for 33% of shrinkage, with process failures and inter-company fraud making up the remaining 32% (Beck, 2011). The figures appear favorable or even stable, compared with earlier estimates reported in 2004 (Bamfield, 2004) of 48% (Europe) and 31% (US) shrinkage attributed to customers, and 40% in 2002 (Hollinger & Davis, 2002) and 1984 (Baumer & Rosenbaum, 1984), respectively. Figures may vary across the years and more widely by country (Bamfield, 2004), however, it appears reasonable to suggest that shrinkage has been and continues to be an ongoing challenge for retailers. This is also reflected in the earlier estimate that as many as 60% of customers have said that they have shoplifted at some point in their lives (Klemke, 1982; Kraut, 1976). There is an ongoing need to

investigate and address underlying factors for shrinkage, and explanations may be sought from theories in criminology.

The Rational Choice perspective (Becker, 1968; Cornish & Clarke, 2014) focuses on contextual factors and decision making, rather than the psychological profiles of offenders to explain the motivation of crime. It suggests that potential offenders weigh up the costs and benefits of committing a crime, and make a rational choice based on the dominance of one factor. In the context of SCOs, customers weighing up the likelihood of being detected stealing may be inclined to take the risk, as they can blame any wrongdoing as a fault of the machine or process if they are caught, which Beck (2011) defines as the "self-scan defence" (p. 212). Thus, the perceived cost of being caught may be reduced as the system may potentially be blamed for any 'mistakes' due to operational factors.

Extending the idea that decision making is the critical component in committing crime, the Crime Triangle put forward by Clarke and Eck (2014) suggests that the occurrence of a crime depends on three factors: 1) a target with opportunity available, 2) the ability to obtain a product in a specific place, and 3) the desire of the offender to complete the crime. Eliminating one of these factors may prevent the crime. For example, increased surveillance, security tags, and employee positioning can address available opportunity.

5.1.3 Surveillance and Social presence

The perception of a social presence within retail has been one of importance for both security reasons and for promoting feelings of comfort and safety for the customer (Kajalo & Lindblom, 2010). There has been an increasing number of surveillance measures to reduce crime within retail over the past few decades (Welsh, et al., 2010) indicating that theft continues to be an ongoing issue. The perception of a social presence within a retail environment is viewed, by store managers, as effective in reducing thefts within shopping centres (Kajalo & Lindblom, 2010). Historically, counteracting theft in retail has been addressed by introducing a social presence in a variety of ways including formal surveillance, e.g., CCTV, the presence of security guards and staff, or informal surveillance, such as mirrors or lights, to maximize visibility and encourage positive social interaction (Reynald & Elffers, 2009). The importance of surveillance is also evidenced by the finding that shoplifters themselves

perceive formal surveillance as one of the biggest deterrents for stealing (Carmel-Gilfilen, 2013).

5.1.4   Social Presence

The presence of others influences our behavior in everyday activities. Social presence has been defined as the perception of another real or imagined being or psychological involvement with something or someone in mediated communication (Biocca et al., 2001; Short et al., 1976) but definitions vary (Lowenthal, 2009). The influence of a social presence on human behaviour has been of interest to social psychologists as it has been found to influence human behaviour, specifically within a retail context (Gefen & Straub, 2004; Argo, Dahl & Manchanda, 2005). The factors and conditions that influence human behaviour whilst in the presence of others has been of interest to research as they play an informative role within academia (Rourke, Anderson, Garrison, & Archer, 2007), marketing (Dahl, Manchanda, & Argo, 2001), and interaction design (Gunawardena, 1995). This thesis builds upon research and theories in the fields of social psychology with the addition of consumer research and computer science to propose a working definition of social presence and the perceived social responses that it could produce. In the context of this study we use the definition of social presence in the widest sense as the perception of another. Social presence induces individuals to alter their behavior to give a positive impression (Reynald & Elffers, 2009) or increases self-awareness linked with pro-social behaviors (Bateson et al., 2006; Nettle, et al., 2013; Pfattheicher & Keller, 2015). The presence of others, such as other customers, even if we do not interact with them, may still influence our behavior (Argo et al. 2005; Dahl et al., 2001) and may influence decision making in a retail context (Ahmad, 2016). Social presence can also be introduced by virtual characters or embodied agents (as co-presence) (e.g., Bailenson et al., 2005) affecting human behavior. Thus, we would expect that the perception of a social presence on the part of a customer – even in the absence of direct interaction with staff - would increase the likelihood of honest behaviors to some extent.

Social presence - or its absence - may be relevant from two perspectives for the current study. Firstly, to the extent that customers may perceive a reduced social presence at a SCO itself due to limited staff interactions, the likelihood for pro-social behavior may decrease, resulting in a higher likelihood of dishonest behaviors.

Second, as already mentioned, historically, social presence has also been induced by the introduction of formal surveillance, such as CCTV and security guards, which may affect customer behavior. However, research findings are often inconclusive with respect to the effectiveness of formal surveillance to affect crime (Cozens, Saville & Hillier, 2005).

5.1.5 CCTV

Formal surveillance, such as represented by CCTV and store security guards, have been popular methods used to deter thefts for many years and are seen to be effective by managers (Kajalo & Lindblom, 2010). Pretious, Stewart and Logan (1995) discussed the use of several methods of theft prevention within the area of Dundee and managerial attitudes towards them. Managers' preferred "physical" deterrent for theft was found to be CCTV although there are some recommendations regarding installation in relation to their responses. Managers stated that some systems were designed with the control panels back of house which meant that they were not always able to be monitored due to insufficient staff numbers thus they should be accessible front of house. CCTV generally produces recordings and managers state that it is not practical to watch hours of video footage. They reported that footage did prove useful *after* known incidences of theft occurred, and were viewed as effective surveillance.

Security guards are required to detect thefts and rely on CCTV for confirmation of a theft. Beck and Willis (1999) state that opportunistic thieves are likely to weigh up the odds of getting caught before engaging in offending behaviour. If the consequences and likelihood of being caught are less than the potential benefits of the stolen product then the theft is likely to occur. Previous research suggested that self-service checkouts tend to have one member of staff present and there tends to be one security guard monitoring the entire shop floor (Creighton et al. 2015). Staff felt that CCTV onscreen a SCO would produce a greater social presence than the current design in stores (Creighton et al. 2015). Self-service checkouts cannot detect certain types of theft and they rely on human detection of dishonest behaviours. This can be problematic as security guards and staff members are not always able to watch everyone at the SCOs or monitor CCTV continuously. Customers weighing up the likelihood of being caught may be more inclined to take the risk at SCOs as they can blame any misdoing on the machine not working correctly if they are caught. Beck and Hopkins (2016) call this excuse the self-scan defence. Retailers use CCTV as a deterrent as it aims to increase potential

offenders' perceptions of the likelihood of being caught (Beck & Willis, 1999). Beck and Willis (1999) argued that customers may have become inured (Beck, 2015) to traditional CCTV and it may no longer be an effective measure of theft prevention, although it may still be useful for confirmation of a suspected theft. As intentional shoplifters perceive formal surveillance as a major deterrent, they are highly intent on avoiding it (Carmel-Gilfilen, 2013), giving credence to its effectiveness; if CCTV can be avoided though, its efficiency as a deterrent will naturally be impaired.

5.1.6 Security Guards

Security guards are the most widespread and recognizable form of surveillance to prevent crime in public places (Sklansky, 2006). Kajalo & Lindblom (2010) reported that security managers perceive the use of store security guards to be the most effective formal surveillance method. The effectiveness of the use of security guards as a social presence in crime prevention has been explored in previous research (Welsh et al., 2010), however, their effectiveness after the implementation of self-service technologies has not yet been fully evaluated. As security guards are a vital element of store security, this research considers their perceptions of customers and their role in relation to customer theft at self-service checkouts. We were particularly interested in how security guards perceive customer behavior surrounding theft, how supported security guards feel in their ability to supervise checkouts, and their thoughts on technological implementations to support their role. The findings from the research may enhance knowledge of the nature of dishonest behavior at SCOs, and inform technological or operational opportunities. This knowledge may ultimately lead to the identification of measures that can support security and store staff in their role and reduce shrinkage for retailers.

5.1.7 Other deterrents of theft

Many attempts at reducing shoplifting within retailer have been tried and tested for instance Electronic Article Surveillance (EAS) such as tags on clothes that generally get removed at the point of purchase by a store employee. This method of surveillance has been associated with various negative aspects including false activations of door alarms due to a number of reasons: staff not properly removing tags from items, customers entering the store with tags from others stores which set off the alarms, tags reactivating themselves (Beck & Palmer, 2010). False activations cause employees to be less

reactive to the alarms as they have lost confidence in the system (Beck & Willis, 1995). Self-service checkouts come with their own challenges when it comes to de-tagging items that have been scanned by the customer. This makes it more likely for a tag to be (or not to be) removed by mistake, which in turn could set off the door alarms even when the items have been paid for. The EAS hard tags were also negative perceived as being unsightly and damaging to clothing during the removal of them. These factors contributed to the design of discreet sown-in tags for clothing etc. Research showed that introducing the newer design of sown-in source EAS tagging on items reduced damage to items when being removed however, negatively affected shrinkage. This was attributed to sown-in tags being easier to remove compared to hard tags. There was an increase in employees stealing as they were able to remove the tags more discreetly, resulting in internal thefts doubling from an average of 44 cases a month costing $26,000 to 90 cases a month costing $55,000 (Beck & Palmer, 2010). Employees were also found to tell friends the logistics of how to remove tags from clothing items and where they can be found within garments. These tricks of the trade can then be fed into the wrong hands and can be abused by professional thieves. Professional shoplifters have also discovered ways to beat the system of EAS such as lining shopping bags with aluminium foil as the foil then stops the tags being detected when leaving the store. Thieves have also been known to set the alarms off on purpose to distract security allowing other thieves to leave with stolen items. EAS systems are costly for the retailer and inconvenient when they do not work as they should thus there is scope for measures of security with retail to be enhances. As technology increases and SCOs increase within retail, perhaps security measures within SCO should be considered. Reducing the opportunities for thefts to occur has been suggested as the most important factor in situation crime prevention research.

5.1.8   Situational crime prevention

Situational crime prevention was originally developed after research on correctional treatments in the 1960s and 1970s by the Home Office Research Unit, the British government's criminological research department (Clarke and Cornish, 1983).This research highlighted a technique for the management of misbehaviour called "opportunity-reduction," and suggested that it should be a topic for further research. Their research focussed on rehabilitation and found that the probability of a youth absconding or re-offending while resident in a probation hostel was dependent to the

nature of the institutional regime that they were exposed to rather than their personality or background (Tizard et al, 1975). The institutional regime identified opportunities for misbehaviour than could be "designed out."

Situation Crime prevention is defined as:

"Situational prevention comprises opportunity-reducing measures that (1) are directed at highly specific forms of crime, (2) involve the management, design or manipulation of the immediate environment in as systematic and permanent way as possible, (3) make crime more difficult and risky, or less rewarding and excusable as judged by a wide range of offenders" (Clarke, 1997 p.4)

Situational crime prevention offers "discrete managerial and environmental change to reduce the opportunity for crimes to occur" (Clarke, 1997 p.2). It focuses on the situation that the crime may occur in rather than the individual committing the crime. There are many successful measures of situational crime prevention methods that reduce opportunities for crime including; electronic access to cars, record keeping of stock within warehouses, surveillance in car parks and traffic controls in residential areas. Introducing technologies such as CCTV was also done as a method of situational crime prevention in subways in an attempt to make criminal behaviour less attractive by increasing the chances of being caught. All of these strategies aim to reduce opportunity for crime, making it less appealing to potential offenders.

Situational crime prevention techniques can be a practical way of reducing crime opportunities. One key downfall in some current crime prevention methods is that they focus too much on dealing with the criminal rather than controlling crime (Wilkins, 1990). Research on increasing an individual's self-awareness suggests that it can influence their behaviors (Baumeister & Alghamdi, 2015). Increasing self-awareness in supermarkets may make customers who are faced with a situation, involving them weighing up the likelihood of getting caught behaving in a dishonest manner, be more aware of their behavior and encourage positive social behaviours.

5.1.9 Self-awareness and Social Presence

Self-regulation is an effective tool for mediating behaviour impulses and also manages emotions, using them to help fuel a move toward ethical action (Baumeister & Alghamdi, 2015). Baumeister and Alghamdi (2015) discuss self-awareness research which established early on that people are not simply aware of themselves or their morals the way they might notice a tree or clouds. Rather, self-awareness typically involves comparison of self to various standards and ideals, including moral standards (Duval & Wicklund, 1973). Research suggests that failure to monitor one's actions, also known as low self-awareness can undermine self-control and can result in behaviours that are inconsistent with their moral beliefs (Duval & Wicklund, 1973). Pfattheicher, and Keller, (2015) state that subtle cues that are suggestive of being watched increase a sense of presence within an environment which increases self-awareness and has been found to encourage pro-social behaviours. Individuals shape their behaviour when being watched in the sense that they tend to behave less antisocially and more pro-socially (Nettle et al., 2013). Pfattheicher, and Keller, (2015) found that individuals' behaviour was influenced by a subtle cue of being watched which was consistent with the theory of the spotlight effect that suggests individuals tend to overestimate the extent to which they are seen by others (Gilovich et al. 2000). If SCOs were to provide subtle cues of a social presence to customers, it could increase their self-awareness and potentially reduce antisocial behaviours such as theft.

5.1.10 Present Work

While the effectiveness of the use of surveillance, i.e. a form of social presence, on dishonesty has been explored in previous research (Welsh et al. 2010), its effectiveness after the implementation of self-service technologies has not yet been investigated in great detail. However, the perception of social presence raises self-awareness (Hoffman et al. 2015; Pfattheicher & Keller, 2015), which may be linked with a reduction of thefts. Creighton et al. (2015) reported that SCO staff felt they were unable to produce an effective sense of social presence, which they believed increased the likelihood of thefts at SCOs. While this work presented the staff perspective on the use of self-service and customer dis/honesty, it showed only a partial view of the actors involved in direct customer – staff interactions. As it was not feasible within our field study to interview dishonest customers in relation to thefts at SCO, store security guards were interviewed

with regard to their perceptions of customer dishonesty at SCOs. As security guards have the means (and role) to monitor dishonest customer behaviour in detail, either in person or via closed-circuit television (CCTV), their perceptions and insights can provide valuable information on the factors surrounding theft at SCOs, with a view to identifying approaches to combat customer dishonesty.

To gain a holistic view of the effect of social presence in SCO, we conducted interviews with security staff from a retail setting. As security guards are a vital element of store security, and provide a social presence in the form of surveillance, this research considers their attitudes towards self-service checkouts and their role in relation to theft at self-service checkouts. In addition, we also address how security guards perceive their own presence to impact upon customers. To explore solutions to the problem of shrinkage we also explored how supported security guards feel in their ability to supervise checkouts with the incorporation of an additional social presence, for example, induced by technology.

5.2   Method

5.2.1   Participants

Six security guards (SGs) (five males and 1 female) from two major supermarkets in the UK participating in the study were interviewed on store premises during September 2014 - February 2015. Four of the security guards were located at one store and two at the other store. Their experience in security ranged from 12 months to 21 years and they were aged between 23 and 46 years.

5.2.2   Materials

Semi-structured interviews were used to allow participants' insights and attitudes to emerge, allowing for inductive thematic analysis to take place. Interviews with security guards explored generic questions relating to their daily routines and their experiences of dishonesty or thefts at SCOs. We also explored their views on the effects of actual and perceived social presence on customer behaviour, for example, in the form of an onscreen camera on the checkout itself, as discussed in Creighton et al. (2015) as a form

of social presence. Participants were initially asked about general customer behaviours at self-service checkouts, for example, "What does an average day at work involve for you"? Or "Does your daily routine change according to the different days of the week"? Specific questions on dishonest behaviour were then asked such as "Do you feel there are any differences between SCOs and staffed checkouts in terms of theft"? And "What happens when you catch someone stealing at a SCO/the door alarms go off"? A full list of questions asked can be found in Appendix 11. The interview was recorded using a handheld recorder to allow for later data analysis. Responses were transcribed and then coded using Nvivo software to identify reoccurring themes. In order to assess the reliability of the coding, two coders performed the analysis. An interrater reliability analysis using Cohens's Kappa statistic was performed to determine consistency between the coders. Information sheets, consent forms and debrief statements were completed by all participants. Ethical Approval was granted from Abertay University's ethics committee before the study was conducted and the store gave permission for the study to commence.

5.2.3   Store layout

Both stores were located in the town centres: one had a size of 45,000 square feet and the other was 67,000 square feet. One store had one self-service checkout area containing ten SCOs located near the main door (67,000 sq. ft.), whereas the other store had two separate SCO areas containing six SCOs in each (i.e. a total of twelve within the store) with one area positioned at the main door and the other nearer the back end of the store (45,000 sq. ft.). In each of the stores, security guards are typically placed at the entrance of the main door.

5.2.4   Procedure

Interviews with security guards took place either during work or break time in private staff rooms, within the work premises. The security guards had been provided with information on the study, i.e., to explore aspects of customer behaviour at SCOs, by the store managers and prior to the actual interview. All six security guards volunteered to take part in the research and were asked to read and complete the information and informed consent forms (Appendix 9 & 10) before being interviewed. It was again emphasized that security staff did not have to answer questions they were not

comfortable with answering. All staff agreed to being recorded; a typical interview lasted about 20 minutes. Participants were debriefed on the nature of the study at the end of the interview, focusing on the security angle involved in SCOs and more specifically, on dishonesty at SCOs. This was not initially disclosed within the information sheet provided to security guards to reduce any influence the term dishonesty may have had on their responses. Responses were coded and reoccurring themes were identified. Reliability analysis was performed to determine consistency between two coders. A typical security guard interview lasted about 20 minutes.

5.3   Results

Open-ended questions allowed for security guards' (SGs) opinions and attitudes to surface, which provided cues for further prompting and discussion that formed the basis of the following analysis. Responses were transcribed and then coded using NVivo software to identify occurring themes. In order to assess the reliability of the coding, two coders performed the analysis. Inter-rater reliability for the key themes was confirmed as the average Cohen's Kappa, $\kappa=.882$, $p<0.01$, which indicated a very good overall agreement between the two coders (Landis & Koch, 1977).

These themes were then grouped into higher-order categories, i.e., antecedents of theft, factors surrounding committed theft, after the (suspected) theft, thus preserving a logical order of activities related to theft, as well as staffing roles and measures as to how to address theft.

5.3.1   Antecedents of theft

In line with their job description, all SGs stated that monitoring, i.e. "watching" was one of the most important parts of being a security guard, to identify suspicious behavior and thefts, and meet store policy guidelines for stopping someone suspected of theft. A typical day in the life of a security guard may include a variety of security activities, including store and alarm checks, making random patrols, and monitoring CCTVs and customer activity.

5.3.1.1   Customer characteristics.

SGs reported that many customers who are caught stealing usually act alone, however, many customers act in a group, with one customer trying to distract a staff member. *"Either/or but on the whole – individuals. One person will walk and distract, but majority have been alone."* (SG3)

With respect to monitoring activity at SCO, most SGs perceived that the intention of theft could be identified from a customer's behavior.
"If watching, you can see it [the intent to steal]*, they* [the customers] *usually look around themselves, always looking for the position of the person in charge of the self-service checkouts*." (SG1)

"[The customers] *look around a bit nervous, they make mistakes, maybe testing the water."* (SG3)

However, at the same time, all SGs pointed out that there is no 'stereotypical thief' as far as the demographic of the customer is concerned.
"It can be anyone." (SG5)

"[There are] *all different types* [of] *people you would never expect."* (SG4)

"[There is] *not a stereotype, such as your average drug user. Everyone has this perception, but it's not."* (SG3)

More specifically, SGs identified a variety of customer types that may steal, ranging from school kids to the elderly to affluent customers, as and if the opportunity presents itself.
"Opportunistic thieves at different time of the day. School kids before and after school." (SG3)

"Banned a granny from store [for stealing]*."* (SG4)

"Folk walk out at the chance opportunity regardless [of] *whether they have plenty of money to pay for it. Nine times out of ten it's just opportunity and it's someone that's 'well to do'."* (SG2)

The motivations of customers that steal were not perceived to be uniform, but could be categorized in three different motivations, the first arising from financial hardship and need, and the second being attributed to financial gain.

"People are needy and desperate, stealing for their kids. Or you get ones stealing […] like, whisky to resell." (SG2)

A third motivation for theft SGs identified appears to be less associated with a premeditated intent to be dishonest, but rather a consequence of situational factors that may occur, for example, when customers need staff assistance, but staff are busy helping other customers:

"They [the customers] *wouldn't steal otherwise if the wee lassie* [staff] *wasn't busy. I think they just get irate that they are waiting a length of time* […] *and they are needing help. Frustration is a big part of it."* (SG2)

"People may steal through frustration." (SG3)

To the extent that frustration is associated with lack of technological assistance or staff, which thereby provides an opportunity to be dishonest, addressing both of these factors could be an important dimension in theft prevention. The association between opportunism and dishonesty is discussed in more detail in the next section as a separate category.

5.3.1.2 Busyness, opportunism and staff.

Opportunism seems a major factor in relation to thefts at SCO, be it associated with intent or with frustration. Unsurprisingly, all SGs stated that more thefts occur at SCOs when the store is busy.

"It [theft] *tends to happen at busier times of the day because there are a lot more people for the one cashier to deal with, so they see the opportunity and take it."* (SG6)
"Busier days [are] *easier for a thief, as* [there is] *more for the one cashier* [means SCO staff] *to deal with. If quiet, it's one on one, they won't do it. If busy, greater risk* [of theft occurring].*"* (SG3)

"It's a lot easier to steal at self-scan than from [traditional staffed] *checkouts because there is one person - 5/6/4 machines - they* [staff] *cannot see everything."* (SG1)

The next comment is also noteworthy, as most SGs reported that more thefts occur at SCOs compared to staffed checkouts:

"Yes, [theft] *more prone through SCO than manned. Because they are manned there's a personal interaction. Do get the odd one at manned* [checkout]*, nesting, push through or walk through. SCO gives option of saying 'it's not my fault, it didn't scan', and* [customers] *can try to deceive camera by looking as if they are making payment, and worker is fooled as they are watching over six checkouts as opposed to one, so customer interaction is less; therefore* [there is] *more opportunity for an opportunistic thief before realisation sets in."* (SG3)

SGs clearly perceive SCO staff members struggling to supervise multiple SCOs. And also expressed sympathy with the SCO staff, as they are seemingly put in a difficult situation of having to juggle many customers at busy times:

"Speaking from experience things happen; people walk away, abandon them [the SCOs]*, they won't scan something, put it in bag. It's a bit much to ask to have attention on all eight* [SCOs] *and you often find they* [staff] *get the blame. I have covered it and it's a hard job. One on one with a cashier - if there's chance of error then the person* [staff member at cashier checkout] *is more responsible than SCO* [staff member]*."* (SG4)

The comments also hint at the responsibility SGs ascribe to SCO staff. While a traditional staffed checkout (cashier) has the sole responsibility for the purchasing transaction with the customer, SCO staff are responsible for multiple interactions at the same time, which appears to induce a dilution of perceived responsibility for the SCO staff due to perceived pressure. This is also illustrated by the following quote:

"A weight mismatch comes up on SCO - if girls [SCO staff] *are busy they just clear it; they don't look in the bag so there is pressure on the staff."* (SG5)

Having discussed customer characteristics and the busyness at SCOs associated with lack of staff assistance (social presence) providing opportunities for theft, SCO layout

was also identified as a factor associated with dishonest behavior, and presents the final theme in this category.

5.3.1.3 Layout of SCOs.

SGs identified the layout or design of the SCO as a component that could be relevant in addressing thefts. Stores where the SCOs are arranged in two parallel rows with customers and staff located in between those rows are particularly troublesome since when a staff member helps one customer, s/he has his/her back to half of the other checkouts, which means that the other SCOs are not monitored. This arrangement makes it easier for thefts to occur, since social presence or the effect of watching is reduced.

Many SCOs are also situated at the entrance to the shop making it easy for a quick escape for thieves.

"Fact that it's near the door. [Thieves] *will always go to bottom one coz they are right next to the door. Common sense - by the time they get to me at the door the lassie* [SCO staff] *could have shouted for me to stop them, but they are straight out the door; the nearer they are the door the better. Better having one bank or two banks up the top. It's a quick exit."* (SG1)

5.3.2 Factors surrounding thefts

5.3.2.1 Methods of theft.

SGs noted that SCO is easy to trick. Customers are perceived to adopt a variety of methods to shoplift (see Appendix 12), such as concealing items, swapping bar codes or leaving the store without paying, which clearly shows intent on part of the customer.

"[It is] *quite easy to deceive the machine." (SG3)*

"Walking off without paying." (SG6)

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"Concealment of the item. Ticket swapping. Scan cheaper. Make-up easy to conceal." (SG4)

"Two weeks ago we had a girl scanning one thing with two things in hands, so [she] *scanned one thing, put the other one behind and both in the bag".*

"Ticket swapping with reduction stickers." (SG5)

"Scanning bananas for £1 and putting down steaks." (SG2)

Concealing items, and swapping bar codes are methods shoplifters may adopt irrespective of which method of shopping they adopt, i.e., these methods are not exclusively linked to the use of SCOs. Indeed, these actions may most likely occur while the customer is still in the middle of the store. However, there are unique types of theft associated with SCO, such as scanning cheaper items instead of expensive one, or simultaneous scanning of two items, as expressed in the last comment. Due to the control the customer has SGs perceive there are more opportunities for theft to occur compared to traditional checkouts.

"More chances and opportunities; [the customers] *can make it look like they are paying or not paying for some. Can't get away with that at a cashier unless you conceal it before the till or if the cashier was in on it."* (SG4)

This last comment hints at the possibility of a staff member being complicit in dishonest behavior, i.e., 'sweethearting'. Historically, sweethearting occurs when a staff member facilitates friends, family or colleagues to steal by not scanning their goods or by providing illegitimate discounts and it has been associated with shrinkage (Beck, 2011). Sweethearting was not flagged up as a major factor associated with SCO use by the SGs we interviewed, but it is not possible to exclude this as a method of theft, just as it would occur with traditional staffed checkouts.

5.3.2.2 Type and value of stolen items.

SGs stated that they have seen an increase in thefts of high value items such as electrical items and make-up and everyday items such as fresh produce and expensive meat.

"Expensive electrical items and expensive alcohol and clothing." (SG4)

"Usually it's just their daily shop; it can be milk and bread and stuff." (SG1)

Customers tend to use the 'scan & bag' method of theft where they scan a cheap item and bag an expensive one, or they will weigh the item and select loose veg/fruit when it should be a steak.

5.3.2.3   Types of excuses/customer accountability.

SGs noted that customers that have been caught stealing indicate it was a mistake, however, this appears to be similar irrespective of how customers shop, i.e. irrespective of SCO use.

"We always get that story [i.e., that customers indicate it is a 'mistake' when they get caught] *whether they have been through checkout or not. They turn it around to be our fault, but that's their guilt; makes them more guilty." (SG5)*

"The smarter dressed will say it's a mistake." (SG4)

However, SGs recognized that there may be a 'grey area' (see Appendix 14) where customers may indeed accidentally make a mistake.

"A lot of times it [mistake] *can happen, aye. Most the times they are chancing their arm." (SG5)*

In this case, the role of CCTV becomes important to confirm whether a customer has intent to steal, or whether indeed the customer merely made a mistake.

"Yes, they [customers] *do* [make mistakes]. *Until I check back the CCTV I can't actually comment on that." (SG2)*

"Case dependent. CCTV can see if it's been a genuine mistake or not." (SG3)

In this case, the formal surveillance measure, which has historically been seen to deter theft, is mostly used for confirmation of dishonest intent. The role of surveillance is discussed in the next category.

5.3.3 After the (suspected) theft.

As SGs noted, some thieves may be professional, but some may be opportunistic. Once a customer is suspected of theft, SGs will look at the CCTV footage to assess a suspect's body language/behavior throughout the store to create a clearer picture whether they have acted in a suspicious manner prior to a theft, such as looking to where the member of staff is before concealing an item (see also 5.4.1.1 Customer characteristics in 5.4.1 Antecedents of theft).

5.3.3.1 CCTV

CCTV can be very useful in helping see whether a theft appeared to be on purpose or not and can be used as evidence for prosecution. However, thefts tend to be over and done with quickly and the perpetrator has left by the time a member of staff is able to alert security and the CCTV can be analyzed.

"By the time they have seen that there has been a walk off we will look at [CCTV] *footage but that person is long gone."* (SG5)

CCTV in store does not always allow SGs to view entire interactions with SCOs due to their positioning. SGs are in the uncomfortable position that, with a short distance between a SCO and store exit, any alarms regarding potential theft may be raised too late by a member of staff.

5.3.3.2 Police involvement

SGs generally felt that not much will happen to those who face prosecution after having been caught for alleged stealing. SGs state that thieves who have planned on stealing at the SCOs are unlikely to pay fines that they receive, and police involvement may not be an effective deterrent for them. Opportunists will make excuses regarding the technology of the SCOs, as they will either pay for their items or say they will be back to pay for them and then never return. This then makes managers reluctant to contact police for every theft that occurs at SCOs.

"Manager doesn't usually want to pursue it; if you bring the manager down then they don't want to do anything about it" (SG1)

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Thus, security guards are put in a difficult position, having to balance their perceived duties with store policies.

5.3.3.3 Store policy and accountability

To stop a customer suspected of theft, SGs have to follow a particular policy involving store management. SGs feel that the policy can restrict their ability to deal with thefts efficiently.

"Would I go and stop myself without a member of staff ... not with [store name] *policies, because we would be penalised regardless of whether we were right or wrong."* (SG2)

It seems that SGs at times may not feel supported by the store policy in their perceived role. Associated with this, SGs state they are made heavily aware of the repercussions of falsely stopping someone, as it can lead to newspaper articles and ultimately give bad press for the store which they feel could impact on their job.

"Have to think about reputation and false arrest. False arrest can lead to local papers and can be a bad thing." (SG1)

SGs appeared to be very aware of their store policy and how false arrests may lead to negative repercussions for them personally. This appeared to leave SGs feeling torn between fulfilling their job role and protecting their job. Clearer guidelines for the role and rights of SGs may address this issue. With new technology, for example, by the introduction of random checks before customers reach the exit (as is done for 'scan while you shop technologies' via 'random basket checks') may allow them to be more confident in their role. However, random product checks may be difficult to accept by customers.

5.3.4 Staffing roles.

Customers ask SGs for assistance in removing clothing tags etc. which takes away from their role as a security guard, meaning thefts may be more likely to occur as they are impaired in the ability to monitor for criminal activity.

"Sometimes by yourself at the door operating cameras and still have to check all keys and door seals. Fire exit doors with security seals, key checks for locked areas given out then given back at end of day" (SG4)

"Problems dealing with alarm goes off at front door, because of tags being left on [items]*"* (SG6)

SGs state that they can become frustrated with SCO staff if they feel they are not vigilant enough to detect thefts. SGs also stated that manned checkout staff who do not correctly remove security tags can waste a lot of the security guards' time as this leads to door alarms going off and unnecessary checks needing to be made. Clearer guidelines for job roles and expectations of staff members may reduce these issues occurring and disrupting the role of the SG.

5.3.5   How to address theft.

SGs offered some suggestions to reducing thefts at self-service checkouts. They all stated that more vigilance would reduce thefts at self-service checkouts. Better technology was also stated as being likely to reduce thefts at self-service checkouts as they were too easy to trick. Also the SCOs positioning in the store was described as providing a quick exit (i.e. when the SCO is close to the exit) and making it easier for thieves to get away and difficult for security guards to stop them.

As a concluding question, SG's thoughts on whether technological implementations on the SCO itself may affect thefts, such as screen cameras, were explored. Security guards felt that CCTV on a SCO could be effective if perceived by the customer.
"I think if customers could see it [camera at SCO] *and were more aware they were being watched it definitely would."* (SG4)

However, there was also a realisation that shoplifting is an ongoing problem, with measures to counteract it lagging behind.
"[…] in general thieves are always adapting and evolving, whether it be a trolley pusher – it doesn't matter what it is. [Thieves are] *always going to find ways round it. If they get caught one way, they will share information and find a new way to do it."* (SG1)

"They [thieves] *are always one step ahead. You are catching up with them all the time because they just think of something new."* (SG5)

5.4 **Discussion**

The aim of the current study was to explore the current scenarios of dishonest retail customer behaviours at self-service, and to identify opportunities that may arise from these scenarios to address shrinkage. As it was not feasible within our field study to interview dishonest customers in relation to thefts at SCO, store security guards were interviewed with regard to their perceptions of customer dishonesty at SCOs. As security guards have the means (and role) to monitor dishonest customer behaviour in detail, either in person or via closed-circuit television (CCTV), their perceptions and insights can provide valuable information on the factors surrounding theft at SCOs, with a view to identifying approaches to combat customer dishonesty. SGs' responses were grouped into five main categories, antecedents of theft, factors surrounding committed theft, what happens after the (suspected) theft, staffing roles, and how to address theft, which we discuss in turn.

Antecedents of theft. SGs provided a number of responses with respect to the type of customer committing theft. SGs suggested that there is no 'stereotypical' thief, in that shoplifters vary in age demographics and apparent wealth, which is in line with the inconsistent findings regarding shoplifter demographics others have noted (Dabney, Hollinger & Dugan, 2004). Potential offenders reveal themselves rather by their body language than their demographic (Dabney et al., 2004), e.g. by scanning the store for staff or other surveillance, which was also noted by SGs in the current study, who reported potential thieves can be spotted by the way they monitor where store staff are positioned at SCO.

There was an overall agreement from SGs that there were more thefts at SCOs when the store was busy and that there were more thefts at SCOs overall, compared to traditional manned checkouts. All security guards stated that it was easier to steal using SCOs due to only one member of SCO staff being generally present. These findings are consistent with those of Creighton et al. (2015) who found that SCO staff reported feeling under pressure when SCOs are busy, as they are impaired in their ability to watch for thefts and assist customers at SCOs. Store staff also felt this increased the risk of thefts occurring (Creighton et al. 2015), which in turn mirrors the perceptions of security staff in the current study.

The findings suggest that the implementation of a social presence, for example, via cameras within the SCO area, or indeed on/at the SCO itself (Creighton et al., 2015), or strategically placed staff within the SCO area, could provide an opportunity to increase surveillance perceived by the customer, especially when the shop is busy. As an alternative, camera systems that could automatically monitor a customer's behavior to flag up suspicious customer activity to staff would represent a technical solution to spot potential suspect behavior, and is in line with, for example, biometric technology implementations.

SGs perceived that some consumers may steal because of frustration, for example, when they have to wait for staff because staff are assisting customers elsewhere. Frustration has been implicated in theft at SCO (Taylor, 2016) in a recent study and is noteworthy as a motivator, as it can be speculated that frustrated consumers may not be habitual shoplifters. The blurry line between initial intent and theft happening through frustration is interesting to the extent that frustration may increase the desire to steal, which represents one aspect of the Crime Triangle (Clarke & Eck, 2014). Taylor (2016) states that frustrations at SCO may lead to thefts as customers will apply neutralization techniques to justify their actions. This would suggest that addressing frustration may be the critical factor for customers in this category, as it could be expected that customers were not initially intent on stealing, yet were somehow tempted into it.

Frustration experienced at SCO may also be addressed by, for example, training staff to deal with frustrated customers effectively, or indeed, providing more staff at SCO for customer assistance. In addition, the implementation of technology that could flag up if a customer is likely to be frustrated may be helpful in this instance, for example, when a SCO process may take too long. Interface design may also address some of the user frustrations, for example, by introducing anthropomorphic agents or indeed real staff in an image area on the screen to induce social presence to deal with customer frustration.

Finally, the layout of the store was flagged up as critical for committing thefts, as SGs pointed out that more thefts occur at SCOs near 'the doors'. This suggests modifying SCO layout, by, e.g., increasing the distance between SCOs and the exit.

Furthermore, social presence when exiting the store could be enhanced by introducing mirrors (Reynald & Elffers, 2009), embodied agents or indeed robots (Hoffman et al.

2015) or cameras (Creighton et al., 2015) displaying the customer's footage in the SCO area.

Factors surrounding committed theft. SGs noted that SCOs are easy to trick and that customers use a number of methods to steal, including concealing items by simultaneously scanning two items, with one item being concealed, or scanning cheaper instead of more expensive items (e.g. bananas for steaks). The responses are consistent with recent findings by Taylor (2016), reporting many techniques of theft, such as selecting items that are less expensive than the loose items being weighed, or selecting cheap cooking tomatoes instead of expensive vine tomatoes, etc. The methods of theft are creative and SGs noted that they are always trying to 'catch up'.

With respect to the type of item stolen, SGs noted an increase in thefts of high value items (electrical, make-up, clothing) but also everyday items. Typically, customers scan a cheap item and bag an expensive one. While bar codes can be swapped in the store, before a customer even proceeds to a staffed or SCO checkout, the difference in price between cheap and expensive items is probably bigger at SCO than at staffed checkouts. At staffed checkouts, staff may actually notice the difference if the price for an expensive item is too low. However, at SCOs swapped price tags may go unnoticed until a SCO staff member actually checks the prices and receipts.

Our findings are consistent with a study by Bamfield (2004), who also noted that items that were reported stolen were typically of high value, a relatively small size, and often designer brands or in great or regular demand by the public. Those findings point again to a wider demographic of customer, refuting the idea of a 'stereotypical' thief motivated by financial need as outlined above.

SGs pointed out that most thieves caught stealing, irrespective of whether they use SCOs or not, tend to indicate that it was a 'mistake', however, they also acknowledged that honest mistakes could have been made by customers. SGs state that the majority of people who are suspected of theft at SCOs will blame the technology as there are grey areas (Appendix 14) of security that allow for this to happen, which means it can be difficult to prove customer intent. This is consistent with research from Beck (2011) who calls this the self-scan defence. With respect to the thief with intention to steal, others (Taylor, 2016) have noted that that a large majority of thieves admit that they

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stole initially by accident, but that shoplifting became a routine after that, especially when it was easy to do the first time. Here, staff vigilance, but also increased tagging of items or technological implementations at SCO, such as item recognition, may be useful means to address the first experience of a successful theft.

After the (suspected) theft. SG stated that, once a customer is suspected of theft, the role of CCTV is to confirm that a theft has occurred. The finding that CCTV in its current form is not effective in deterring thefts is noteworthy, given that shop-lifters perceive the presence of formal surveillance effective ad deterrents (Carmel-Gilfilen, 2013). This points to the implementation of more effective ways of inducing perceived surveillance – and staff assistance – for customers at SCO to prevent theft. For example, adaptions such as onscreen cameras may increase a sense of social presence and reduce the likelihood of such behaviors occurring (Creighton et al., 2015) especially if this camera surveillance cannot be avoided by the customer using the SCO.

The findings also suggest that SGs are under many pressures from store policies and other expectancies of their role, as they have to abide by store policies once a customer is suspected of theft. Having to perform their role as Security Guards effectively has to be balanced with the potential damage to the store's reputation, if a false arrest is made. Some expressed feeling demoralized by the lack of authority they have when someone is caught and a suspect is not further prosecuted. That this may be a valid perception is supported by findings from recent research (Bamfield, 2012) showing that only a small proportion of shoplifters are apprehended and prosecuted, and is consistent with an earlier study (Hollinger & Davis, 2002) which noted only 24% of all apprehended shoplifters being prosecuted.

SCOs may increase the number of instances of 'walking' off with goods that have not been paid for (Bamfield, 2012) and SGs in the current study commented on this too. Clear position of the SCO could assist security guards and members of staff in reducing thefts occurring, as they would have more time to evaluate and act on suspected 'walkers' or thieves in general. Taylor (2016) also highlights the matter of reduced staff presence at SCOs as a factor that can influence thefts, suggesting that implementations that induce presence may reduce thefts, in line with what was earlier discussed regarding the store layout above. However, Hoffman et al. (2015) state that initial

effects of a social presence may reduce if customers learn that the risk of repercussions is limited.

Staffing roles. SGs can become frustrated with SCO staff if they perceive staff are not vigilant enough to detect thefts. SG also stated that staff who do not correctly remove security tags can waste a lot of the security guards time, as this leads to door alarms going off and unnecessary checks needing to be made. This is impacting on their task to monitor for criminal activity. There was an overall agreement among SGs that SCO staff were under pressure when SCOs were busy and they could not 'do everything' or be held responsible for thefts when the SCO area was busy, however, there was also the perception that this impacted on their own role too. This suggests that clear guidelines should assist both SCO staff and security guards, in particular, when the store is busy, as it appears that both staff groups are distracted from being an effective social presence at this time (Creighton et al., 2015), and this may be affecting their working relationships. The findings suggest that security implementations within a SCO could assist both SCO staff and SGs, perhaps allowing customers to de-tag items after valid payments have been made. This research does consist of a small sample size so future work should explore whether or not these findings are replicated.

How to address theft. SGs stated a number of factors to address theft, ranging from better vigilance, to better technology at SCOs and store layout with respect to SCO positioning further away from the door. The theme of 'watching' was alluded to multiple times. Clearly, SGs perceive surveillance as effective in deterring thefts, and so do shoplifters (Carmel-Gilfilen, 2013), with store managers (Kajalo & Lindblom, 2010) perceiving security guards to be the most effective surveillance method. However, given that an increasing number of formal surveillance measures are implemented to address crime (Yaniv, 2009), it is questionable to which extent these are indeed successful, given the shoplifting figures generally, and the absence of exact figures of theft at SCOs (Taylor, 2016).

This study also found evidence consistent with research from Beck and Willis (1999) who suggest that CCTV is no longer an effective deterrent of thefts. CCTV in store requires security guards to be watching screens in order for thefts to be detected. Security guards stated that they are expected to carry out a variety of tasks during a general days work therefore the likelihood of them being able to watch CCTV,

and catch thieves, is limited. Self-service checkouts are currently not acting as deterrents to theft thus future designs should implement security measures to reduce the likelihood of thefts occurring. These securities could be met via a social presence in the form of an onscreen camera to enhance the presence of CCTV and remind customers that they are being watched. This could also increase customer's self-awareness and morals, making them more aware of their actions and less likely to behave in an anti-social manner (Pfattheicher & Keller, 2015). If surveying social presence was more apparent it would be likely to suppress opportunistic ideas that customer may experience. Of course their morals will have to be in line with pro-social behaviours for this to work but findings from the present research suggest that many thefts occur by opportunists who take advantage of the design faults in SCOs, such as selecting to weigh an item when in fact it should be scanned. Such behaviours are done to benefit the opportunistic customer financially. Perhaps a social presence integrated within a SCO may encourage the customer to evaluate their beliefs before continuing with such behaviours.

It should be noted that SGs commented positively on the implementation of cameras on SCOs, provided the customers were aware of this type of surveillance. As shoplifters tend to avoid cameras (if they are aware of them), implementing them where customers cannot avoid them, i.e. at the SCO itself, may be useful, as noted above. The perception of a social presence has been linked to more positive behavior via an enhanced self-awareness (Willis, 1990; Yaniv, 2009) and should be considered. Given that customers have to direct their attention to the SCO while conducting their transactions, a highly visible camera on the SCO screen may not go unnoticed, and thus, may raise their awareness of social presence.

5.5 Conclusions

The thoughts and views of security guards are important in understanding perceived customer motivations and behaviors surrounding theft at SCO. The research presented consists of a small sample size however it clearly suggests that security guards feel security measures for reducing thefts at SCOs could be improved. Thefts may occur for multiple reasons and involving self-service in customer transactions may create a complex situation, with many factors at play. Customers may over- or undercharge themselves, and they may or may not be aware of it. The control that customers

experience at SCO may create situations where theft can occur by accident. However, theft that can be conducted easily, whether intentional or non-intentional, may predispose individuals to repeat this behavior (Taylor, 2016), and thus should be avoided. Factors that bring about theft, such as the busyness of the store combined with opportunity for stealing at SCO, should be recognized and could be addressed by, for example, enhancing surveillance temporarily during busy times. Others have noted that the implementation of social presence has a positive effect on human behavior (Pfattheicher & Keller, 2015; Reynald & Elffers, 2009), and this should also be the case with regard to reducing theft, be it via enhancing staff presence or other, technological implementations at SCO (cameras, mirrors, embodied agents etc.).

Given that we interviewed security staff on their work premises, the cooperation of staff and the stores was paramount to conducting the study. This research, as part of the larger research project focused on the effects that a social presence may have within a retail environment, and in particular, theft. One limitation of our study was the relatively small sample, thus, findings may not be generalizable to different cohorts of security guards or indeed, different countries or types of stores. However, the interviews allowed us to get a comprehensive, in-depth view of the perceptions of security guards in relation to theft, which was valuable in understanding the factors that may be addressed to prevent theft. Given that our findings were also consistent with the work of others hints at the validity of the discussed findings.

SGs considered surveillance as one of the most important factors to address theft. However, our study indicated that a constant social presence is difficult to achieve consistently and effectively. Given that social presence has been shown to be effective in modifying people's behavior (e.g., Ahmad, 2016; Argo et al., 2005 ; Dahl et al., 2001; Pfattheicher & Keller, 2015; Reynald & Elffers, 2009) it would be reasonable to suggest that future research should consider variations on how social presence is implemented in retail. Methods could include the implementation of technology within SCOs or varying social presence over a period of time to avoid habituation effects. With technological advances within the retail sector there is great potential to address theft to ultimately benefit businesses and customers, and their experiences, and also support the staff working in retail.

5.6 Chapter Summary

This study explored factors around customer dishonesty at SCOs from the perception of security guards (SGs), with a view to identify possible opportunities to address shrinkage in retail. The findings suggest that there were many factors surrounding customer thefts and how they are managed in stores. Security guards state that it was easier to steal at a SCO and more thefts occurred at SCOs compared to traditional checkouts, especially when the store was busy as customers are less likely to be being watched. There was also a consistent suggestion that more vigilance was required at SCOs. This suggests that the current securities in place are not effective in deterring thefts, and more social presence is required. Enhancing security measures within SCOs will likely increase savings for retailers by reducing the need for staff but also reducing levels of theft. Security measures may be increased within a SCO by implementing a social presence via a virtual computer agent, defined as "automated programs that act in place of human agents" (Edwards et al., 2014, p.372). Biocca (2003) considered whether or not people would respond socially to computer controlled entities. Their findings suggest that people do respond socially to artificial computer agents and that the presence of an agent with virtual human-like features, increases levels of social presence, for example an agent representing a human assistant. If a social presence is represented within a SCO then it may make customer less likely to behave in an opportunistic manner as they will feel that they are being observed (Lee et al., 2016; Short et al., 1976; Zhao 2003) and they will be more aware of their behavior (Baumeister & Alghamdi, 2015).

5.7 Qualitative research summary

The findings of the qualitative studies comprehensively indicated that lack of social presence appears to be a critical factor for the occurrence of theft. Study 1 which considered the customer journey, highlighted that although some customers are deterred from using SCO, if they believe that they could be delayed waiting on assistance from a member of staff who could be busy assisting others, this reduced level of social presence may also attract opportunists who will take advantage the lack of surveillance in order to steal at a SCO. Study 2, considering SCO staff perceptions of dishonest behaviours, discovered that they reported to feeling limited in their ability to promote an effective level of social presence. SCO staff *actual* social presence is not effectively deterring thefts. There is also uncertainty as to whether or not customers are

intentionally stealing at SCOs or whether thefts occur due to aspects of the technological setup which could then lead to customer frustrations. A large proportion of the research literature (Biocca et al., 2001; Frochlich & Oppenheimer, 1998; Walther, 1998; Whitty, 2002) points to the role of social presence in the form of actual people as an influencing factor on human behaviour. There are also findings that social presence can be implemented in technology to influence human behaviour (Botha & Reyneke, 2016; Han et al., 2016; Lombard & Jones, 2015). Study 3 highlights the perceptions of security guards who work in supermarkets with SCOs. They state that thefts are easier to commit at SCO than a traditional checkouts and security measures for reducing thefts at SCOs could be improved. They also promote the importance of the customer feeling that they are being watched as an effective measure of reducing thefts at SCOs.

It seems reasonable to suggest that the technological implementation of social presence may have an influence on consumers, given that many technologies use (online) virtual agents (e.g. IKEA's Anna) to interact with buyers. However, the means of introducing a social presence within technology to mediate dis/honest behaviour are not well understood. Given that the previous research identified social presence as an important factor in the deterrent of theft, the question arises to which extent the technological implementation of social presence within a SCO can address theft, and this is the focus of the quantitative studies discussed next. The next study will explore the effects of implementing a social presence within a SCO.

6 CHAPTER 6 Study 4 Levels of Social Presence and its effect on Opportunistic behaviour at Self-Service Checkouts (SCOs)

Opportunistic behaviour has been of interest to researchers of deviant customer behaviour (Dootson, 2014; Wirtz and McColl-Kennedy, 2010) and is concerned with ways in which customers choose to take advantage of opportunities during an interaction with a retailer, to advantage themselves. Berry and Seiders (2008, p. 34) define an opportunist as someone who "may not be a chronic gold digger, but rather just someone who recognizes an opportunity to take financial advantage". Kadefors (2004) defined opportunistic behaviour as a bias to advantage oneself financially. Research has considered opportunism when interacting with technology such as self-service checkouts and suggests that some people chose to take advantage of the opportunities available, i.e. lack of interaction with an employee, resulting in an increase in store thefts (Taylor, 2016; Beck 2015). The findings from the previous, qualitative research conducted; hint strongly at the possibility that social presence is a critical variable in addressing thefts. The effects of a social presence have been investigated within e-commerce, where social presence was found to promote feelings of user trust (Gefen & Straub, 2004) which may then increase customer loyalty (Cyr et al. 2007). Biocca et al.'s (2003) description of social presence as a sense of being with another and that the "other" can be human or an artificial, indicates that also non-humans can induce the perception of social presence. Findings from Nowak and Biocca's (2003) research into the effects that computer agents have on their users suggested that agents can encourage social behaviours. Despite research supporting the positive effects of a social presence and the use of agents within technology on user behaviour, there has been an absence of the application of it with consumer behaviours, in particular, with self-service in retail and dishonesty. The following sections will provide an overview of the effects of implementing a social presence via technological or artificial representations on human behaviour. The section will also cover the use of eye tracking technology as a means to monitor how users engage with the implementation of a social presence, as this is of methodological relevance to the following empirical studies conducted.

6.1 Social presence in relation to dishonest behaviours within retail

The Social Presence Theory argues that relationships are more personal with an increase of social factors in an interaction (Whitty, 2002) For example, face-to-face interaction produces a greater sense of community and encourages cooperation in comparison to e-mail interaction (Frohlich and Oppenheimer, 1998) (Refer to 3.2.1.2.3. p. 97). As mentioned in Chapter 4, advances in technology could be argued as creating day-to-day situations as less personal, such as self-service checkouts (SCOs) compared to the traditional checkout involving a sales assistant. This may have implications for dis/honest behaviours at such self-service technologies and is supported by the finding from the studies described in Chapters' 3, 4 & 5 which provide insight into situations that lead to thefts at SCOs. Howells (1938) suggested that another key factor that can influence honesty is the degree to which it is associated with personal rather than general or institutional interactions. Associated with this is Gneezy's (2005) work which showed that perceptions of wealth may influence deceptive behaviours as their participants deceived those who they believed to have greater wealth compared to those they believed to have similar wealth. Gneezy (2005) proposed a formula of preferences to describe deception behaviour. The consumer considers the benefits of telling the truth as a reference point when they evaluate the benefits of lying. The monetary consequences of the lie are compared to this reference level. According to Gneezy (2005), the consumer is selfish in the sense of maximising his/her own payoffs, but sensitive to the cost of their lie on others. He states that this sensitivity diminishes with the increase in the size of payoffs. Moreover, since perception of the counterpart's cost is subjective, when there are differences in wealth such as consumer-retailer interactions, the decision maker is more likely to lie to the wealthier the counterpart than they would to another consumer. Thus, 2 factors may impact on opportunistic, dishonest behaviour, i.e. less personal interactions and perceived wealth associated with supermarkets compared to individuals. It could be argued that if customers perceive the use of SCO as representing a corporate body (less social presence/more wealth) compared to an 'individual', then they may be more likely to behave dishonestly. Perpetrators may not feel that there is a social presence when there is no direct face-to-face contact when using an SCO.

6.1.1 Social Presence and Social Agents

Several definitions of social presence have been put forward, yet they have in common the indication that there is a perception of a shared environment with others (Biocca et al. 2001; Short et al., 1976; Walther, 1992). For example Romano et al. (2005) state that a social presence creates the illusion in the mind of the perceiver that another intelligence exists in the environment. Biocca et al. (2003) state that social presence is a sense of being with another and the "other" can be human or an artificial intelligence. Research from Zhao (2003) suggests that if someone feels that s/he has a co-presence then it may modify his/her behaviour. Co-presence is the dimension of social presence relating to the degree to which the observer believes he/she is not alone (Lee et al. 2016). Baumeister (1982) found that the presence of others can lead individuals to alter their behaviour in a manner that communicates a positive self-impression. Consistent with this, Bateson et al. (2006) conducted research looking at the effects that a social presence has on behaviour using not actual humans, but images of human characteristics. Their research involved counting money that had been put in an honesty box within an office setting, for staff to contribute towards the price of tea and coffee. The money in the honesty box was counted at the same time on a specific day of alternate weeks. The authors varied the implementation of a social presence by either showing a pair of eyes (high social presence) or a bunch of flowers (low/no social presence) next to the honesty or box. The findings showed that the presentation of a pair of eyes next to the honesty box, resulted in three times more money in the box compared to when the poster was of a bunch of flowers. This finding suggests that people were more likely to behave honestly when they experienced a high social presence (the image of a pair of eyes) even when only an implied human presence in the form of a picture was present. Research that shows a social presence can be induced by images that resemble humans has also been conducted by Nowak and Biocca (2003), who looked at whether or not people will respond socially to computer controlled entities that involved human-like features such as eyes. Their findings suggest that people do respond socially to artificial computer agents and that the presence of an agent with virtual human-like features, increases levels of social presence, for example an agent representing a human compared to an animal (Parise Kiesler, Sproull, Waters, 1999).

There has been a growing interest in the social interaction between humans and computer agents as technology innovations continue to be developed (Burgoon et al., 2000; Lunardo, Bressoles, & Durrieu, 2016; Parise et al., 1999). Sproull et al. (1996) showed that people presented themselves more positively when the interface they interacted with contained a face compared to a text-display. Research has highlighted that people will cooperate more, and respond socially to human-like virtual computer agents compared to agents that look like a dog (Parise et al., 1999). Parise et al. (1999) found that increasing levels of realism of human-like agents can positively influence cooperation. A virtual agent or a "computer-generated character" (e.g., Payne et al. 2013, p. 107) is designed to interact with users by mimicking human appearance and behaviours through artificial intelligence. Recent advances in virtual agent technology enable retailers to offer customers the possibility of interacting with agent that can assist them when they are in the need of specific information (Lunardo et al., 2016). Virtual agents can be beneficial to companies as they can assist them to maintain relationships with customers, capture market intelligence such as their purchase history, and increase cross-selling opportunities (Köhler et al., 2011).

Researchers have examined the importance of having human features within their virtual agents as research suggests that attractiveness (Holzwarth, Janiszewski & Neumann, 2006) and gender (Lunardo et al., 2016) can positively influence user behaviours such as purchase intentions in retail. Literature on customer–salesperson gender congruence (Beetles & Crane, 2005) suggests that stereotypes that are associated with gender may affect the way people respond to virtual agents. For instance, women represent typical checkout staff and service sector frontline workers employed to offer assistance (Lunardo et al., 2016) for example, IKEA's virtual assistant is a female, Anna (see Fig. 10). Human-like features, such as eyes, have been suggested as being advantageous to human-computer interactions to imply that the computer holds particular social skills. Human forms indicate human qualities that evoke perceptions of lifelikeness in the system (Küster, et al. 2015). Research has revealed that people prefer computer characters with more human-like appearance and this is particularly the case for tasks requiring social skills (e.g., Goetz, Kiesler & Powers, 2003; Zimmerman, Ayoob, Forlizzi & McQuaid, 2005; Walters, Syrdal, Dautenhahn, Boekhorst, & Koay, 2008). Anthropomorphic representations, i.e. human-like appearance or behaviour, representations have been shown to make the computer appear more intelligent,

engaging and capable of higher agency than those with non-human visual forms (King & Ohya, 1996; Koda & Maes, 1996). Social interactions between computers agents and humans have been suggested as being similar as humans have a need to care for others (Sproull, Subramani, Kiesler, Walker & Waters 1996). Sproull et al. (1996) showed that people presented themselves more positively when the interface they interacted with was a talking face compared to a text-display. Human-like interfaces may result in users applying similar impression- formation and management techniques to those that would be expected in human-to-human communications (Küster, et al. 2015).

Increasing user interactions with virtual agents or assistants has encouraged research to consider factors that may be influencing social responses from the user. Gaze behaviour has been examined as a contributing factor to such behaviours as it has been considered as influencing the perception of interest from the agent on the user, also known as the mutual attention mechanism (Peters, 2005). There is evidence that users will follow a virtual agent's gaze (Martinez, Sloan, Szymkowiak & Scott-Brown, 2011), akin to social gaze in human-human interaction, thus evidencing that virtual characters can induce behaviours that resemble human interactions.

Figure 11 IKEA's virtual assistant Anna (Clarkson, 2009)

6.1.2   Gaze detection and social presence

Burnham and Hare (2007) discuss the effects of having someone watch an individuals' behaviour and state that humans are more likely to act in a cooperative manner if there is another human present. This effect on behaviour has been explained through research theories considering eye gaze detection and it has been suggested that humans have involuntary perceptual systems that respond to stimuli of faces and eyes (Emery, 2000;

Haxby, et al. 2000). Haxby et al. (2000) states that humans rely on face and eye cues in order to make social decisions and determine whether or not an individual is trustworthy. Baron-Cohen (1995) states that theorists including Emery (2000), suggest that it is humans' reliance on face and eye cues that is responsible for our unique cognitive abilities such as language, acquisition, deception and cooperation. We also have brain structures that respond to gaze, thus, our processing of this information is hardwired (Emery, 2000), evidencing its evolutionary significance.

Within human-human interaction, social gaze, i.e. the "reliance on eye-gaze perception to guide and interpret social behaviour" (Frischen, Tipper & Bayliss, 2007, p. 694) indicates the importance of understanding user looking behaviour when attempting to understand user cognition. Gaze detection has been closely linked with theory of mind research from Baron-Cohen (1997) who suggests that individuals may perceive an agents level of interest in him/her via the agents visual behaviours displayed. Eye contact with a virtual agent or a common gaze direction may also indicate that there is an awareness of another intelligence in the environment i.e. the perception of a social presence (Short et al., 1976). It seems reasonable to suggest that the presence of virtual characters, especially when they hint a human physiognomy, more specifically eyes, may be related to the perception of social presence.

Risko and Kingstone (2011) highlight that people often behave differently when they know they are being watched. They investigated whether a social presence can influence an individual's gaze behaviour – a popular measure of attention allocation (Risko & Kingstone, 2011). Risko and Kingstone (2011) were interested in gaze behaviour to gain a better understanding of social attention and the characteristics of individual's gaze behaviour when they are engaged in social tasks. Their findings suggest that an implied social presence can alter users gaze behaviour and social attention, similar to Baumeister's (1982) findings, which state that the presence of others can lead to individuals altering their behaviour to communicate a positive self-impression. Applying this research to self-service technologies with a social presence may be beneficial in examining whether or not a social agent can influence user behaviour. Eye tracking has been developed to investigate gaze direction and associated cognitive processes (Duchowski, 2005), and thus provides a useful technique to investigate user interactions with interfaces, including the perception of agents.

6.1.3 Eye tracking

Eye tracking i.e. the recording of a person's eye movements and fixations has seen an enormous uptake in the past decade in the HCI literature and has been used for improving web design screen layouts etc. (Djamasbi, Siegel & Tullis, 2011; Duggan & Payne, 2009; Neilson, 2006; Sherman, 2005). Initial methods of eye-tracking date back over 100 years and were quite invasive- involving direct mechanical contact with the cornea. Dodge and Cline (1901) developed the first precise, non-invasive eye-tracking technique, whereby they used photography to record the movements of the eye accurately and non-invasively, and the same basic technique continued to be used into the 1970s. Nowadays, individuals are able to simply look at a screen where an (infrared) light is directed at the eye, and the light reflections from the cornea and pupil are used to infer where people are looking. This is the method used by one of the most often used eye trackers in the HCI community, the Tobii TX 300 (see Fig.11).

Figure 12 Tobii TX300 (Tobii pro, 2017)

The measurements taken from corneal reflections using the infrared technology consist of mainly two measures, 1) fixations which are considered to be the points in which the eyes remain still, and 2) saccades which are the movements that connect fixations. Scan paths are the patterns formed by fixations and their connecting saccades (Aaltonen, Hyrskykari & Raiha, 1998). Gaze duration is the time that an area is fixated on (Preece, Rodgers & Sharp, 2002). The duration of a fixation is typically 120-600ms, depending on what is looked at, while the saccades last only 30-120ms (Aaltonen et al. 1998). Eye

tracking measures can then be associated with different cognitive events (Jacob & Karn, 2003). Buswell (1935) conducted one of the earliest studies to examine ways in which people look at pictures and relating eye movements to attentional processes (Unema, Pannasch, Joos and Velichkovsky, 2005), stating "eye-movements are unconscious adjustments to the demands of attention during a visual experience" (Buswell, 1935, p.9).

Research focusing on how users look at interfaces suggests that users tend to approach an interface, such as online web, via an F-shape movement of the eyes. Neilson (2006) suggests that it is F for *fast* stating that users read content in a few seconds in a pattern that is very different from what you learned in school. Neilson (2006) conducted an eye tracking study focusing on gaining information on how 232 users looked at interfaces. He found that users' main reading behaviour was fairly consistent across many different sites and tasks. This dominant reading pattern looks somewhat like an F. Neilson (2006) concluded that the important finding to consider when designing an interface layout such as a website are:

"Users first read in a horizontal movement, usually across the upper part of the content area. This initial element forms the F's top bar; Next users move down the page a bit and then read across in a second horizontal movement that typically covers a shorter area than the previous movement. This additional element forms the F's lower bar. Finally, users scan the content's left side in a vertical movement. Sometimes this is a fairly slow and systematic scan that appears as a solid stripe on an eye tracking heat map. Other times users move faster, creating a spottier heat map. This last element forms the F's stem."(p.1)

Similar findings from Neilson (2006) in relation to users viewing pattern following an F-shape have been replicated within later eye tracking studies (Djamasbi, Siegel & Tullis, 2011; Duggan & Payne, 2009; Sherman, 2005). Thus, this should be taken into consideration when designing an interface, in the sense that important information should be displayed within the area 'drawn' by the F.

6.1.4 Fixations and cognition

Fitts, Jones and Milton (2005) describe several eye tracking metrics that were indicative of participants perceptions or cognitive processing, for example, fixation frequency (the number of times the eyes look at an area) and fixation duration (the duration of a fixation). Fixation frequency is a measure of an areas importance (Duchowski, 2002), fixation duration is a measure of difficulty of information extraction and interpretation, and the patterns of fixation transitions between displays as a measure of efficiency of the arrangement of individual displays. Fixation durations represent attention allocation (Henderson, 1993) and durations will be longer on more informative objects than less informative objects (Antes, 1974; Friedman & Liebelt, 1981; Unema, Pannasch, Joos & Velichkovsky, 2005).

Researching the finer details of eye movement measures, Van Gog, Kester, Nievelstein, Giesber and Paas (2009) stated that eye movement data can provide important information on cognitive processing. For, example, fixation duration has been found to increase with increased processing demands of a task, whereas the length of saccades decreases. This has led Van Gog et al. (2009) to suggest that fixation durations can be a measure of cognitive load, i.e. when there is too much going on and working memory processing becomes hindered (Clark, Nguyen & Sweller, 2006). Aaltonen et al. (1998) states that the more familiar the user is with an interface the fewer saccadic movements have to be made (Aaltonen et al. 1998). This finding is also related to research by Preece et al. (2002) who discuss experiential cognition which is a state of mind in which we react and perceive events effectively and effortlessly. Once cognition reaches a certain level of engagement, memory will store the information needed to interact with a similar environment. Van Gog et al. (2009) state that attention shifts associated with fixations, can be influenced by an individual's prior knowledge of a task and environment and also by the importance of the available information involved in the task. Increased knowledge of a task has been found to result in individuals fixating on task-relevant information (Haider & Frensch, 1999).

Linking eye movement behaviour with user experiences, Lu et al's. (2011) cognitive economy principle suggests that cognition strives to minimise effort and resources and states that cognitive efforts may lead to negative impressions. Fitts et al. (2005) states

that fixation duration is a measure of difficulty of information extraction and interpretation. Thus, longer fixation durations may indicate that a user is focusing on a specific area in an attempt to extract more information for clarity. Designers should take this into consideration when implementing features within an interface to ensure areas of importance receive the attention desired and are not inconspicuous or ignored. If an area within an interface is capturing attention but it does not serve a purpose, it may hinder performance by distracting the user and could lead to negative impressions.

Henderson (2007) stated that fixation durations may reflect changes in visual and cognitive difficulty. To test this theory he tracked participant's eye-movements whilst they looked at photographs of real life scenes and he turned off the scenes while the participant's eyes were in saccadic movement from one location to another. After a predetermined delay the scene was turned back on. The duration of the delay was varied and the influence of the delay on duration was measured. Henderson (2007) found strong evidence to suggest that fixation durations are systematically influenced by currently available stimulus information as data showed that when the scenes were turned off, the gaze control system often held the fixation until the scene became visible again. This finding provides a compelling demonstration that scene processing during a fixation can produce an immediate and direct influence on the duration of that fixation (Henderson, 2007). If researchers are considering the effects of an onscreen agent, then the agent design should remain consistent throughout the test as any changes to the agent could result in an effect of duration.

6.2   Experiment rationale

The eye tracking technology is of relevance to this study, as it provides a means to assess how users interact with an implementation of social presence via an interface agent displayed on a simulated SCO. The research presented in Chapter 2 discusses theories that may explain the underlying reasons as to why customers chose to steal at SCOs from a social presence perspective. Gneezy's (2005) research may explain an underlying motive for theft occurring at SCOs in that customers may feel they are stealing from a rich corporation rather than an individual, and feel less guilt as a result of this. Vohs and Schooler's (2008) findings suggest that deceiving participants into believing there will be no record of their behaviour may encourage dishonest behaviour as they will not feel judged for it. This may explain dishonest behaviours at SCOs as

customers may not feel that anyone is watching them or that there is any record of their actions in order for a judgement to be made, thus, there is no influence on behaviour that has been associated with there being a social presence (Zhao, 2003).

Furthermore, the qualitative findings presented in Chapters 4-5 suggest that the lack of social presence is associated with a higher likelihood of theft. Nowak and Biocca's (2003) research suggests that adding human-like features to a computer agent within a SCO may create a social presence and induce feelings of empathy and trust within users, which, in turn, could result in the transaction to be perceived more personal which may then encourage fewer instances of opportunistic (dishonest) behaviour and ultimately benefit industry by reducing theft (Howells, 1938). Parise et al. (1999) found that varying levels of human-like features can positively influence cooperation between users and agents. Therefore, the following two experiments will examine the effects of varying social presence in the form of computer designed agents, via manipulation of their 'humanness', i.e. agents that have human features or look more or less human-like, on opportunistic behaviour (cheating) in a simulated self-service checkout (SCO) transaction.

The present research also proposes that eye tracking data may illuminate consumers' behaviour with a self-service interface by displaying what captures users' attention, i.e. whether or not they fixate on the agent. It will explore how consumers engage with self-service technology interfaces that contain different levels of social presence, using eye tracking measurements. Eye tracking data (e.g. eye gaze and fixation counts) may be indicators of perceived social presence as research from Risko and Kingstone (2011) found that a social presence influenced users' looking behaviour. Therefore, these data will provide unobtrusive measures of what captures a viewer's attention and whether their attention can be guided by display features indicating a social presence, such as human-like display features. The findings from this research may also benefit potential industry/interface design guidelines as dishonesty/cheating costs businesses money; thus, research suggesting ways to reduce this could result in enormous savings. If this research suggests that displays can be shown to induce people to behave in an ethical manner, via the implementation of a perceived social presence, it could be the basis for research across multiple disciplines, such as psychology, business, and human-computer interaction.

The earlier review indicated that, eye tracking data (e.g. eye gaze and fixation counts) are associated with-user' mental model when they interact with a task (Duchowski, 2002). They can provide unobtrusive measures of what captures a viewer's attention and whether their attention can be guided by display features (e.g. highlighting relevant information or guiding attention via agents or other screen objects etc.) As eye tracking data are objective (e.g. fixation durations, fixation counts etc.) and do not rely of self-reports, they can highlight areas that a user sees but may not report to have seen. In addition, analysis of fixations is straightforward and usage of the tracker does not require any complex calibration procedures and set-up. The addition of eye tracking measures will provide a novel, integrated, and comprehensive account of perception and action as both relate to, and link in with, the consumer experience. Using the Tobii TX300 in the study enabled data to be collected quickly and accurately and participants did not need to learn how to use it or wear any restricting head gear. This reduces time and effort for the participants involved.

6.2.1 Hypotheses for experiment 1

The present study considers the social presence effects described within this and previous Chapters including research from Bateson et al. (2006) who found that a social presence within an environment can increase positive social behaviours and Zhao (2003) who found that social presence encourages people to modify their behaviours. Parise et al., (1999) found that varying levels of human-like features can positively influence cooperation. Eye tracking data were gathered to measure engagement with the SCO interface and the agents implemented within it. This present study examines whether a social presence in the form of computer designed agents, varying in 'humanness', i.e. agents that looked more or less human-like, will have an effect on opportunistic behaviour (cheating) in a simulated self-service checkout (SCO) transaction. It is expected that, varying the social presence via the implementation of social agents should be associated with less instances of dishonesty. Research from Risko and Kingstone (2011) found that users' gaze behaviour (fixations and durations) is influenced by a social presence. Therefore it is hypothesised that eye-tracking data will show that participants look at the social presence when it is present within the interface **(H1)**. It was also hypothesised that interfaces containing a high level of social

presence would result in fewer instances of opportunistic behaviour occurring compared to when there was a low social presence **(H2)** in line with research form Zhao (2003) and Bateson et al. (2006). It was predicted that the highest level of cheating would occur in the control condition with no social presence.

6.3 **Method**

6.3.1 **Experiment 1**

This research aimed to investigate the effect of a social presence (SP) on user behaviour. Participants were taking part in a simulated retail checkout scenario, in which they were exposed to opportunities to cheat to benefit themselves financially, by, for example, redeeming a voucher they did not deserve, or selecting less weight for produce or fewer items that needed entered into an item list on a SCO (see Procedure for details). There were 3 levels of the Independent Variable, i.e. high social presence, low social presence and a control condition on a simulated self-service checkout screen a user had to navigate in a simulated shopping transaction. In the high social presence condition, a pair of eyes was presented on the screen within a shape representing a shopping bag (see Fig. 12).

 Eyes were used to represent a high level of social presence as previous research from Bateson et al. (2006) found that a social presence in the form of a picture of a pair of eyes, resulted in positive social behaviour. Research from Burnham and Hare (2007) states that eyes can activate "neural architecture dedicated to eye detection". This may also trigger social responses described within theories including Computers as Social Actors and social agency theory (Marakas et al. 2000; Kim & Baylor, 2016). The low social presence condition removed any human-like features that have been associated with social presence (Bateson et al., 2006) and contained a bag with a logo saying "shop & go" (see Fig. 13). In the control condition there was no bag at all (see Fig. 14). The control condition was included to measure engagement within the area that the agent was implemented on the screen to establish whether participants were looking at the agent or was it simply that they always looked at that part of the screen. The Dependent Variables included instances of cheating and fixations on the social presence across conditions. Further explanation of these measures is given in the following sections.

6.3.1.1 Design

There were three levels of the Independent Variable: High Social Presence (HSP), Low Social Presence (LSP), and the condition with no social presence (Control). Using a between-subjects design, participants were assigned to the three different Social Presence conditions (HSP, LSP, Control). Dependent Variables were instances of cheating and eye tracking data to assess the effect of social presence. More specifically, instances of cheating in each condition included the reported receipt amounts, instances of cheating (by selecting lesser weights or amounts), the number of people who cheated within each condition and the number of people who accepted a money-off voucher (see Procedure for details). The eye tracking data included the average fixation duration times within the area of interest (the social presence), and the fixations counts. All participants completed two shopping scenarios (2 shopping baskets), both in the same condition (HSP, LSP or Control) that they were assigned to.

Figure 13 High Social Presence Condition, HSP (bag with eyes & logo)

Figure 14 Low Social Presence Condition, LSP (bag with logo, i.e. text "Shop & Go")

Figure 15 Control condition (no bag, eyes or a logo)

6.3.1.2 Participants

Forty-four (20 female, 24 male) participants with an average age of 26 took part in the study, all recruited from Abertay University. There were 14 participants in the HSP (eyes) condition, 15 in the LSP (bag, no eyes) condition and 15 in the Control condition. All participants had experience with computers and self-service checkouts. The study received ethical approval from Abertay University's ethics committee prior to the start of the study.

6.3.1.3 Materials and Apparatus

A simulated SCO was used to measure participant behaviour (see Fig. 15), consisting of a touch screen monitor and a barcode scanner, which collected participant responses. A Tobii TX300 eye tracker was used to collect gaze behaviour while participant's interacted with the simulated SCO. The TX300 allows easy testing of screen-based stimuli without extensive calibration or user set-up procedures, i.e. it does not require goggles or head mounted gear– the participant merely sits in front of the screen while his/her eye movements are recorded. There was a barcode scanner connected to the hard drive for the Tobii. There was a chair for the participant to sit on in front of the Tobii. Although sitting at a SCO is not be ecological valid for the majority of customers who use SCOs, it was required to allow for eye tracking data to be collected in the sensitive zone in front of the screen to avoid/reduce the occurrence of missing data. Item scanning movements were not impaired by participants sitting when they were doing the task.

Figure 16 Setup of the experiment

There were 20 shopping items used in the study and a bottle of screen wash was used as an example item for a demonstration in using the barcode scanner and the touch screen monitor. Microsoft Paint was used to develop the interfaces used in the experiment (See Fig. 16). There were 81 slides programmed onto the Tobii eye-tracker to represent the self-service interface procedure created via Power-point using a self-service checkout design provided by NCR. The social presence was placed on the top right of the screen with the main SCO content screen being placed on the left, following findings from Djamasbi et al. (2011), Duggan et al. (2009), Neilson (2006) & Sherman (2005) who suggest that users view interfaces first reading in a horizontal movement across the upper part of the content area. The position of the SCO content screen was also representative of a typical SCO interface to encourage a natural interaction (Clark, Nguyen & Sweller, 2006; Norman, 2004).

Figure 17 The simulated SCO checkout interface display, containing a bag with eyes and logo, i.e. HSP

6.3.1.4 Procedure

The experiment took place in a laboratory setup at Abertay University where participants were received. Upon arrival for the experiment, all participants were given an information sheet and consent form (Appendix 15 & 16) stating they would be taking part in research that involved scanning barcodes. The participant information sheet also explained that they could withdraw at any time and that all data collected would be treated with confidentiality and would remain anonymous. Participants were also informed that there were no known dangers of using the eye tracker. After providing informed consent, participants were then taken into a room that contained the Tobii eye-tracker with the simulated checkout screen and shopping items placed next to it.

Participants were asked to sit on a seat in front of the eye tracker and were shown an example of how to use the barcode scanner to scan an item and how to use the touch screen on the eye tracker's monitor. The researcher deceived the participants by suggesting that the research was taking place for a multinational company who wanted to examine the effectiveness of a new barcode reading system, as a bias for dis/honest behaviour was to be avoided. They were also informed that the eye tracker had been introduced as part of a study that was looking into interface design. Participants then completed a calibration process on the eye-tracker with the researcher. The researcher informed them that the eye tracker would not record their behaviours, only where their eyes look on the screen. They were also informed that they would complete the experiment alone in the room and that they were to go to a different room to tell the researcher when they were finished. This was true, however, it was also mentioned as a way of reducing the social presence effects of the researcher.

The participant was informed that there were two shopping baskets, represented by 2 rows of items that were already laid out, to be scanned in the order that they were presented. Participants were told that there were items that were to be scanned, weighed or counted. There were 3 items that had weights on them in the first basket and 3 items to be counted in the second basket. It was explained that these were put in simply to cause an interruption in the barcode reading process to resemble a real life shopping experience.

Participants were informed that the items were continuously changing to test as many barcodes as possible and that the weights may not be accurate. If this were the case then participants were to select the weight they believed to be fair. This was also said to introduce the idea that the experimenter was unaware of the cost of the items. Participants were asked, to write down the total cost and how much change they were due after they had completed scanning each item row, as they would receive the change from £10 per basket, on a receipt slip. Thus they would be receiving the change from £20 in total. They were to give the receipt to the researcher at the end of the experiment. The researcher gave a quick demonstration of how to use the bar code scanner and touch screen. The researcher then allowed the participant to have a practice of scanning a barcode on a bottle of screen wash which had been pre-programmed into the Tobii. This aimed at providing the participant with practice but also in suggesting to them that the Tobii was responding to what they had scanned in real-time, where as it had actually

been pre-programmed. The researcher then left the participant alone in the room to complete the task.

6.3.1.4.1 The Dilemmas

Using research from Vohs and Schooler (2008) as inspiration for the present experimental design of dilemmas, the following manipulations were included within the experiment to assess participant honesty.

6.3.1.4.1.1 Dilemma 1

The first basket of shopping to be scanned involved participants' receiving the change from £10. This had been pre-programmed to be £2, as the total bill of the items scanned in the first basket equalled £8. Participants were instructed to scan items and select a weight shown on the screen for the products that had weights. A dilemma had been created as none of the weights were accurate and all of the weights that were presented were less than the stated weight on the shopping item. The participant had to choose a weight of their choice from three slightly inaccurate weights on screen. The dilemma was input to measure whether the participant chose to act in an opportunistic manner by choosing a much lesser weight than the one displayed on the product. In doing this, they may presume that the total cost of the basket would be reduced. Thus they would gain more money at the end of the experiment if they chose the least weight.

6.3.1.4.1.2 Dilemma 2

The second basket of shopping to be scanned also involved participants receiving the change from £10. This basket involved participants scanning a row of items and selecting how many items there were of certain products e.g. selecting the number of apples that were present. Participants were to select the number of items via a keypad on the screen. This basket measured whether participants chose to act in an opportunistic manner by choosing a lesser number of items (such as apples), as this may have been presumed to reduce the total cost of the basket.

6.3.1.4.1.3 Dilemma 3

At the end of the scanning process, participants were wrongly offered an opportunity to "Accept" a £1 voucher as it claimed they had spent more than what the total came to. Participant could either accept or reject the voucher. Accepting the voucher indicated an

instance of cheating. At the end of the experiment participants were fully debriefed (Appendix 17) on the true nature of the study, including the deception element, and were given the option to have their data removed.

Participants were asked again if they were happy for their data to be used for analysis. A consent form (receipt) was also signed at the end of the experiment to confirm that the participants had given consent for their data to be reviewed and to confirm that they had received their payment. All participants agreed to their data being kept for analysis.

The researcher kept the receipt that was returned to them, and also looked at the video recording of the screen which indicated participants' responses to assess how opportunistic the participants had been throughout the experiment. It should be noted that the video did not record participants themselves, just their responses on the touch screen which were flagged and recorded with bespoke inbuilt software.

To summarise, the occurrence of cheating within the experiment was manipulated within the first basket as follows: the weight buttons consist of weights that are 15g less, 30g less and 45g less than the stated weight on the products. Each time the participant selects a weight that was greater than 15g less, it was considered as acting opportunistically. For the second basket of shopping, cheating analysis looked at the number of produce items that had been selected by the participant (e.g. number of apples), and any number that was less than the number of items present, was considered cheating. Finally, accepting a money-off voucher was considered cheating.

6.4 Experiment 1 Results

All quantitative data were subjected to statistical analysis and visualized in combination with the qualitative data from heat maps and gaze plots which display the density of fixations within an interface (see Fig. 17; 18; 19; 20). A one-way Analysis of Variance test (ANOVA), with Social Presence as factor, Kruskal Wallis and Chi-square tests were conducted for the analysis. Analysis of a user's eye movement patterns while interacting with the interface allowed us to detect where participants were looking and whether they looked at the social presence producing heat maps that indicated where the user's attention was focused whilst interacting with the interface. The Tobii eye tracker also allows for analysis to apply measurements on *areas of interest,* for example, on the

specific areas containing the social presence (i.e. the upper right corner, containing the eye (HSP), bag logo (LSP) or no presence (Control), respectively). This then provides statistics relating the number of fixations and durations that occur within that area of interest as an indication of user engagement.

In the following section, the eye tracking data are presented first to assess whether the different levels of social presence resulted in different attentional engagement, i.e. whether participants looked at the social presence (**H1**). Following this, the findings for opportunistic behaviour i.e. dishonest behaviour as a function of social presence implemented in the interface were analysed. This was to establish whether a higher social presence would result in fewer acts of dishonest behaviour than a low social presence. (**H2**) The results are presented in the following section.

Quantitative performance data were:

For H1

- Average fixation duration and
- Average fixation count within the area containing the social presence

For H2

- Receipt amounts reported.
- Instances of cheating
- Number of people who cheated
- Number of people who accepted the money off voucher

Analysis was conducted on average fixation durations and the average fixation count, within the area of interest on level of social presence being either high, low or none (HSP, LSP, Control) (see Table 4 for variables, test statistics and findings). Statistical analysis was also conducted on receipt amounts, instances of cheating, the number of people who cheated and the number of people who accepted the money off voucher in each condition (HSP, LSP, Control). Results that are statistically significant are presented in **bold**. For the post-hoc tests the p size for a significant result was reduced to 0.017 to account for multiple testing to decrease the likelihood of a Type 1 error.

Table 4 Statistical Analysis

Analysis	*p*-Value	*Post-hoc*	**(Statistical test)** and conclusion
Average Fixation Durations	*p*=0.65		**ANOVA** There was no significant effect of Social Presence on average fixation durations. (no support for H1)
Average Fixation Count	**_p_=0.001**	**HSP v Control _p_<0.017** **LSP v Control _p_<0.017** HSP v LSP *p*>0.017	**(ANOVA)** These results indicate a significant main effect for Social Presence on Fixation counts. Post-hoc tests indicated that the HSP and the LSP drew attention to the area of interest containing an agent design in comparison to the Control condition, which had an empty space (see Fig. 22). This was predicted and supports H1, highlighting that people noticed the presence of the agent. Fixation counts for HSP and LSP did not significantly differ.
Receipt Amounts	**_p_<0.001**	**HSP v Control _p_<0.017** **HSP v LSP _p_<0.017** LSP v Control *p*>0.017	**(ANOVA)**These results suggest that a high social presence, HSP, resulted in greater cash amounts being reported as being owed to participants, i.e. they cheated more compared to the low social presence, LSP, and Control condition (which did not differ), (See Fig. 23).

Instances of cheating	p=0.07		**(Kruskal Wallis)** The main effect of Social Presence approached, but did not reach significance (See Fig. 24), providing no support for H2.
No. of people who cheated	**p=0.046**	**HSP v LSP p=0.017** HSP v Control p>0.017 LSP v Control p>0.017	**(Chi-Square)** Statistically more people cheated in the LSP condition than in the HSP condition as predicted, supporting H2. However, there was no significant difference found between the HSP condition and the Control condition or between the LSP and Control condition regarding the number of people cheating. These results are a surprise as they contradict H2.
No. of people who accepted the money off voucher.	p=0.5		**(Chi-Square)** There was no significant effect of Social Presence on the number of people accepting the voucher. The relationship between these variables was not significant, X^2 (2, N = 44) = 6.3, p=0.58, providing no support for H2.
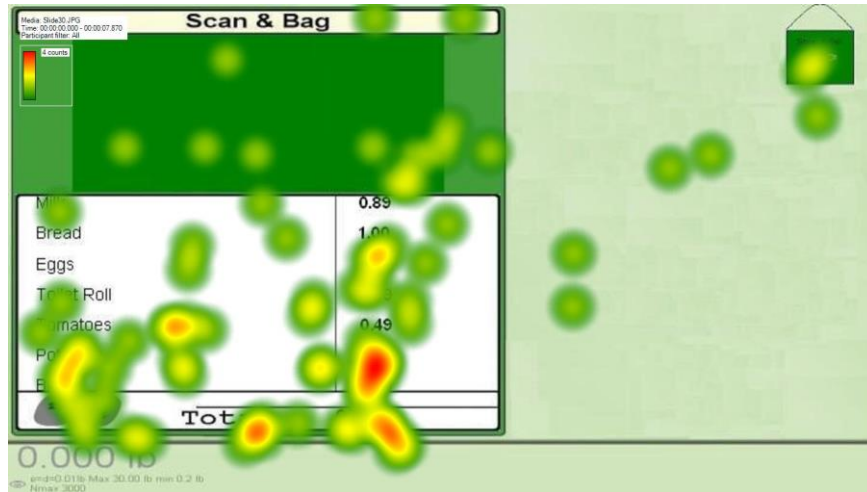
Figure 18 Heat-map image showing high density of the participants' fixations on and around the implemented social presence in the high social influence condition.
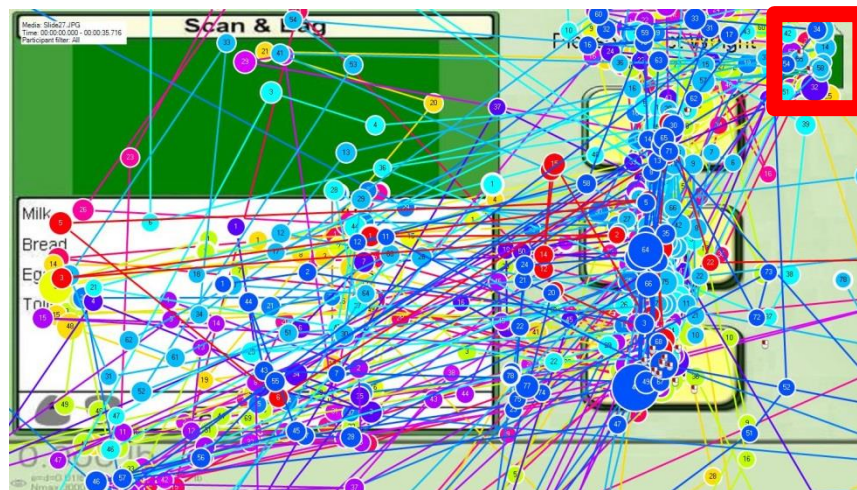
Figure 19 Gaze-plot confirming participants' fixated on the implemented social influence in the high social presence condition (HSP).
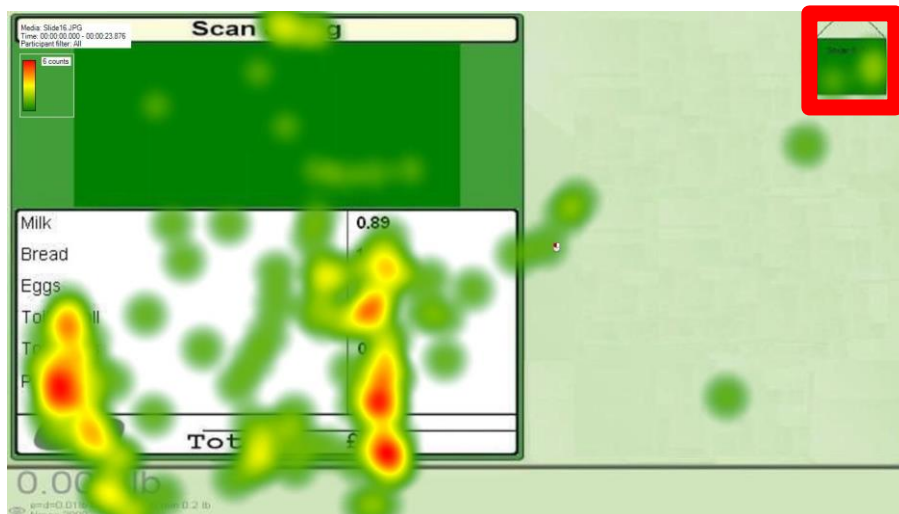
Figure 20 Heat-map showing participants' fixated on the implemented social influence in the low social presence condition (LSP).

169
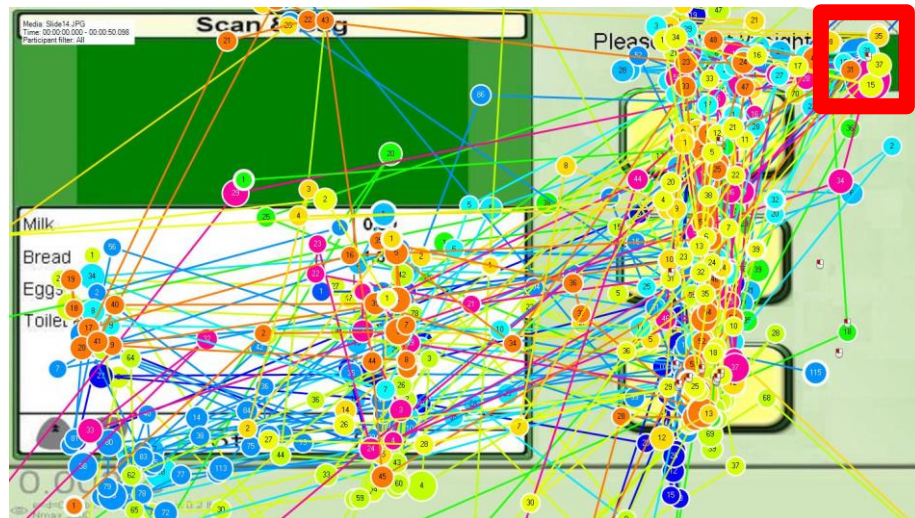
Figure 21 Gaze-plot confirming participants' fixated on the implemented social influence in the low social presence condition (LSP).
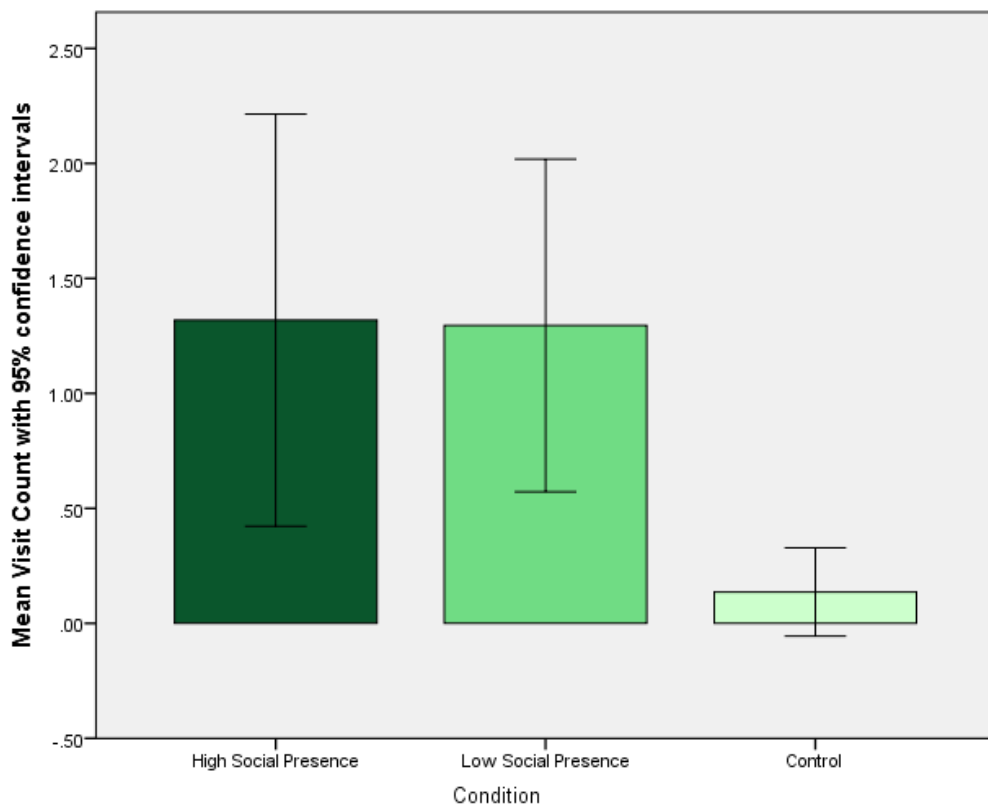
Figure 22 Means and 95% confidence intervals for the average count of fixations with the Area of interest for each condition.

.
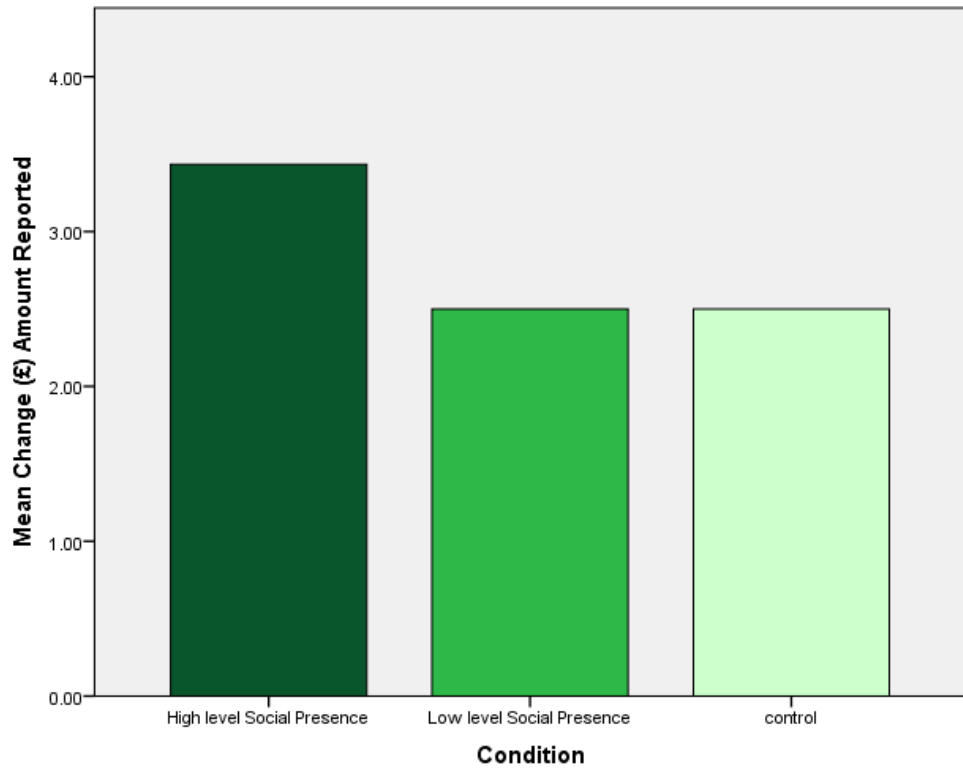
Figure 23 The mean amount of change reported as being due to the participant. Higher bars indicate more dishonest behaviour.
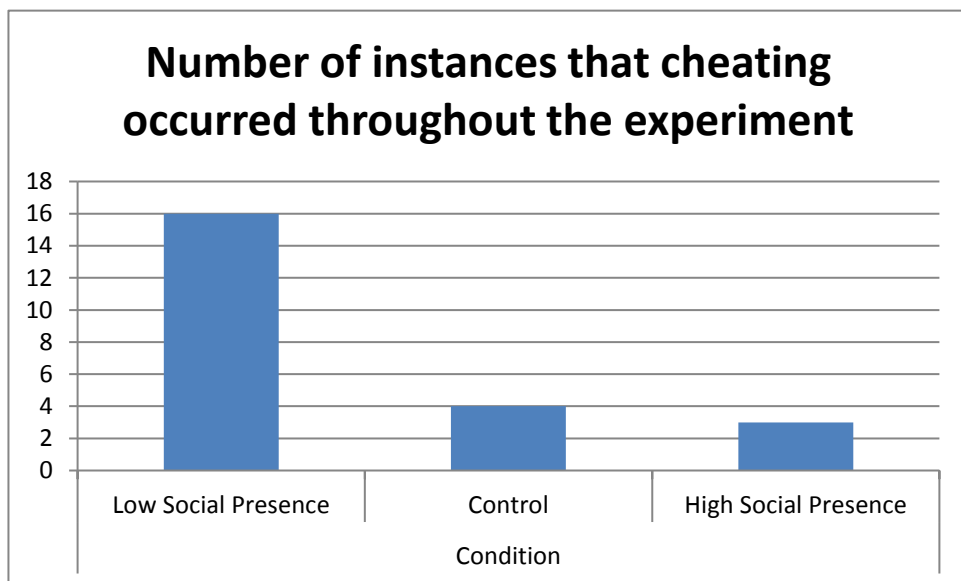
Figure 24 The number of instances that cheating occurred throughout the experiment (i.e. selection of lesser weights, lesser items & accepting £1 off voucher). Higher bars indicate more dishonest behaviour.

6.5 Experiment 1 Discussion

This research aimed to investigate the effect of a social presence on user behaviour. There were 3 levels of the independent variable, high social presence, low social presence and a control condition (HSP, LSP, Control) on a simulated self-service

checkout screen a user had to navigate in a simulated shopping transaction. In the high social presence condition a pair of eyes were presented on the screen within a shape representing a shopping bag (see Fig. 12). In the low social presence condition, a bag with a logo was used. It was predicted that most instances of cheating would occur in the control condition, which had no social presence. It was hypothesised that the condition with the HSP would result in the lowest level of cheating occurring. It was also hypothesised that eye-tracking data would show that participants looked at the social presence when it is present within the interface.

The findings from Experiment 1 provide mixed support with respect to the Hypotheses. Hypothesis 1 (H1) was supported as eye-tracking data showed that participants fixated on the social presence when it was present within the interface (HSP condition a pair of eyes within a shape representing a shopping bag (see Fig. 12) and in the LSP condition, a bag with a logo). This finding supports the suggestion from Risko and Kingstone (2011) who state that users' looking behaviour is influenced by a social presence. This finding suggests that if a similar sized design were to be integrated within a SCO, it would be noticed by customers. However, with respect to Hypothesis 2 (H2), the findings did not support that the High Social Presence (HSP), i.e. have eyes integrated, would result in fewer instances of opportunistic behaviour, as our HSP did not significantly differ from the Control condition. Although the LSP condition did significantly show more instances of cheating compared to the HSP, it was not significantly different from the Control condition. This result was a surprise and is the opposite of the prediction for H2 as it predicted that the lowest level of social presence, i.e. the Control condition would have the most instances of opportunistic behaviour. These findings suggest that a social presence within an SCO interface would be noticed by customers and it appears to influence gaze behaviour, however, there was no noticeable influence of social presence. These findings are consistent with research from Parise et al. (1999) who concluded that agents that are perceived as being "too artificial" (p.125) and are unappealing to the user can result in reduced levels of cooperation. They found that participants were likely to cooperate, and to keep their promises, with computer character that looked like a person. There is perhaps a point that participants initial response to the social presence decline as they may interpret it to be too simplistic a design to maintain an influence on behaviour, suggesting that further research with a variation of the social presence is necessary.

The results from Experiment 1 found that there were no significant differences in mean fixation durations within the areas of interest on the interfaces for all conditions. There was a significant difference between the mean numbers of fixation counts within the areas of interest on the interfaces; there were a greater number of fixation counts within the area of interest for the low and high social presence conditions compared to the control condition. The low and high social presence logos drew the users' attention; however, they did not differ from one another in the level of attention drawn as there was no significant difference between fixation counts or durations for the two conditions. This finding suggested that the social presence was positioned well within the interface as participant gaze was drawn to it throughout the experiment.

Experiment 1 highlighted that opportunistic behaviour does occur in self-service environment as 89% of participants accepted the £1 off voucher that they were not deserving of. The effect of condition on the amount of money reported by participants' receipts was found to be significant. The HSP condition resulted in greater cash amounts being reported as being owed to participants than the LSP condition and the control condition. This is the opposite from what was predicted. This may be a result of the social presence being too basic, thus, it may not have achieved the desired behavioural effects associated with a social presence, such as a positive influence on behaviour (Bateson et al., 2006).

Experiment 1 appeared to have resulted in the opposite effect than was anticipated when looking at Fig. 22, as higher cash amounts were retrieved by those in the high social presence condition than in the control condition which was surprising. However, Fig. 23 shows that the highest occurrence of "active" opportunistic behaviour occurred in the condition containing the bag without eyes, as more participants chose lesser weights and fewer items than were present. A further analysis showed that significantly more people actively cheated in the low social presence condition than in the high social presence condition as predicted, i.e., more frequently chose lower weights in the low social presence compared to the high social presence condition. These accounts of cheating were found when reviewing the recordings from the experiments which showed the weights selected for items and the numbers of items selected. For example, analysis of the occurrence of cheating within the experiment was measured by counting the number of times participants selected a weight that was greater than 15grams less. Analysis of

the occurrence of cheating was also measured by counting the number of times participants selected any number that was less than the number of items present. This is consistent with our hypothesis, as it was predicted that a high level of social presence would result in fewer instances of opportunistic behaviour. It was also found that more participants cheated in the low social presence condition than in the high social presence condition which again supports our hypothesis although neither were significantly different than the control condition which suggest further research needed to be completed looking at the social presence.

Burnham and Hare (2007) used a public goods game within a laboratory experiment, to examine whether or not humans use involuntary eye detector mechanisms to evaluate privacy levels. Half of their participants were "watched" by a robot that was presented on their computer screen. The robot was designed from objects that were not human; however, they did include human-like eyes. The human-like eyes were added to examine whether or not they would activate the participants' "neural architecture dedicated to eye detection," (Burnham & Hare, 2007). It was predicted that this activation would cause participants to adjust their behaviour as if this activation had occurred while observing the eyes and face of an actual human. The findings from their study showed that the condition containing the robot produced a significant difference in behaviour. The participants, who were "watched" by the robot, contributed 29% more to public good than the participants who were not watched. The present research examined the effect of a high social presence on instances of cheating and found that more people cheated in the condition with the low social presence, however this only approached significance. There was also no significant difference found between the high level of social presence condition and the control condition nor was there a significant difference between the low level of social presence and the control condition for instance of cheating. This may have been due to the design of the low level of social presence agent being too simplistic resulting in an opposite effect on behaviour than what was found in Baumeister's (1982) study i.e. did not induce a positive self-impression.

The effect that the presence of eyes appears to have on participants behaviour, may be explained by Beaman et al.'s (1979) and Mazar et al.'s (2007) theory of self-awareness which involves individuals considering their internal standards and making sure that

their behaviour is consistent with these standards. Martinez et al. (2011) found that users follow a virtual agent's gaze and that it can influence their communication. Bateson et al's. (2006) finding suggest that people were more likely to pay a contribution towards their drinks when a pair of eyes were present compared to when they were not. This finding may link with the finding from Experiment 1, although not significant, it showed less instances of cheating in the HSP containing the bag with eyes and logo compared the condition just containing the bag and logo without eyes (LSP) or nothing at all (Control).

Küster, et al. (2015) states that if people identify themselves more with agents with human representations, they may be more motivated to engage in empathic behaviour. A study by Riek, Rabinowitch, Chakrabarti, and Robinson (2009) found that people empathised more strongly with human-like robots that were shown to be maltreated by humans, compared to those that looked mechanical. Furthermore, participants' sense of responsibility was influenced by the degree of human-likeness of the system. For instance, when carrying out a joint task, participants took less credit and more responsibility for successfully completing the task when they collaborated with a human-like robot than a mechanical one (Hinds, Roberts & Jones, 2004). This was concluded as an indicator that they relied more on and shared responsibility with their humanoid partner. Together these findings suggest that a human appearance proves beneficial in the attribution of cognitive and social qualities. Hence, computerized systems should profit from human-like representations by rendering the interaction more intuitive and socially engaging (Küster, et al., 2015). This suggests that the agent within the current study should be enhanced to appear more human-like.

6.6 Conclusion

The findings show mixed results with respect to the effect of social presence on cheating and attentional engagement. One reason may be that the manipulation of social presence was not efficient or strong enough to be perceived. The background research discussed relating to the effects that a social presence and eyes can have on behaviour along with some of the findings from Experiment1, suggest that a having a high level of social presence in the form of eyes, could affect the likelihood of opportunistic behaviour occurring. However, cartoony eyes were used in this experiment, and this

may perhaps not have been sufficient to induce a strong sense of social presence. Shinozawa et al. (2005) showed that human qualities increased user performance and Nowak and Biocca (2003) found that human features created feelings of a social presence. Research presented in 2.4.2 on the effects of an anthropomorphic agent suggest that users respond to them in similar ways that they do with humans (Grange & Benbasat 2017; Lombard & Jones, 2015; Reeves & Nass, 1996). It could be assumed that a more specific implementation of 'humanness' in the form of embodied virtual agents may induce a higher level of social presence compared to eyes or a logo. Therefore, an additional experiment was conducted to investigate whether agents containing eyes, with varied humanness levels would create a social presence and effect levels of dishonest behaviour

6.7   Experiment 2

Shinozawa et al.'s (2005) research found that human qualities integrated within an on-screen agent, increased user performance in a decision-making task. Nowak and Biocca (2003) found that human features designed within computer agents created feelings of a social presence when participants interacted with them. Parise et al. (1999) found that varying levels of human-like features can positively influence cooperation. Therefore, Experiment 2 was conducted to investigate whether agents containing eyes, with varied humanness levels would create a social presence and effect levels of dishonest behaviour.

Experiment 2 involved the same method, design, materials and apparatus and procedure as Experiment 1, although this time it involved varying the degree of social presence in the form of different forms of agents with eyes. There were again, 3 levels of social presence integrated within the interface; one was a human like female agent (Human) (Fig. 24), which represented the high level of social presence (HSP). One was an embodied social agent ESA with coloured blots as eyes (ESA) (Fig. 25), which represented the low level of social presence (LSP) and one was a logo with eyes created in Microsoft Paint (LOGO) (Fig. 26), to represent the Control condition. The Human agent represented the highest level of humanness, followed by the ESA and then the LOGO. The scale for weight under the on-screen receipt was also removed as eye tracking data showed that it may have been causing a distraction. Parise et al. (1999) found that increasing levels of realism of human-like agents can positively influence

cooperation. Thus, a perceived realism questionnaire was also added to the experiment, providing ordinal data, to investigate whether or not this had an effect on the levels of opportunistic behaviour.

6.7.1 Participants

Forty-seven participants (25 female, 22 male) involved in Experiment 2. There were 16 participants in the Human condition (HSP), 15 in the embodied social agent (LSP) condition and 16 in the logo condition (Control). A participants were recruited from Abertay University and they all had experience with computers and self-service checkouts. The study received ethical approval from Abertay University's' ethics committee.

6.7.2 Design

Figure 25 Human agent condition with greatest humanness level (HSP)

Figure 26 ESA condition with medium humanness level (LSP)

Figure 27 LOGO condition with least humanness condition (Control)

Hypothesis 3 (H3)

There would be an effect of humanness level on eye movements, with higher level of humanness being associated with greater attentional engagement.

Hypothesis 4 (H4)

There would be an effect of humanness level on opportunistic behaviours with lower levels of opportunistic behaviour occurring as humanness levels increase.

6.7.3 Procedure

Participants experienced the exact same procedure as discussed in 6.3.1.4

6.8 Experiment 2 Results

Quantitative performance data were:

H3

- Average fixation duration and
- Average fixation count within the area containing the social presence

H4

- Receipt amounts reported
- Instances of cheating
- Number of people who cheated
- Realism scores rating the experience compared to a SCO experience
- Number of people who accepted the money off voucher

Analysis was again conducted on average fixation durations and average fixation counts, within the area of interest on level of social presence being either high, low or control (HSP, LSP, Control) (see Table 5). Statistical analysis was also conducted on receipt amounts, instances of cheating, the number of people who cheated, and the number of people who accepted the money off voucher, as well as the realism score for each condition (HSP, LSP, Control).

Quantitative performance data were retrieved by video recordings of the experiment and showed the number of instances that opportunistic behaviour occurred throughout the experiment and the number of people who acted in an opportunistic manner throughout the experiment. Results that are statistically significant are presented in **bold**. For the post-hoc tests the *p* size for a significant result was reduced to 0.017 to account for multiple testing to decrease the likelihood of a Type 1 error.

Table 5 Quantitative Analysis

Analysis	*p*-Value	*Post-hoc*	**(Statistical test)** and conclusion
Average Fixation Durations	*p*=0.52		**(One-way ANOVA)** There was no significant effect of Social Presence on average fixation durations (no support for H3).
Average Fixation Count	*p=0.046*	**LOGO v ESA *p<0.017*** Human v ESA *p>0.017* Human v LOGO *p>0.017*	**(One-way ANOVA)** These results indicate a significant main effect for Social Presence on Fixation counts. The results show that the LOGO condition drew more fixations to the area of interest in comparison to the Human condition and the ESA condition (Fig. 28), however they did not differ in duration (No support H3)

Receipt Amounts	*p*=0.54		**(ANOVA)** There was no significant effect of Social Presence on receipt amounts (no support for H4).
Instances of cheating	***p*=0.049**	**LOGO v Human *p*=0.01** Human v ESA *p*>0.017 LOGO v ESA *p*>0.017	**(Kruskal Wallis)** These results suggest that there were significantly more instances of cheating the LOGO (Control) (M=1.75) condition compared to the Human (M=1) condition (HSP) X 2 (3, N=32) = 11.07, p=0.01, supporting H4. However, the difference between the frequencies of cheating for the Human condition (HSP) and the ESA (LSP) condition was not significant X 2 (3, N=31) = 1.67, p=0.6 nor was there a significant difference between the LOGO condition (Control) and the ESA (LSP) condition X 2 (3, N=31) = 9.76, p=0.3. (Fig. 27).
No. of people who cheated	*p*=0.72		**(Chi-Square)** There was no significant effect of Social Presence on the number of people who cheated (no support for H4).
No. of people who accepted the money off voucher.	*p*=0.39		**(Chi-Square)** There was no significant effect of Social Presence on the no. of people who accepted the money off voucher (no support for H4).
Realism Score	*p=0.07*		**(Kruskal Wallis)** To examine the effect of condition and realism scores. The relationship between

			these variables approached but did not reach significance with a two-tailed test, $X^2 (2, N=47) = 5.38$, p=0.07. Mean score for realism was 2.7, rounded up this represents rating 3 which was "A lot like a SCO experience".
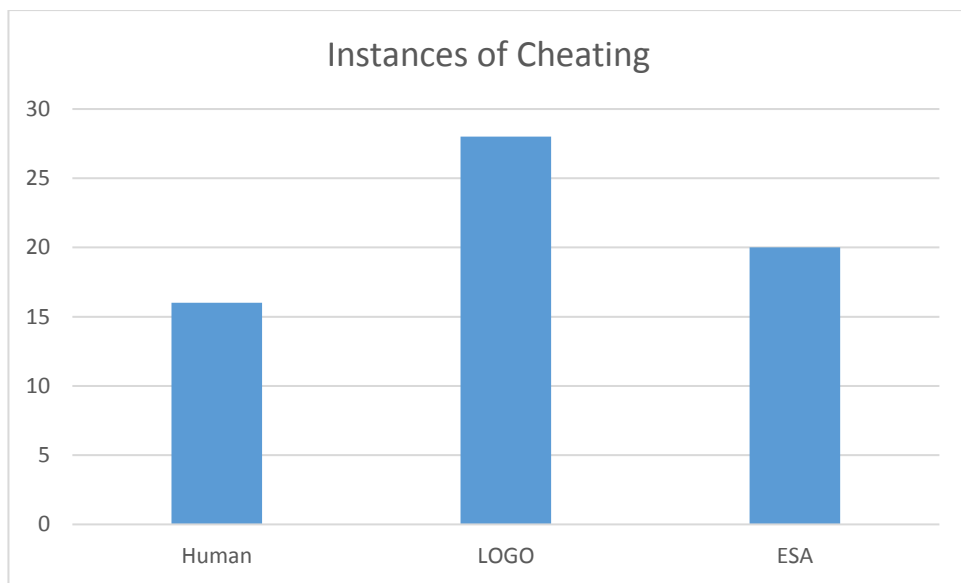
Figure 28The number of instances that cheating occurred throughout the experiment. Higher bars indicate more dishonest behaviour.
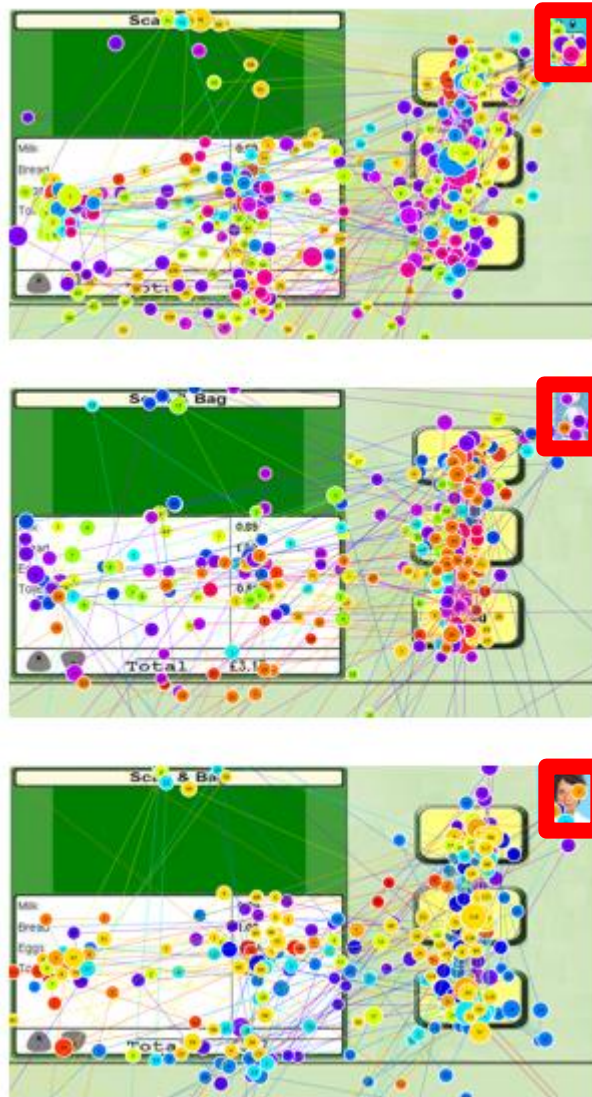
Figure 29 An example of a higher frequency of participants' fixations on the LOGO social presence compared to the ESA and Human condition highlighted by the red square.

6.9 Discussion

The present study investigated whether the influence of a social presence, such as that found in Nowak and Biocca's (2003) study and suggested by Howells (1938) and Bateson et al. (2006), affected dishonest behaviour. According to research from Shinozawa et al. (2005) and Nowak and Biocca (2003), it was predicted that there would be an effect of humanness level on opportunistic behaviours with greater level of opportunistic behaviour occurring as humanness levels (social presence) decrease. It was hypothesised that there would be an effect of humanness level on eye movements, with higher level of humanness being associated with greater attentional engagement. It

was also hypothesised that interfaces with a HSP, i.e. greater levels of humanness would result in fewer instances of opportunistic behaviour occurring.

The results showed that there was no significant difference of social presence on average fixation durations on the social presences, indicating no support for H3. There was a significant difference between average fixation counts on the social presence with the LOGO condition receiving the greatest number of fixation counts. This may have been a result of the writing on the logo resulting in people reading what it said, however, the average fixation durations were not significantly different between conditions thus it does not suggest that it received more attention than the other conditions (Unema et al. 2005). It may also have been due to the design of the eyes in the logo or the design of the logo itself.

With respect to Hypothesis 4 regarding the association between cheating and social presence, there was also no significant difference between social presence conditions regarding the amount of money reported on participant receipts. There was no significant difference between social presence conditions regarding the number of people who cheated. There also was no significant difference between social presence conditions with respect to the realism scores provided by participants. There was a significant difference in the instances of cheating between conditions with the LOGO condition receiving the greatest frequency for participants cheating. Thus the hypothesis stating that there would be an effect of decreased humanness level on opportunistic behaviours was supported (H4) as the LOGO was representative of the lowest level of humanness. Biocca (1997), states that there is a difference between something being viewed as physically present and socially present. Participants' may have looked at the LOGO but not perceived it as being a sufficient social entity, which would explain why there is not a significant difference between fixation durations (Duckowski, 2002). This may also explain similar findings from Experiment 1.

The Human condition (HSP) received the lowest number of instances of cheating; however, this was not significantly different from the ESA (LSP). The Human condition and the ESA condition both included human-like characteristics as the Human agent has human-like facial features whereas the ESA agent had human-like features in the form of a body with a head and arms. These characteristics may have resulted in people

feeling like there was a social presence on screen thus resulted in fewer instances of cheating compared to the LOGO condition (Haxby et al., 2000; Shinozawa et al. 2005).

The Human condition resulted in the greatest number of people choosing not to take the money off voucher that was wrongfully presented to them, followed by the ESA condition. The LOGO did not show anyone decline the voucher. Sproull et al. (1996) states that the anthropomorphic representation renders a computer system more approachable whether it is embodied or physical. Though not significant, the findings from this study may be a result of the Human and ESA agents creating a greater social presence than the LOGO design. The Human and ESA agents may have resulted in feelings of caring and bonding from the participant in line with findings from Batson (1990) who states that humans are social animals who have an inherent need to care and bond with others. These findings may also be explained by Dautenhahn and Billard's (2002) theory that high levels of social presence create feelings of companionship resulting in fewer instances of opportunistic behaviour. As there has been a significant difference between decreased humanness levels and the number of instances of cheating (H3) appears to be supported, however, the results do not clearly indicate whether the Human agent or the ESA design would be better at reducing opportunistic behaviour, further testing is required to distinguish them from one another.

6.9.1   Limitations and considerations

All participants accepted and many reported to the researcher that they were due the £1 voucher that was wrongfully suggested to be owed to them. This finding may suggest that people are generally inclined to want to maximise their gain. However this may have due to participants being confused by the statement that said "As you have spent over £10 you are due a £1 off voucher". They were able to accept or decline this although they may not have realised that accepting the voucher that was wrongly suggested to them was a form of dishonesty. This would reduce their accountability and may not be a reliable representation of cheating. The method used within Vohs and Schooler's (2008) research, where participants were to press the space bar to avoid "cheating" may provide a better design for interpreting levels of dishonest behaviour. This should be applied within future research by ensuring the text cannot be viewed as encouraging their decision to accept the voucher.

Due to experimental setup, the findings cannot be generalised to be representative of a supermarket environment thus future research should be investigated within a more realistic setting. It is important to highlight that SCOs within a store setting have many other factors that may affect opportunistic behaviour, such as the number of SCOs, the number of customers at the SCOs, busyness of the store etc. Future research may want to test whether or not any of these factors have an effect on opportunistic behaviour. A positive aspect of the present research is that it uses a Tobii eye tracker which allows natural interactions with a simulated self-service system for the collection of qualitative data on user behaviour. Regarding the dilemma within the design of the study, it enabled us to view active opportunistic behaviour and support findings from researchers such as; Ariely (2012), Accenture (2003), Mazar and Ariely (2006), and Smith (1999) who provide examples of day-to-day dishonest behaviours occurring from good people. Further research considering the effects of having eyes integrated within interfaces and a variety of humanness levels of agents, for self-service technologies would be beneficial for the retail industry.

It is difficult to fully determine the participants' perceptions of social presence on their behaviours alone. Leite et al.'s (2009) study involving a social robot playing chess against a human opponent, measured social presence using Biocca and Harms (2003) networked minds social presence inventory (NMSPI) questionnaire examining six dimensions of social presence. Putten et al. (2009) measured perceptions of social presence using the NMSPI for users with a belief that they were interacting with either an avatar of an agent. Future research should consider examining perceived levels of social presence using a measurement tool. This is likely to provide more insight into the participants' perceptions of social presence within the condition they are in.

6.10 Conclusion

The current findings suggest that social presence may have a relationship with increased levels of humanness. Findings from the experiments showed that significantly more people cheated in the condition with the lowest levels of humanness compared to the condition containing the highest levels of humanness. However, the findings suggested that the effective level of humanness was difficult to determine as instances of cheating did not differ significantly between the Human and the ESA condition. Nonetheless,

these findings suggest that an increased social presence in the form of a human agent, may result in fewer instances of cheating. If there is a relationship between social presence and perceived humanness of an agent, then it may be applied to SCO to reduce opportunistic behaviours, such as theft. Further research is needed on the effects of humanness of agents on opportunistic behaviour.

6.11 **Chapter summary**

This Chapter aimed to further discuss research associated with social presence and its importance within a retail environment to reduce opportunistic behaviour from customers. It adopted an empirical approach to examine the potential influence that a social presence within a SCO, in the form of an agent, could have on customer behaviours. The findings suggest that there may be a relationship between increased social presence and the likelihood of thefts occurring at a SCO. The research findings also suggest that humanness levels of an agent may increase perceived social presence, which could result in reduced opportunistic behaviours. Greater levels of humanness may have resulted in participants perceiving the system as having more qualities associated with a human such as awareness, also recognised as an associate of social presence (see section 2.4.1.1 p.79). This may then lead users to believe that their behaviour could somehow be monitored by the machine, reducing the likelihood of them acting opportunistically. Further research measuring the perceived social presence via increased levels of humanness will be beneficial to display whether it could be a possible method of reducing thefts at SCOs.

Burgoon, Bonito, Bengtsson, Cederberg, Lundeberg & Allspach (2000) suggest that agents can be made to appear more human by creating human-like physical features, gestures and a voice. Current designs of SCOs have a voice that is designed to guide the user through their transaction. This may be considered as a social presence however it doesn't appear to influence the likelihood of thefts at SCO in supermarkets in its current form. Research from Nowak and Biooca (2003) states that anthropomorphic virtual bodies with human voices may consistently elicit social responses. Thus, additional research focusing on the influence of the voice with a SCO should be examined. Burgoon et al. (2000) also states that agents can be designed to be interactive and use information provided by the user, along with algorithms, to apply the details to

interactions. If agents were to be perceived as being interactive via the voice on a SCO then it could potentially increase the perceived humanness of an agent resulting in increased social presence and reduced opportunistic behaviours. The following Chapter will examine this theory further.

7 CHAPTER 7 Study 5 Social presence of anthropomorphic agent and interactivity of "the voice".

Experiment 1 in Chapter 6 investigated whether social presence induced by agent features such as eyes influenced users' social responses as humans have involuntary perceptual systems that respond to stimuli of faces and eyes (Emery, 2000; Haxby, et al. 2000). The results were inconsistent but there was some evidence that high social presence (eyes) resulted in fewer number of people cheating compared to lower social presence (bag with logo). As a result of the findings presented in Experiment 1 in Chapter 6, Experiment 2 manipulated the anthropomorphism of the social presence using updated designs to represent human like features as research suggests increasing human-like features can promote cooperation (Hinds et al., 2004; Nowak & Biocca, 2003; Parise et al., 1999). Higher levels of anthropomorphism appeared to suggest a decrease in the likelihood of thefts in Experiment 2. The designs with increased levels of humanness (i.e. anthropomorphism) may have triggered attributes associated with human intelligence (Küster, et al., 2015), increasing mutual awareness (social presence) of the agent, which could have influenced the fewer instances of dishonest behaviour. Manipulating agent behaviour such as communication and gestures has been found to influence user behaviour (Yung & Pass, 2015). Therefore, shifting the focus of the empirical manipulation of agent characteristics from appearance based features toward communicative behaviour of the agent may reveal yet another component to address dishonest user behaviour at SCOs.

This Chapter will examine the effects of added social abilities of agents and their potential influence on consumer behaviour. This Chapter will specifically examine the effects of a social presence in the form of an anthropomorphic agent and the effects of varying the level of interactivity of the system via the voice. Research on socially intelligent agents, i.e. agents that show aspects of human-style intelligence (Dautenhahn, 1999), will be discussed including aspects of their behaviour that can encourage perceptions of social intelligence and social presence.

7.1 Qualities of an intelligent agent

There are a variety of studies investigating the influence that agent characteristics such as competence, gestures and dimensionality can have on user perceptions. However,

voice seems to be an important indicator of social presence as research considering the audio output of an agent suggests it can influence user perceptions. The following sections will discuss research relating to agent qualities, and anthropomorphism. The review will conclude with a discussion of Biocca and Harms (2003) networked minds social presence inventory (NMSPI) questionnaire which examines six dimensions of social presence, before describing the methodology of the final study.

7.1.1 Competence

The ability to obtain knowledge about a user and apply this knowledge within the context of the interaction is considered to be features of a competent agent (Laurel & Mountford, 1990 p.362). A system that can retrieve and generate information relative to the user and their shopping styles will be beneficial in creating a personalised experience. An agent that is dynamic and relational, that can respond to change and specifics within its environment, will likely produce a better customer experience (Greef, Schumacher & Hrelic, 2000; Shank, 2014). Conversely, agents that are viewed as systematic applications, such as a computer function simply to direct interaction, instead of comprehensive agents, i.e. a dynamic form reacting to the environment, may also reduce the level of perceived competence (Fox et al. 2015) and awareness of the agent (Reeves and Nass, 1996) and therefore its social presence within an environment. In relation to cognitive load theory sometimes providing less information is more beneficial to the user, for example, fewer visual features of an interface may allow more focus on other aspects of the interface, such as communication. Agents do not have to be visually present to be effective, take, for example, Siri or the voice on Google Maps. They are audio agents that capture user attention via relational, dynamic communication rather than visual representations of them. Not being able to view an agent visually could increase attention given to a system, as users can focus more on the audio output. Reducing accessible traits of an agent, such as their appearance, reduces the user's ability to predict what it is likely to do in a given situation, on the basis of its character. This uncertainty may encourage users of SCOs to be cautious of their behaviour, specifically dishonest behaviours, as they will be unable to predict the level of awareness that the agent has. Images of an agent onscreen may provoke negative attitudes associated with an "agent as virus" (Laurel, 1990) and make users lose respect for the system or get annoyed with it which may result in a decrease in use. Conversely,

visible virtual agents have also positively influenced user behaviours and attitudes towards systems, in particular human-like agents (Cowell & Stanney, 2005).

7.1.2 Intelligence

There have been rapid developments in technology with the aim of enriching communication between human and computer (Küster, Krumhuber, & Kappas, 2015). Gestures, i.e., a motion of the body that contains information, such as waving good-bye, are used in human communication to emphasise ideas and express feelings and help to demonstrate what a person is saying (Kurtenbach & Hulteen, 1990). Kurtenbach and Hulteen (1990) state that gestures are an extremely effective element of communication, however, the use of gestures is limited when people interact with computers as they are not yet able to fully understand gestures in a way that a human does, thus this affects the computer experience making it noticeably different than interaction with a human. More recent findings have presented inconsistent results regarding the effects of agent gestures, with some stating that gestures increase perceptions of anthropomorphism and likeability of an agent (Salem, Eyssel, Rohlfing, Kopp & Joublin, 2013) whereas other findings suggest that they are only effective when mirroring speech output of an agent (Buisine & Martin, 2007) and are not as effective as facial expressions (Baylor & Kim, 2009).

Kramer, Simons and Kopp (2007) conducted a study using a conversational agent Max who communicated by either a set of co-verbal gestures alongside speech or by speech alone without any accompanying gestures. The results of the study showed that virtual agents are perceived in a more positive light when they produce co-verbal gestures rather than using speech as the only modality (Salem et al. 2013). Conversely research from Baylor & Kim (2009) suggest that gestures may be unnecessary as they did not facilitate learning and deteriorated the effectiveness of instructions. This is discussed in relation to the cognitive load theory which suggests that when there is too much going on, working memory processing becomes hindered (Clark et al., 2006) thus less information can be more beneficial, as it may not overload working memory.
The brief review suggests that the effect of gestures may be linked with the variable investigated in the particular study, with gestures being positively associated with likeability, but negatively with cognitive processes, particularly if the gestures are not recognised as being associated with speech output (Baylor & Kim, 2009).

7.1.3   Dimensionality

Research considers what qualities an artificial intelligence requires, to induce the feelings that there is a social presence within the environment (Biocca et al. 2003). Shinozawa, Naya, Yamato, and Kogure, (2005) suggest that increased dimensionality of agents (i.e. 2D to 3D design) may produces a more meaningful interaction, thus, it may create a greater social presence. Their study considered whether it was the difference in dimension of their agent and environment, that would have an effect on social presence, or whether it were other factors of the design such as colours, gestures and communication. They used a computer designed rabbit to represent 2D and a robot of the rabbit to represent 3D to point to a colour within the testing environment, and to ask what the colour was. The environment that the colour was in was either 2D (on a computer screen) or 3D (an item within the testing room). Both the computer designed rabbit and the robot rabbit had a human-like voice created from "Fluet," a Japanese speech synthesizer developed by NTT (Shinozawa et al. 2005). The findings from their study suggested that dimensionality did not have an effect on participant's ability to understand and communicate with the rabbit. They found that the gestures (pointing) from both the computer designed rabbit and the 3D rabbit were more important than dimensionality for understanding instruction and the human-like voice was more important than dimensionality in regards to understanding instructions. Their findings suggest that humans tend to quickly recognize communication environments even when interacting with an embodied social agent, such as the computerized rabbit, and they can influence a user's decision making (Shinozawa et al. 2005). Agents that involve non-verbal and verbal human-like qualities such as gestures and speech appear to be successful in creating feelings of a social presence (Shinozawa et al. 2005). Therefore, research should consider the effects of having agents with human qualities on SCO's as a social presence to determine its effects on the occurrence of cheating.

7.1.4   Audio Output

The audio output from agents can be useful in capturing user attention, especially when the agent mentions something relating to the user's immediate environment (Mount & Gaver, 1990). Historically, computer systems' main focus of interaction was largely

founded with the visual interface and graphics, and alternate sensory modes of input and output were often ignored (Mountford & Gaver, 1990). However, nowadays with the increase in smart technology, speech is considered an efficient medium for sharing information and meaning using technology (Rothwell, Romigh, Simpson, & Thompson 2016). For example, Siri from Apple allows users to ask technology questions and receive computer-spoken communicative answers in a human voice. Sound or audio can be a useful form of information as it can be listened to in a relatively unobtrusive manner whereas a visual object has to be given focused attention such as looking in the right direction to perceive it. Audio within technology provides the benefit of additional information whilst the user can still examine other visual designs or environments. Sounds can be heard in many locations or from particular angles at one time whereas visual objects may only be seen in specific locations, or from particular angles, at one time thus audio can reach larger audiences (Alghamdi, Regenbrecht, Sydney, Langlotz, & Aldridge 2016).

We accept many background descriptive noises within our natural environment in everyday life such as the sound of a stapler, a printer or the keys being pressed as someone types on the keyboard of a computer. Computer interfaces should form natural extensions of existing auditory signals within their environments to create sounds that are distinguishable without being surprising (Alghandi et al. 2016; Mountford & Gaver, 1990). The addition of audio can create usable interfaces for people with visual impairments. Buxton (1988) observed that we are all visually impaired when faced with a cluttered graphic display. Sound can present information that is not graphically displayed and can sometimes do so better than graphics would. Audio output is part of the self-service checkout experience to assist the customer with their transaction. It is arguably more effective than graphics would be at influencing customer behaviours, for example, an image aimed at describing a mistake has occurred or an item has not been properly scanned by the SCO is likely to cause more confusion for customers than an auditory explanation of "*unexpected item in bagging area*", however annoying it may be. The audio output has to be carefully designed as research suggests that it can have more impact on the user experience than the appearance of a machine (Kiesler & Goetz, 2002). Aspects of the auditory experience, such as the responsiveness of computer agents with audio output should be carefully considered as part of the design.

7.1.5 Responsiveness

An interface agent is a prime example of a user-centred interface design as its priority is to respond to, and influence user experience (Sutcliffe, 2016). An agent may succeed or fail in their ability to be responsive to the user (Laurel, 1997). When a self-service checkout states "*please wait for assistance*", after the item has been correctly scanned and bagged, this deviates from the expected level of communication from the agent and may quickly move from being assistive to annoying. Instead of the agent encouraging the user's personal performance at a SCO, mistakes with weights, or slow processing of the system may make the agent a hindrance which is likely to lead to negative experiences and the machine could be viewed as lacking ability to identify items being scanned or working properly. This may then influence dishonest behaviours as customers learn that the machine has faults, which may reduce perceived levels of competence of the SCO machine. This, in turn, may then provide customers with a rationalisation to excuse dishonest behaviours as being a result of the machine being faulty. This type of rationalisation has also been considered with work from Adrian Beck (2011) and his theory on the self-scan defence reviewed earlier. Rationalisations linked with the equity theory suggest that customers may also feel that they are deserving of some discount on their items as they have worked to pay for them. They have taken on the role of an employee by scanning their items and it was a role that they never signed up to do nor do they get paid for it. This may encourage customers to behave opportunistically to receive what they feel they have earned or deserve. Exploring ways of reducing thefts at SCOs, via computer mediated design features, will be beneficial to retailers as innovative technology continues to develop and be introduced within our supermarkets (NCR, 2014). The design of agents within computers has considered the effects of anthropomorphism characteristics, however, this has not been applied to an SCO interface to determine potential effects on dishonest behaviours.

7.2 Anthropomorphism

People have been known to associate human characteristics to non-human objects and also to computers. For example, Nass, Fogg & Moon, (1996) found people associate concepts of "self" and "other" to computers and attributed genders to them. Psychological research topic on this discusses human's natural behaviours to react to non-human items in social ways as we make social inferences on items like we do with

humans, to predict outcomes as part of our survival and evolution (Emery, 2000; Reeves & Nass 1996). People's tendency to anthropomorphise has encouraged computer designers to include character traits associated with humans in their products to unconsciously trigger cues for social behaviour and influence users' interactions with computers. Morkes, Kernal and Nass (1999) conducted research into characteristics of agents and their influence on user behaviour. Their findings suggest that agents designed without humour are perceived as less likeable, less sociable and less like the participant compared to the agents designed to portray humour. Their findings suggest that adding human characteristics such as humour can enhance the users experience and the interaction between the user and the computer. In line with Nass and Moon's (2000) social response theory, the relative effect of the agent's characteristics on its ability to foster a personal relationship will be stronger when the agent is anthropomorphised. Other research suggests that users are likely to show impression management with an agent whose appearance displays talking in comparison to agent text (Sproull, et al., 1996). Küster et al (2015) states that the use of computer agents results in more shared communication, compared to text, as the agents make it more social, thus an "immediate source of communication" (p. 275). This relates to the theory of modified behaviour by Baumeister (1982) who found that the presence of others can lead individuals to alter their behaviour in a manner that communicates a positive self-impression. Some theorist have reported conflicting views on anthropomorphic agents stating that they can have negative effects on the user experience such as Nowak (2004) who found that people reported the less anthropomorphic image to be more credible and likeable than the more anthropomorphic image. This was suggested as being a result of humans being limited in their ability to distinguish between things that look human, but do not act human and things that act human but do not look human. Thus, the increased anthropomorphic image led to greater expectations of behaviour, which were not met, whereas the less anthropomorphic image drew lower expectations and performed to match expectation to exceed them. This is similar to finding from Parise et al. (1999) who found that increased human-like agents can be viewed as too artificial. Nowak and Biocca (2003) state that computer agent designs may reach a point where "increasing anthropomorphism may be less important to presence, than exaggerating certain features of the image to enhance the experience. Increasing anthropomorphism may raise expectations and should be done only when the interface and system can meet higher expectations" (p. 492).

Similarly Sproull et al. (1996) suggest that human-like agents may be subject to over attribution of human-like qualities that they do not possess, e.g., motivation, resulting in negative perceptions from users. Baylor & Kim (2004) likewise express their concerns about human-like inter-faces. If an interface is anthropomorphised too much, i.e. looks like a human, people tend to form unrealistic expectations about its behaviour and performance. That is, a too realistic human-like appearance and interaction can be deceptive and misleading by implying promises of functionality that can be never reached. Consistent with this, Norman (1997) argues that people will be more accepting of an intelligent interface when their expectation matches with its real functionality. However, and given expectations about functionality are met, a meta-analysis of the impact of the inclusion and realism of human-like faces on user experiences in interfaces indicates that human-like agents with 'higher realism' elicit more positive social interaction, especially when subjective evaluations are employed (Yee, Bailenson, & Rickertsen, 2007). Verhagen et al. (2014) explored agent characteristics including the friendliness and expertise of computer agents that were either cartoon-like or human-like, in order to examine their effects on perceived social presence and perceived personalisation. They found that both characteristics of friendliness and expertise positively influenced perceptions of social presence and personalisation which are linked with increased customer experience (Li, 2009). Baylor and Kim (2005) found that expert agents are able to elicit feelings of human warmth and therefore feelings of social presence. Interestingly there was a non-significant effect of anthropomorphism on perceptions of social presence and personalisation, with human-like agents performing the same as cartoon-like ones. An explanation could be that a change in physical appearance does not elicit more social responses. Indeed, Lee (2010) suggests that the increase in anthropomorphism from cartoon-like to human-like agents might be too small to find variance in perceptions of social presence (Verhagen et al. (2014). Adding more fundamental human characteristics to the human-computer interaction, like use of language, interactivity, and conversing using social roles, were shown to evoke more social responses (Nass & Moon, 2000).

7.2.1   Oppositions to anthropomorphic agents

Human-like agents can also incur feelings of unease (Mori et al. 2012; Payne, Szymkowiak, Robertson & Johnson, 2013). According to Ho and MacDorman, (2010) the initial positive emotional responses in perceivers to increased human-likeness of characters rapidly declines when they become 'too' human-like, evoking unpleasant emotional responses. Laurel (1997) discussed the resistance that some people have when using an interface with an agent and describe it as the "agent as virus" problem. She states that the traits associated with agents, such as them being uninvited, are generally considered to be negative and invasive. Laurel and Mountford (1990) state that human-like agents can be viewed as "silly", as the user may be expected to pretend there is a person in their computer, however, an agent in the form of a pet may be considered much more appropriate. The offer of help with tasks via an interface agent is often tied to unpleasant feelings associated with loss of control and of predictability, which could lead to early rejection of a system (Cowell & Stanney, 2005; Payne et al. 2013). Human agents can seem like indirection if they are present when they are not felt to be required (Laurel, 1997). An agent presented only by audio interface may encourage users to feel like they are in control of an interaction, and more so than when an agent is physically present, as they may feel less like the agent is being invasive if it is not clear why they are there.

In defence of anthropomorphic agents, Laurel and Mountford (1990) state that psychologically, we are skilled at communicating with other people and we apply this when interacting with non-humans and animated objects through the process of anthropomorphism. This has also been highlighted within theories including CASA (Computers As Social Actors, Reeves & Nass in the Media Equation) and social agency theory (Marakas et al. 2000; Kim & Baylor, 2016) where we respond to computers as we would do so to humans. Anthropomorphising a machine does not assign human personality to it; instead it associates metaphors that are relevant within the particular context of the interaction (Laurel & Mountford, 1990). Two distinct anthropomorphic qualities that computers must perform to achieve the metaphor of agency, i.e. something that initiates and performs actions, are: responsiveness and the capacity to perform actions (Laurel & Mountford, 1990). Agents can be represented via qualities such as appearance, sound, and communication style, which in turn will encourage the user to

assume intelligence dependent on these characteristics (Laurel & Mountford, 1990 p.358). Humans predict the behaviours of others via such external traits that they are presented with and this also happens when interacting with agents and draws attention to the qualities associated with agents such as their: responsiveness, competence, accessibility and capacity to perform actions (Laurel & Mountford, 1990 p.359). If agents are found to lack in capacity and social interaction then initial perceptions of the agent can diminish. This taken together with overly but not quite realistic agent appearance has been associated with theories on the uncanny valley.

7.2.2   The uncanny valley

Research by Masahiro Mori observed that as robots come to look more human-like, they seem more familiar, until a point is reached at which subtle deviations from human norms cause them to look creepy (MacDorman, 2006). He referred to this dip in familiarity and corresponding surge in strangeness as *the uncanny valley* (Mori, 1970; MacDorman, 2006; Mori, MacDorman & Kageki, 2012). The more human-like a robot is then the more is expected from it to meet expectations of behaviours that are generally displayed by other humans.

Robots have been increasingly used within factories for manual production and are associated with reductions in personnel (Mori et al., 2012). These robots are designed to extend, contract, and rotate but do not have faces and are not generally associated as being human-like. For this kind of production the focus for the robots is functionality. As long as the machines are functioning like humans to work within the factory then they are beneficial, they do not have to look human-like. Some types of robots are considered to be more human-like and take on the form of having body part such as arms (Mori et al., 2012). Research has suggested that applying such human-like attributes increases the level of affinity with them. This is also suggested within the model of "Computers as Social Actors (CASA)" (Marakas, et al., 2000). As soon as a human-like but not quite human component is introduced in the human-machine and indeed human-human interaction, the uncanny valley becomes of interest. Mori et al. (2012) provides an example of the uncanny valley and its effects on the perceiver. If one were to see someone who had a prosthetic hand it is unlikely that the viewer would notice this right away as the design of prosthetics has evolved so much over the years. However, if that person were then to learn that what they thought was a human hand

was actually a prosthetic by shaking hands with the person, it could result in an eerie sensation. Mori et al. (2012) states that when this happens we lose our sense of affinity and the object becomes uncanny, as depicted in Fig. 29.
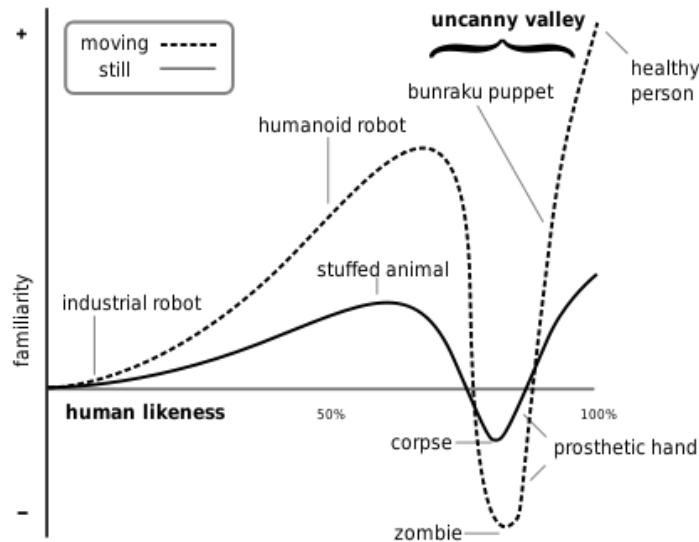
Figure 30 The Uncanny Valley [Mori, 1970]

Mori hypothesized the relation between human likeness and perceived familiarity: familiarity increases with human likeness until an uncanny valley is reached caused by sensitivity to perceived imperfections in near-human-like forms (Mori, 1970). Movement, according to Mori, magnifies the uncanny valley.

Qualities such as movements have been suggested as increasing the uncanny valley effect. This may occur after a human-like robot moves as they are unlikely to move as smoothly as a human would, thus highlighting that they are a robot. To reduce the likelihood of the uncanny valley effects of an agent occurring, research has considered communication as a method of inducing affinity credibility of agents. Communication has been suggested as promoting feelings of connectedness between users and agents (Rettie, 2003).

7.2.3 Anthropomorphism: physical or audio

Agents can be made to appear more anthropomorphic by creating human-like physical features, gestures and a voice (Burgoon et al. 2000). Creating human-like (virtual) agents has been associated with creating more social experiences for the user as they will be likely to attribute human qualities to an agent with human-like features (Nass, Fogg & Moon, 1996). This can then encourage users to perceive a sociable interaction.

In the case of social interaction, the presence of voice as well as shape or facial expression of a character could be a strong trigger for anthropomorphic perception (Lee, et al., 2015). Fink (2012) suggests that verbal communication of an interface can be a way to express social awareness. Lee et al. (2015) investigated the effect of an anthropomorphic sounding interface on perceived co-presence, telepresence and social presence of the agent, i.e. how much they were perceived to be within a shared environment. They had a between-subjects design with 2 conditions, one with speech including a human-like voice and the other with non-speech audio, including a machine-like ringtone. Participants felt more co-presence from the interaction which had the speech interface than the non-speech interface. The results suggested that the anthropomorphic features of sound representing a social agent would complement their presence during a communication. Research from Eyssel et al. (2012) found that participants' anthropomorphised a computer agent more when it had a human voice compared to a robotic voice. Lee (2010) found that participants evaluated human-voiced computer agents more positively and conformed more to their suggestions than to agents using synthetic speech. This suggests that computer-generated speech might remind people of the technical nature of the interaction, thereby hindering social responses (Lee, 2010). Similarly Spoull et al. (1996) found that a human speech (vs. simple text) heightened social presence and induced social responses. They suggested that the human speech might have reminded participants of a real person, thus encouraged socially desirable behaviours. Applying human-like speech to an interface is likely to enhance perceptions of its social capabilities, such as intelligence, thus may increase perceptions of social presence. However, as suggested by Arons (1994), speech audio can be intrusive and interfering if the sound interface is not presented within the right context. Research suggests that anthropomorphism of speech audio should match agent physical features. Aiming to increase perceptions of an agent's anthropomorphic personality, via speech, can lead to confusion and negative perceptions if the agent presented is not human-like (Kuwamura, Minato, Nishio, & Ishiguro 2012).

As stated earlier, making an agent appear more human-like externally creates an impression of a social character, however, this effect decreases as agents become too human-like physically but are not internally able to socialise like a human-being can; the significance of an agent meeting expectations will ultimately determine the effects it has on its user's behaviour (Mori et al., 2012) and its level of effectiveness. It could be

argued that adding an interactive voice to an agent may increase the user's apprehension of, and interest in the agent, which may make users pay more attention to the agent and their behaviour, as there will be a degree of uncertainty to how aware the agent is of the interaction.

Burgoon et al. (2000) suggested that enhancing the anthropomorphism of an agent may increase the likelihood that humans would understand and believe the agents, resulting in it having a greater influence on the user. However, humanising an agent too much can have adverse results on human perceptions if its appearance approaches the "uncanny valley". If agents do not live up to the expectations of the user in terms of appearance, intelligence or interactivity then this is likely to negatively impact the interaction (Cowell & Stanney, 2005; Krämer, Bente, & Piesk, 2003; Mori et al., 2012).

7.2.4   Social responses to agents

Various empirical studies have shown people to respond socially to computers and agents as they would respond to other humans (Reeves & Nass, 1996; Gratch, Wang Gerten, Fast & Duffy, 2007; Putten, Kramer & Gratch, 2009). Research has even found that humans display social responses to television sets (Lemish 1982; Nass et al. 1996) and web sites (Kumar and Benbasat, 2002). Durlach and Slater (2000) examined the effects of avatars, a digitally embodied human character, in a virtual environment of user behaviour. They introduced the notion of togetherness, the sense of people being together in a shared space and highlight the role of tactual communication as being fundamental to togetherness. Putten et al. (2009) examined whether users belief of interacting with an agent or avatar would result in different social effects. Participants were informed of what entity they were going to be interacting with, an agent or an avatar, but were unaware if this was true or not. Putten et al. (2009) found that the belief of whether the particular entity was an agent or an avatar, did not make a difference in the behavioural reactions of the user. However, behavioural realism of the character did affect users' social responses with more realistic behaviours from the agent or avatar resulting in more social behaviours from the user. This finding supports the assumption proposed by the social response theory, that "the more computers present characteristics that are associated with humans, the more likely they are to elicit social behaviour"

(Nass & Moon, 2000 p.97). Lombard and Ditton (1997) state that these social responses are in response to a particular type of presence representing a social actor.

7.2.5   Agents and social presence

Within the context of mediated interactions, social presence has been described as the degree to which a technology is able to create a sense of social interaction (de Greef and Ijsselsteijn, 2000; Fiore et al., 2003) and how technology may affect, distort, or enhance certain social–cognitive processes in humans (Biocca and Harms, 2002; Lombard & Jones, 2015). Several authors have developed surveys to assess use perceptions of social presence as a subjective measure. Harms and Biocca (2004) developed the networked minds social presence inventory (NMSPI) to examine perceptions of self and another when interacting through technology. Putten et al. (2009) measured perceptions of social presence for users with a belief that they were interacting with either an avatar of an agent. They measured social presence using two scales: the social presence scale (Bailenson, Blascovich, & Beall, 2001) with five items (e.g. ''I perceive that I am in the presence of another person in the room with me") and the Networked Minds Questionnaire (NMQ; Biocca & Harms, 2002; Biocca, Harms, & Burgoon, 2004; Biocca, Harms, & Gregg, 2001). The results displayed that high behavioural realism resulted in users experiencing more perceived social presence.

Nowak & Biocca (2003) found that greater levels of social presence were reported with high anthropomorphic pictures compared to low anthropomorphism. Freeman, Avons, Meddis, Pearson & IJsselsteijn (2000) state that behavioural measures and presence are linked by the premise that, when observers experience a mediated environment that makes them feel present, they will respond to stimuli within the environment as they would to stimuli in the real world. Fortin and Dholakia (2005) suggest that the interactivity of a website induces feelings of a social presence and it is believed that this social presence will result in the user feeling positively about the website. This is consistent with Freeman et al.'s (2000) suggestion that presence may be enhanced via the degree of interactivity of an environment.

Verhagen et al. (2014) hypothesised that greater anthropomorphic characteristics of virtual computer agent (i.e., an image of a human vs an image of a cartoon character) would have a positive influence on the perceived level of social presence and user

satisfaction. They found no effect of anthropomorphism on the influence of agent characteristics on social presence. They suggest that a change in physical appearance does not elicit more social responses. Lee (2010) suggests that the increase in anthropomorphism from cartoon-like to human agents may be too small to find variance in perceptions of social presence. Lee (2010) suggests that adding more fundamental human characteristics to the human-computer interaction, like use of language, interactivity, and conversing using social roles, were shown to evoke more social responses (Nass & Moon, 2000). Thus, examining perceptions of social presence of anthropomorphic agents with varying degrees of interactivity would contribute to these findings.

7.2.6 Interactivity

The perception of an interactive agent can be portrayed using communicative techniques to persuade the user that the agent has a certain level of intelligence (Burgoon et al. 2000). Interactivity of a system involving communication is considered by Burgoon et al. (2000) as being more interactive if it contains greater qualities of: (1) individual involvement (high cognitive, sensory, visceral, and motor engagement, i.e. a sense of presence, of ``here and now"); (2) mutuality between individuals (a sense of "connectedness," interdependence, receptivity, collective sense-making, shared understandings, and coordinated interaction); and (3) individuation (well-defined notions of "me," "you" and "us" rather than vague identities and pseudo- or imagined relationships) (p.558) allowing for interactivity to be considered as a personal system rather than an impersonal system. Recent forms of interactivity are used within technology security to identify users, such as biometric voice or face recognition. Research on machine learning has shown that technology with the ability to identify user behaviour has been associated with improving social behaviours (Baur et al. 2015). The ability for technology to identify individuals has also been suggested to create an impression of a social interaction, which in turn engenders feelings of engagement or connectedness, thus may produce feelings of a social presence (Burgoon et al. 2000).

Tu and McIssac (2002) suggest that interactivity consists of the activities in which computer mediated communication (CMC) users engage and the communication styles they use. The potential for feedback contributes to the degree of salience of the other person in the interaction. Immediacy is a component of interactivity and social presence.

Because responses in asynchronous CMC are delayed, and not immediate, a feeling of low interactivity can diminish social presence. In addition to timing, communication styles may also impact social presence. Norton (1986) identified eleven communication styles (impression-leaving, contentious, open, dramatic, dominant, precise, relaxed, friendly, attentive, animated, and communicator image) that may be associated with online communication and influence levels of social presence thus these should be considered when attempting to induce a social presence via communication. Lee et al. (2016) considered user perceptions of an agent when it had an interactive anthropomorphic voice and their findings suggested that it increased the perception of some dimensions of social presence including message understanding and emotional interdependency. Gunawardena (1995) differentiates interactivity and social presence, arguing that social presence requires users to add one more step to awareness of interactivity; in short, when users notice it, there is social presence (Tu & McIssac, 2002).

7.2.7   Perception of interactive agent presence

Research from Sameh, Benbasat, and Cenfetelli, (2012) found that internal characteristics such as expressive speech were more influential on perceptions of a social presence than the physical representation of an agent. Burgoon et al. (2000) reported that a computer mediated voice was more effective without a picture of an agent, than with a picture in a decision making task. This was contrary to their hypothesis and possible explanations for these findings included the notion described by Walther (1996) as "hyper-personal communication" which can occur from CMC producing greater levels of connectedness, mutuality and involvement compared to face-to-face communications. Connectedness, mutuality and involvement are also factors associated with social presence (Biocca & Harms, 2002), indicating that it is a multifaceted construct. To investigate these facets in more detail, many studies measuring the perceived level of social presence from CMC have used the Networked Minds Questionnaire (NMQ) (Biocca & Harms, 2002).

7.2.8   Social presence measurement of 'Networked Minds'

Biocca and Harms (2002) networked minds questionnaire (NMQ) captures their concept of social presence and its six dimensions. These include co-presence, attentional allocation, perceived message understanding, perceived affective understanding, perceived affective interdependence, and perceived behavioural interdependence. *Co-presence* is associated with the degree to which the observer believes s/he is not alone; *attentional allocation* refers to the amount of attention the user allocates to and receives from an interactant; *perceived message understanding* relates to the ability of the user to understand the message from the interactant; *perceived affective understanding* describes the user's ability to understand the interactant's emotional and attitudinal states; *perceived affective interdependence* refers to the extent to which the user's emotional and attitudinal state affects and is affected by the interactant's emotional and attitudinal states; and finally *perceived behavioural interdependence* is associated with the extent to which the user's behaviour affects and is affected by the interactant's behaviour (Biocca & Harms, 2002; Lee et al. 2016; Leite et al. 2009; Putten et al. 2009).

Co-presence relates to the degree to which the observer believes he/she is not alone and secluded, their level of peripherally or focally awareness of the other, and their sense of the degree to which the other is peripherally or focally aware of them (Biocca & Harms 2002; Lee et al., 2016). Next, psychological involvement identifies the degree to which the observer allocates focal attention to the other, empathically senses or responds to the emotional states of the other, and believes that he/she has insight into the intentions, motivation, and thoughts of the other (Biocca & Harms 2002; Lee et al., 2016). Behavioural interaction is the degree to which the observer believes his/her actions are interdependent, connected to, or responsive to the other and that the other's perceived responsiveness are interdependent, connected to, or responsive to the observer's actions. From these categorisations of social presence research, the six distinct dimensions of social presence identified above were adapted for a survey for the current study from Biocca, Harms & Greggs (2001) structure of Networked Minds (see Fig. 30), and were found to be the strongest indicators of social presence within a later review from Biocca and Harms (2002). One of the drawbacks of the previous studies was that social presence was not addressed. Findings suggesting an influence in user behaviours could not be directly attributed to social presence as this was not directly measured. Thus, the NMQ was used to measure those previous defined as; co-presence, attentional allocation, perceived message understanding, perceived affective understanding,

perceived affective interdependence, perceived behavioural interdependence using Likert scales to measure each item. The same questions, with minor amendments to fit the context of the experiment, were used from Biocca and Harms' (2002) paper testing the internal reliability of the Networked Minds Questionnaire, NMQ. Questions associated with interactivity were also designed to measure the 3 components of interactivity.
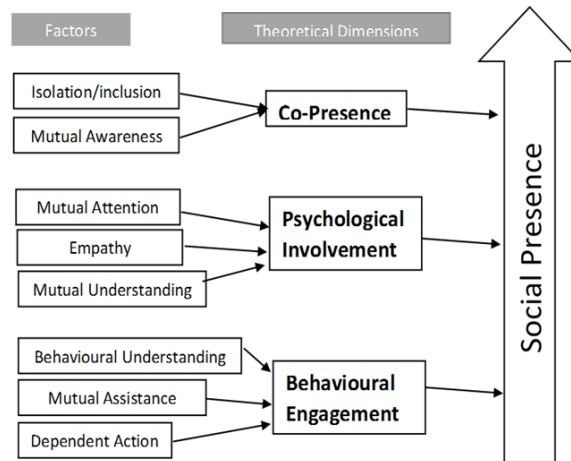
Figure 31 Biocca, Harms & Gregg (2001) Structure of the Networked Minds social presence measure.

7.2.9   Current Investigation

Various researchers have considered the effects of communication and communication styles and the use of voices (Eyssel et al., 2012; Laurel & Mountford, 1990; Lee, 2010; Norton, 1986; Sameh et al. 2012; Tu & McIssac, 2002). The present research stems from finding from Sameh et al. (2012) who consider communication within a system and its influence on user behaviour. They found that internal characteristics such as expressive speech were more influential on perceptions of a social presence than the physical representation of an agent. Burgoon et al. (2000) found that a computer mediated voice was more effective without a picture of an agent, than with a picture in a decision making task. Baylor and Kim (2009) suggest that agent gestures may be unnecessary as they did not facilitate learning and deteriorated the effectiveness of instructions. Leite et al.'s (2009), research hypothesis was that the feeling of social presence towards a particular agent or system motivates the user to maintain the interaction. Nowak and Biocca (2003) found that greater levels of social presence were reported with high anthropomorphic pictures compared to low anthropomorphism. Lee

et al. (2015) reported that participants felt more co-presence (the degree to which the observer believes s/he is not alone) from their interaction with a robot when it had a speech interface than non-speech interface. Their results suggested that the robot's anthropomorphic voice complemented the presence of the robot which could have been reduced during a standard robot mediated communication. Burgoon et al. (2000) discuss interactivity and state that the ability for technology to identify individuals has also been suggested to create an impression of a social interaction, which in turn engenders feelings of engagement or connectedness, thus may produce feelings of a social presence. It could be argued that more interactivity and agent presence could result in a higher perception of social presence. Alternatively, interactivity may be more effective than agent presence as outlined below in the predictions.

To begin with, an exploratory study on customer's perceptions on the voice at self-service checkouts was conducted. This was followed by an empirical study on the effects of social presence and interactivity within a SCO on user behaviour.
The initial exploratory study focussed on customer's perceptions on the voice at self-service checkouts. This aimed to identify whether there would be reason or not to further examine potential interactive (i.e., personal) elements via the voice in the later empirical study. For example if the findings had suggested that there was a strong negative perception of the voice by customers, or that they did not perceive the voice at all, then further research on the voice may not have been beneficial as participants of the empirical study may have been likely to have pre-existing negative attitudes towards audio at a SCO. As this was not found to be the case the empirical study focussed on the effects that an interactive (i.e., personal) social presence, in the form of an agent with audio or just audio, within a SCO interface would have on dishonest user behaviours. The findings from this research will contribute to research on the effects of agent interactivity via communication and users social behaviours in association with social presence research (Burgoon et al. 2000; Baur et al. 2015; Durloch & Slater, 2000; Freeman et al. 2000; Nowak & Biocca, 2003). The empirical study aims to explore user perceptions of social presence in relation to agents and interactivity of the system. By evaluating user's perceived social presence, interactivity and behaviour, it will provide indicators about what intelligent agents should have to engage user's in their interactions and potentially enhance honest behaviours can be retrieved. The following hypothesis have been generated in relation to the literature discussed.

7.2.10 Hypotheses

There appears to be inconsistent findings when considering the effects of the physical appearance of an anthropomorphic agent. Küster, et al. (2015) state that designs with increased levels of humanness (i.e. anthropomorphism) may trigger attributes associated with human intelligence and enhance social interactions. Parise et al. (1999) found that increased human-like agents can be viewed as too artificial and reduce social interactions, such as cooperation. Interactivity has been found to increase levels of social presence Leite et al. (2009), Walther (1996) states that "hyper-personal communication" can occur from CMC producing greater levels of connectedness, mutuality and involvement compared to face-to-face communications. Social presence has been found to influence social behaviours to communicate a positive self-impression (Baumeister, 1982). Sameh et al. (2012) found that expressive speech was more influential than physical representations of an agent. Similarly, Burgoon et al. (2000) suggest that a computer mediated voice is more effective without a picture of an agent. Lee et al. (2016) found that implementing an anthropomorphic voice resulted in greater levels of social presence being reported. Laurel and Mountford (1990) and Shank (2014) suggest that relative audio that is specific to the user and their environment may be more meaningful to a user. Eye tracking research suggest that looking behaviour and fixation durations indicate attentional engagement (Risko & Kingstone, 2011; Van Gog et al., 2009).

Based on the reviewed research and the previous findings that state that anthropomorphism results in higher social presence (Nowak & Biocca, 2003) and interactivity results in higher social presence (Leite et al., 2009), the hypothesis for the current study are that higher social presence, via anthropomorphism or interactivity (sense of "Today" and "Here and Now," i.e. personal), will results in less cheating H1a (Hypothesis 1a) and higher reported levels of social presence H1b (Hypothesis 1b). Based on the findings from Sameh et al. (2012) which suggest that speech is more influential than physical representations of an agent, and Burgoon et al. (2000) who suggest that interactivity, i.e. the ability for technology to identify individuals to create an impression of a social interaction to engender feelings of engagement or connectedness, it is also hypothesised that interactivity will result in greater levels of

social presence regardless of agent presence H1c (Hypothesis 1c). The following prediction can be made, see Table 6 and 7. If both agent presence and interactivity produce high levels of social presence condition 1 will result in the lowest instances of cheating and condition 4 will have the highest.

Table 6 Prediction 1 on social presence levels

	Agent *(visually)* **present**	**No Agent** *(visually) present*
Interactive (personal)	**Condition 1 (n=26)** Interactive Agent (high social presence)	**Condition 2 (n=24)** Interactive-No Agent (medium social presence)
Not interactive (impersonal)	**Condition 3 (n=25)** Not Interactive-Agent (medium social presence)	**Condition 4 (n=24)** Not Interactive-No Agent (low social presence)

However, the physical anthropomorphism of an agent may be less important than the interactivity according to findings suggesting appearance can lead to negative perceptions (Burgoon et al., 2000; Parise et al., 1999) and that speech is more influential than physical representations of an agent (Sameh et al. 2012). Thus, the following prediction is made see Table 7.

Table 7 Prediction 2 on social presence levels if appearance is not relevant (Burgoon et al., 2000; Parise et al., 1999; Sameh et al. 2012)

	Agent present	**No Agent**
Interactive	**Condition 1 (n=26)** Interactive Agent (high social presence)	**Condition 2 (n=24)** Interactive-No Agent (high social presence)

Not interactive	Condition 3 (n=25)	Condition 4 (n=24)
	Not Interactive-Agent	Not Interactive-No Agent
	(low social presence)	(low social presence)

Thus, condition 1 and condition 2 will result in the lowest instances of cheating and condition 3 and condition 4 in the highest instances of cheating. As before eye tracking data will be analysed to provide a full picture of the user experience with the interface, with instances of cheating and the subjective measures of the survey.

7.3 Method

Before the empirical study was conducted, investigating the effects of agent interactivity and presence, an exploratory study was conducted to obtain an understanding of customer perceptions of the voice at SCO, as agent voice would be used to manipulate degrees of interactivity in the subsequent empirical study. If the findings revealed that customers do not even notice the voice, then this would have implications on how to design the voice in the subsequent study. Qualitative methods were used collecting data via a semi-structured interview to examine customer perceptions of the voice. Based on the literature review and guided by our research objectives, the interview questions focused on customer attitudes of "the voice at SCOs".

7.3.1 Participants

Twenty-five participants (11 male, 14 female), aged 21-83 took part in the survey as they were exiting the SCO area after purchasing items from the supermarket. Fifteen participants had used a SCO with a male voice and 10 had used a SCO with a female voice.

7.3.2 Setting

The store was located in a town centre and was 67,000 square feet. The store had one self-service checkout area containing ten SCOs located near the main door. The SCO had a male voice within their design to assist customers during their transaction.

7.3.3 Materials

After gaining permission from the store manager, surveys took place in-store as the customer was leaving the SCO area after previously using the SCO to purchase their items. Customers were asked to complete a semi-structured interview (Appendix 19) which including questions to obtain a quick overview of customer attitudes towards "the voice" at the SCO. Questions such as Do you notice the voice on the self-service checkout? Do you like or dislike the voice? Do you feel that it is helpful or unhelpful? Why? Were asked to gather information.

7.3.4 Procedure

Two supermarkets were approached in relation to the following research to examine customer perceptions of the voice at self-service checkouts, for which they gave permission. Customers were approached as they were leaving the self-service checkout area, having just purchased their shopping items. Customers were asked if they would be happy to provide feedback regarding their experience at the self-service checkout to assist me in my PhD research considering self-service checkout experiences. Those happy to do so, and who met eligibility criteria, then completed a semi-structured interview relating to the voice at self-service checkouts. Eligible participants were those who shopped at that supermarket regularly and had used the self-checkout prior to this occasion. This was to ensure interviewees had sufficient prior experiences so they could provide thoughts on their choice between the self-service and regular checkout service with a sales assistant. As our interview was based on the actual choice the customer just made at the checkout, memory error or bias was expected to be minimal. Each interview ran from five to ten minutes and answers were recorded via interview forms. Data collection occurred over four different days of the week and at different time periods of the day to get a better representation of customers. Thematic analysis was then performed on the data to examine initial responses of customer perceptions on the "the voice" at a self-service checkout.

7.4 Results

Results showed that everyone noticed the voice. Overall people did not mind the voice- participants stated "*don't mind it*", "*it doesn't bother me*", "*its fine*", "*it's alright*". Overall most people, 68% found the voice helpful, 12% said it is unhelpful, 4% said it can be confusing, 4% stated it was only helpful if you had never used it before, the rest

were of no opinion. Overall 76% of people found the voice to be friendly, 4% stated it was slightly annoying whilst the rest were of no opinion. People were unsure of the question regarding the voice being warm or cold with 40% saying neither, 36% saying warm, 8% saying cold, 8% saying lukewarm, 4% stated fine and 4% did not know. Most people, 56%, did not find it irritating whereas 16% said it was. Others stated that it was sometimes irritating depending on what it was saying (16%) whilst the rest were of no opinion. Most people, 88%, felt that the voice was competent in providing a service "*it lets you know when you have done something wrong*", "*it helps you through your shopping*". Four percent stated that it was incompetent and the other 8% had no opinion. Most people felt that the voice was aware of their actions, i.e. 64%, compared to 24% who felt it was unaware. Eight percent stated it was aware sometimes and 4% stated that it was a bit sensitive [implying the weighting function]. Most people, 84%, stated that the voice did not influence their behaviour 84% compared to 8% who stated that it could if it would not pick up weight (one person stated it would make them angry sometimes), 4% stated it can be annoying and the other 4% did not have an opinion. Most people, 80%, viewed the voice as trustworthy with reasons including "*it says the right thing*", "*it's a big company*", 4 % stated "*it's a machine*" [implying that it cannot be trustworthy nor untrustworthy]. The rest did not have an opinion or stated that it was "*neither*" trustworthy nor untrustworthy.

Most people stated that it was not conversational, 84%, some stating that "*it's a machine*", 8% stated it was conversational and the rest had no opinion.
Most people, 68%, stated that it was not bossy, 24% stated it was bossy and the remainder said neither. Most people, 80%, did not find the voice to be invasive, 8% stated it was invasive, 8% stated it was sometimes and 4% stated neither. Most people felt that the voice does not monitor their behaviour 64%, 28% stated that it does monitor, 4% stated that it is responsive but does not monitor, 4% stated that it depends on time of day [further stating that it's not always right in reference to weights]. Four percent stated that it was "*pointless*" whilst 4% stated it was "*fantastic for visually impaired people*". When it came to the question on gender: 90% of those who used SCO with a female voice stated that it was a female voice whilst the other 10% stated that they "*couldn't say*". Those who had used the SCO with the male voice resulted in 53% correctly stating male, whilst 33% stated female and the remainder stated they did not know. The ages guessed for the age group that the voice represented, were 30-50;

with the majority stating 40's. Most people stated that the voice didn't have a personality 84% compared to 16% who stated it did and those were described as serious (male voice SCO), wicked (male voice SCO), happy (female voice SCO) and helpful (female voice SCO).

7.4.1 Interpretation

The key findings from the survey suggest that although customers notice the voice they generally do not mind it.

Table 8 Key results from The Voice surveys

The Voice **IS**	The Voice **IS NOT**
Helpful	Irritating
Friendly	Influential on customer behaviour
Competent	Conversational
Aware	Bossy
Trustworthy	Invasive
	Does not monitoring their behaviour
	Does not have a personality

This exploratory research aimed to identify whether or not there would be reason to further examine potential interactive elements via the voice in the later empirical study. The findings suggest that customers do perceive the voice, at SCOs and that they do not perceive it in a negative view, and thus it would be ecologically valid to further examine a voice on SCOs. These findings suggest that further analysis on the voice at a SCO would be worthwhile and customers are unlikely to have strong negative feelings towards it. The findings also suggest that the voice at a SCO is noticed and is considered to be helpful and friendly. People stated that they did not perceive the current voice to influence their behaviour and that it did not monitor their behaviour. Perhaps an interactive human voice that encourages perceptions of being monitored, via relative information relating to their personal purchase, may induce feelings of social presence during the interaction as technology alone has been associated with reducing this (Meuter et al 2000). The voice at the self-service checkout typically says "please place the item in the bagging area," "unexpected item in the bagging are, remove this

item before continuing". This dialogue may be considered as responsive audio rather than conversational or interactive as it is in direct response to a user's behaviour. Relative audio that is specific to the user and their environment may be more likely to influence feelings of interactivity compared to the standard audio that is presently played throughout an experience with a SCO (Laurel & Mountford 1990; Shank, 2014). These findings suggest that further research considering the social presence effects of "the voice" on SCOs may be useful as it could create a sense of "another intelligence" (Biocca et al's. 2001) which may create a sense that they are being watched and encourage honest behaviour (Bateson et al. 2006).

7.5   Empirical study (Experiment 3)

In the previous empirical studies (Chapter 6) the anthropomorphic appearance features of interface agents were manipulated to represent varying levels of a social presence. Experiment 1 in Chapter 6 consisted of a High Social Presence (HSP) condition (bag with eyes & logo) and a Low Social Presence LSP condition (bag with logo). The findings showed that the HSP (bag with eyes & logo) did not result in fewer instances of theft. This was contrary to the hypothesis for experiment 1 as the condition representing the LSP resulted in the least amount of theft. One conclusion was that the agents were not realistic enough to induce a sense of social presence to influence behaviour though it may not quite explain why low social presence resulted in less theft. The agents may not have been perceived to induce different social presence, due to them not being perceived sufficiently human-like (anthropomorphic). Participants may be more inclined to ignore an agent that is too simplistic or does not meet expectations of social abilities, thus, reduce any social presence effects.

This was then further investigated in Experiment 2, where the effects of varying levels of humanness were contrasted (i.e., a 3D agent, an embodied social agent and a logo) Results suggested that increasing levels of humanness (anthropomorphism) reduced the likelihood of thefts as the condition with the lowest level of humanness resulted in the greatest level of cheating compared to the conditions with greater levels of anthropomorphism. It is suggested that this finding was due to the lower levels of humanness resulting in lower perceptions of social presence experienced by participants. Therefore the agent design within the present study consisted of the same

3D agent used in the previous empirical study, which represented the highest level of humanness design. In addition, features of interactivity were identified as potentially being more effective in producing a sense of social presence (Nass & Moon, 2000) than appearance alone. Therefore social presence will be represented via the 3D agent with an added element of interactivity as an additional variable.

The aim of this final empirical study is to consider the effect of a social presence in the form of an agent and the effects of varied interactivity of the system, on user behaviour. Social presence is thus manipulated via agent presence and agent interactivity.

Social presence was not subjectively measured within the previous experiments, therefore a measurement of social presence, Biocca & Harms (2002) Networked Minds Questionnaire, was used in the final study to assess the perception of social presence by the participants.

7.6 **Method**

7.6.1 **Design**

Nowak & Biocca (2003) found that greater levels of social presence were reported with high anthropomorphic pictures compared to low anthropomorphic pictures. Agent presence in the current study had 2 levels (agent *(visually)* present, associated with high social presence- and no agent *(visually)* present, associated with low/no social presence). According to Gunawardena (1995) if users are aware of interactivity, then there is a social presence. Social Presence of agent interactivity had 2 levels (interactive, associated with greater levels of social presence, and not interactive, associated with low social presence) where the interactive agent represents a higher level of social presence. The interactive condition will use communicative words within the audio to indicate awareness of the user in the present such as "Your," "Now," and "Today" and will identify items of shopping including apples and tomatoes that a user is scanning. The non-interactive condition will use non situational words such as "The", consistent with research from Burgoon et al. (2000) on interactivity, and will not mention any specific shopping items scanned by the participant to deter from creating a perception of awareness of the "Here and now", or "Today". In relation to the research from Nowak & Biocca (2003) and Gunawardena (1995), it is predicted that when the agent is *(visually)* present and is interactive there will be higher levels of perceived social

presence. It is also predicted that when the system is interactive but has no agent *(visually)* present there will still be high levels of perceived social presence in line with research from Burgoon et al. (2000) who found that a computer mediated voice was more effective without a picture of an agent, than with a picture in a decision making task. This was speculated as being a result of the image causing participants to become more aware that the interaction was computer-mediated, reducing socially desirable responses. The results from the previous study suggest that the agent's presence alone is not enough to produce effective perceptions of social presence. Research suggests speech and interactivity of an agent can induce social presence (Gunawardena, 1995; Lee, 2010).

Figure 32 The condition representing Agent Present

Figure 33 The condition representing No Agent

It was a between-subjects design and the Dependent Variables were instances of cheating and eye tracking data to assess the effect of social presence. More specifically, instances of cheating in each condition included the reported receipt amounts, instances of cheating (by selecting lesser weights or amounts), the number of people who cheated within each condition and the number of people who accepted a money-off voucher (see

Procedure for details). The eye tracking data included the average fixation duration times within the area of interest (the social presence), and the fixations counts. All participants completed two shopping scenarios (2 shopping baskets), both in the same condition (HSP, LSP or Control) that they were assigned to.

7.6.2 Participants

Ninety-nine participants were tested (50 male & 49 female) with an average age of 28 years old. Due to technical difficulties, data for 2 participants were not recorded; these participants were replaced with 2 new participants. Participants were recruited within Abertay University and did not take part in the previous empirical studies. All participants reported that they had previous experience in using SCOs.

7.6.3 Materials and Apparatus

The same simulated SCO used in the previous experiment (see section 6.3.1.3 p. 178) was used to measure participant behaviour (Fig. 15). A separate desk and chair was also available for participants to complete the added questionnaire after completing the tasks on the Tobii. Microsoft Paint and Power point were again used to develop the interfaces used in the experiment and there were 29 slides in each condition, 5 of which were videos containing audio, and to represent the SCO interface (see Fig.33). All conditions contained the same slides with the only difference being whether the agent was *(visually)* present or not. There was audio on the slides that have the audio stamp however this was not present within the experiment, this is just for illustration purposes.
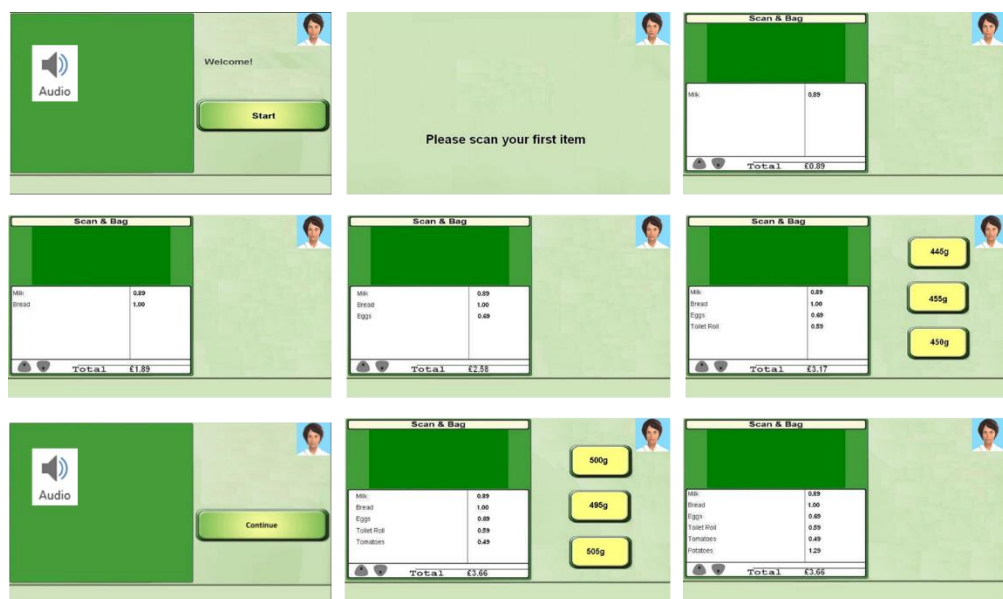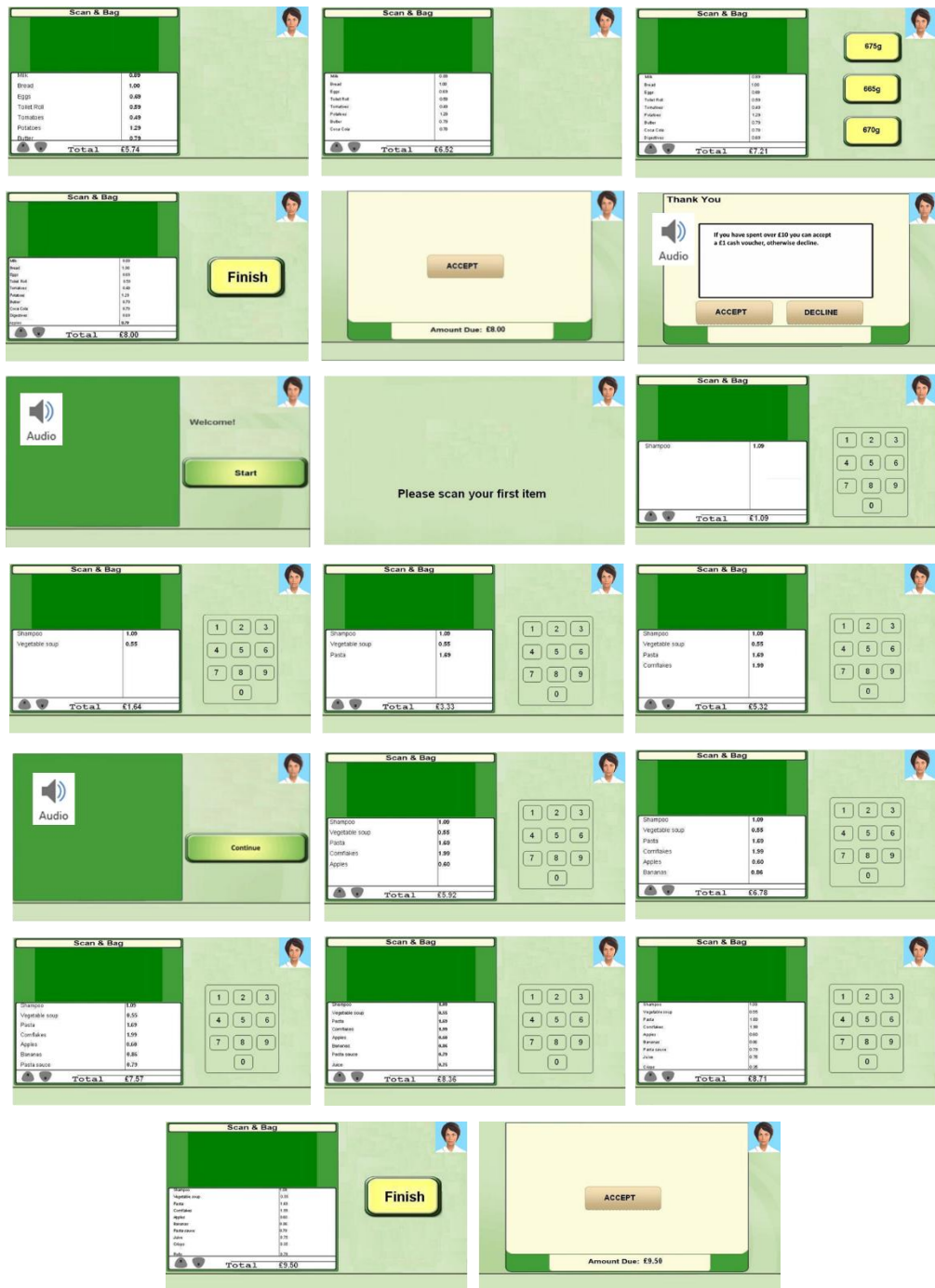
Figure 34 The simulated SCO interface containing an anthropomorphic agent and audio representing HSP

Participants completed an adapted perceived social presence questionnaire (Appendix 20) by Harms and Biocca (2004) and a perceived interactivity questionnaire using Burgoon et al.'s (2000) qualities of interactivity. Twenty videos with audio were recorded and created using Cam Studio software and Moviemaker to format the videos. A desktop microphone was used to record audio. The videos created included the following audio (see Table 9). Conditions 1 and 2 were interactive and conditions 3 and

4 were non-interactive (see Table 7). Conditions 1 and 3 contained agents whereas conditions 2 and 4 did not (see Figures 32; 33)

Table 9 Showing interactive and non-interactive voice statements. The words in capitals represent the interactive nature of the condition

Interactive	Non-interactive
"Please press start to begin YOUR shopping NOW"	"Please press start to begin shopping"
"Did YOU know 1 tomato counts towards 1 of YOUR 5 a day"	"One tomato counts towards 5 a day"
"YOUR total is £8"	"The total is £8"
"If You have spent over £10 You can select a £1 off voucher, otherwise decline"	"If spent over £10, select a £1 off voucher, otherwise decline"
"Did YOU know recipes containing apples can be found on OUR store app"	"Recipes containing apples can be found on the store app"

7.6.4   Procedure

The procedure for this experiment was almost exactly the same as the empirical experiment within Chapter 6 (see section 6.3.1.4 p. 180). The videos were created using Cam Studio software to record the audio via a microphone and Moviemaker was then used to format the videos to make them compatible for use on the Tobii. They were then programmed onto the Tobii eye-tracker to represent the self-service interface procedure. Participants conducted the same procedure as described in Chapter 6 and experienced the same dilemmas. The additional variable of interactivity via audio was added into this procedure to examine any effects it may have of user behaviour. There was audio on the slides containing the start buttons, the slide before the first item to be weighed (tomatoes), the slide before the first item to be counted (apples) and on the slide containing the total amount after the first line of shopping. There was also audio on the slide describing that there was a £1 off voucher for those who had spent over £10. This

slide came after the first scenario (basket), where they had only spent £8 therefore they were not justified to accept the £1 off voucher.

Participants completed the task based aspect of the study by completing 2 questions on the touch screen computer asking their opinion regarding the realism of the experiment in comparison to a real SCO experience. This was measured on a Likert scale from "a lot" to "not at all". They also answered a question on their confidence in using SCOs which again was measured using a Likert scale from "very confident" to "very unconfident". They then took their receipt to the researcher for their payment. After receiving payment they were asked to go back into a separate room and complete the Networked Minds social presence questionnaire in relation to their experience. They were then fully debriefed and asked if they were happy for their data to be used. Participants completed a consent form to confirm that they had received payment and that they were happy for their data to be used.

The researcher kept the receipt that were returned to them, and looked at the video recording of the experiment to measure how opportunistic the participant had been throughout the experiment. Analysis of a user's eye movement pattern while interacting with the interface allowed us to detect where people were looking and whether they look at the social presence that has been created. Heat-maps and gaze-plots indicated where the user's attention was focused while interacting with the interface. Statistical analysis was also conducted on receipt amounts, instances of cheating for each condition, the number of people who cheated in each condition, realism scores, confidence ratings in using SCOs and the number of people who accepted the money off voucher. Quantitative performance data were retrieved by video recordings of the experiment and showed the number of instances that opportunistic behaviour occurred throughout the experiment and the number of people who acted in an opportunistic manner throughout the experiment. For example the number of times people selected a lesser weight greater than 5 or selected less than the number of items present, could be viewed from the video recording as it indicated on the screen what buttons were selected, again without recording the participants themselves. As in the previous studies, there were 5 opportunities to cheat within the experiment by selecting a lesser weight or number items. The data in this case were the instances of cheating, which could vary between 0 and 5 instances.

7.7 **Results**

Fixation frequency is a measure of a display's importance and fixation duration is a measure of difficulty of information extraction and interpretation (Fitts, Jones & Milton 2005; Jacob & Karn, 2003; Milton, Jones & Fitts, 1950). Rayner, Sereno, Lesch and Pollatsek's (1995) eye tracking study suggested that fixation durations represent cognitive effort and attentional engagement. Experiment 1 (Chapter 6) showed that participants looked within the area of interest when there was a social presence (agent) there, thus, H1c predicts that this will also be the case in the present study. Therefore for H1c analysis was conducted on the following:

- Average fixation duration within the area of interest (containing the agent)

- Average fixation count within the area of interest (containing the agent)

In relation to research from Ariely (2016) on dishonest behaviours in relation to situational factors, the effects of agents on social responses (Nass & Moon, 2000) and Becker's (1968) rational choice perspective, the following dependent variables were examined to explore H1a.

- Receipt amounts reported

- Instances of cheating

- Number of people who cheated

- Number of people who accepted the money off voucher

Additional analysis of realism and confidence ratings were also examined to exclude these as confounding variables. See Table 10 for a display of the variables discussed which are displayed.

Table 10 Quantitative Analysis of Agent presence and Agent Interactivity

Analysis	*p*-Value	**(Statistical test)** and conclusion

Average Fixation Duration within AOI*	*p=0.009*	**(2x2 ANOVA)** A two-way ANOVA was conducted that examined the effect of agent presence and agent interactivity on average fixation durations within the area of interest (containing the agent). There was a significant main effect of agent presence on average fixation duration within the AOI (F (1, 95) =115.96, $p<0.001$) (see Fig 35; 36) as to be expected as it simply confirms that participants looked at the agent when it was *(visually)* present. There was no significant main effect of interactivity (F (1, 95) =1.03, $p=0.31$). There was a statistically significant interaction between the effects of agent presence and agent interactivity on average fixation durations within the area of interest, F (1, 95) = 7.107, $p = .009$, thus supports H1c (see Fig 37).
Post-hoc Fixation Durations agent present AOI*	*p=0.04*	**(Independent samples t-test)** an independent samples t-test was completed to compare fixation durations with the AOI containing the agent for conditions 1 with an interactive agent and condition 3 with a no-interactive agent (t (46)=2.1, p=0.04). There was a significant difference in the scores for the agent interactive condition (M=1.16, SD=1.08) and the agent non interactive condition (M=0.63, SD=0.63), with durations being significantly longer on the agent when it was interactive. These findings partially support H1c which states that interactivity will result in greater levels of social presence regardless of agent presence as it creates an impression of a social interaction to engender feelings of engagement.

Average Fixation Counts within AOI	*p<0.00*	**(2x2 ANOVA)** A two-way ANOVA was conducted that examined the effect of agent presence and agent interactivity on average fixation count within the area of interest (containing the agent). There was a significant main effect of agent presence ($F (1, 95) = 109.23$, $p<0.001$) on fixation counts within the AOI, with more people looking at the AOI when the agent was *(visually)* present (see Fig 38). This finding was expected as it shows that people are looking at the agent as found in Exp. 1 Chapter 6. There was no significant main effect of interactivity on average fixation count ($F (1, 95) = 0.78, p = 0.4$). There was no significant interaction between agent presence and agent interactivity on average fixation count with the AOI $F (1, 95) = 0.982, p = 0.324$.
Receipt Amounts	*p=0.6*	**(2x2 ANOVA)** A two-way ANOVA was conducted that examined the effect of agent presence and agent interactivity on reported receipt amounts. There was no significant main effect of agent presence ($F (1, 95) = 0.002$, $p=0.96$) on reported receipts amounts. There was no significant main effect of interactivity on reported receipt amount ($F (1, 95) = 1.1, p = 0.3$). There was no significant interaction between agent presence and agent interactivity on reported receipt amounts (F(1, 95)=1.01, p=0.32) thus, no support for H1a.
Instances of cheating	*p=0.727*	**(Kruskal Wallis)** There was no significant effect of Social Presence (agent presence or

		agent interactivity) on instances of cheating (see Fig 39).
No. of people who cheated	*p=0.52*	**(Logistic Regression)** There was no significant effect of Social Presence (agent presence or agent interactivity) on the number of people who cheated. (x^2=0.406, p=0.52, df=2) (no support for H1a).
No. of people who accepted the money off voucher.	*p=0.4*	**(Logistic Regression)** There was no significant effect of Social Presence (agent presence or agent interactivity) on the number of people who accepted the money off voucher as the majority "Declined" the voucher (x^2=2.413, p=0.4, df=2).
Realism Score	*p=0.58*	**(Kruskal Wallis)** There was no significant effect of Social Presence (agent presence or agent interactivity) on realism. Overall people felt that the experience was "a lot like" a SCO experience with a mean score of 2.46 variables. (1 being "not at all" like a SCO experience; 2 being "a little and 3 representing "a lot") (x^2 (3)=1.94, p=0.58).
Confidence Score in using SCOs	*P=0.34*	**(Kruskal Wallis)** There was no significant effect of Social Presence (agent presence or agent intearactivity) on confidence scores and overall people felt "somewhat confident" in using SCOs with a mean score of 1.6. 1 being "very confident" 2 being "somewhat

confident" and 3 being "neither confident or unconfident" 4 being "somewhat unconfident" and 5 being "very unconfident" (x^2 (3)=3.33, p=0.34).

*AOI Area of interest
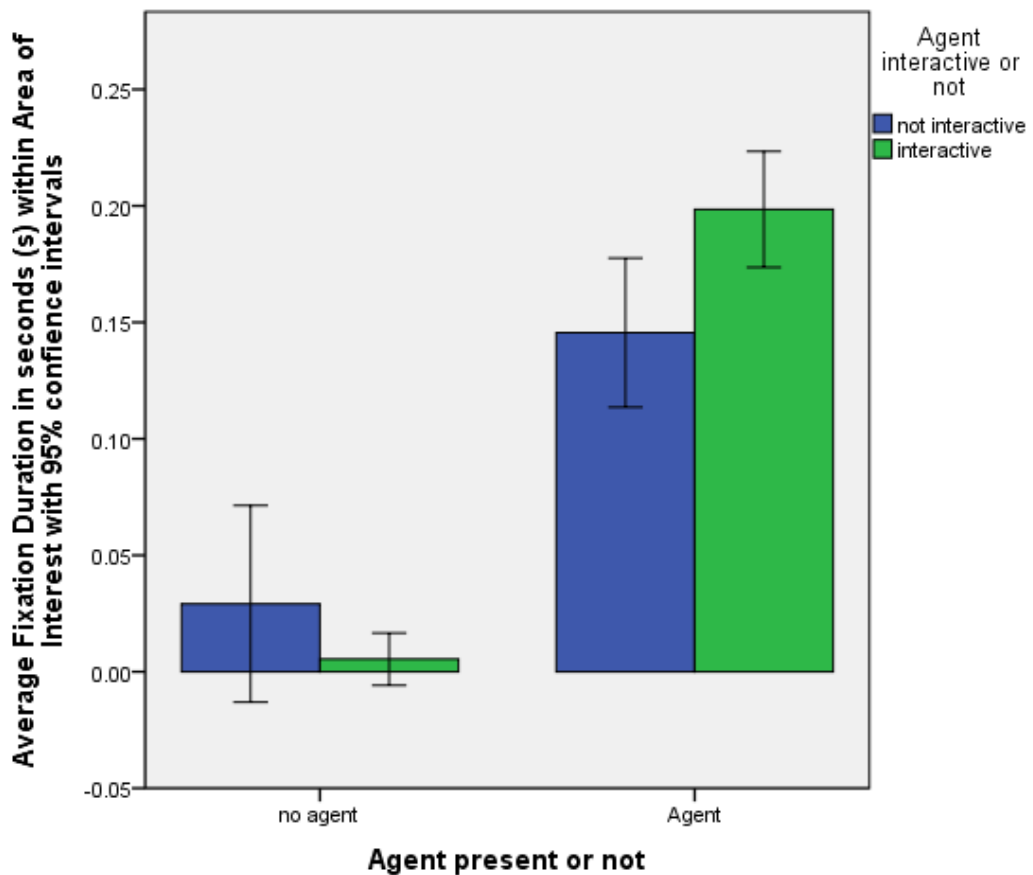
Figure 35 Fixation durations within the AOI for when the agent was present or not and for when the agent was interactive or not

The graph shows that participants in the condition containing an agent had longer fixation durations on the AOI when the agent was *(visually)* present compared to when it was not. This was to be expected as participants are less likely to look at this area if the agent is not there. However, participants were also found to have longer durations when the agent was present and interactive (M=0.20s) compared to when in was present and non-interactive (M=0.15s).

Figure 36 Heat map of Condition 1 (Agent present, interactive), on top, and Condition 2 (Agent present, not interactive) on the bottom

A heat map uses different colours (green for low, yellow for medium and red for high) to show how long participants fixated within specific areas (Tobii, 2016). The heat map for condition 1, on the top of Fig. 36, (Agent present, interactive) shows a yellow colour with the AOI, containing the agent for the Welcome SCO view, (i.e. the first screen viewed by participants), representing medium fixation durations on the agent when it is interactive. The heat map condition 2, on the bottom of Fig.36, (Agent present, not interactive) only shows green within the AOI, containing the agent suggesting that fixation durations were not as long within the AOI for the Welcome SCO view when the agent was not interactive compared to when it was interactive.
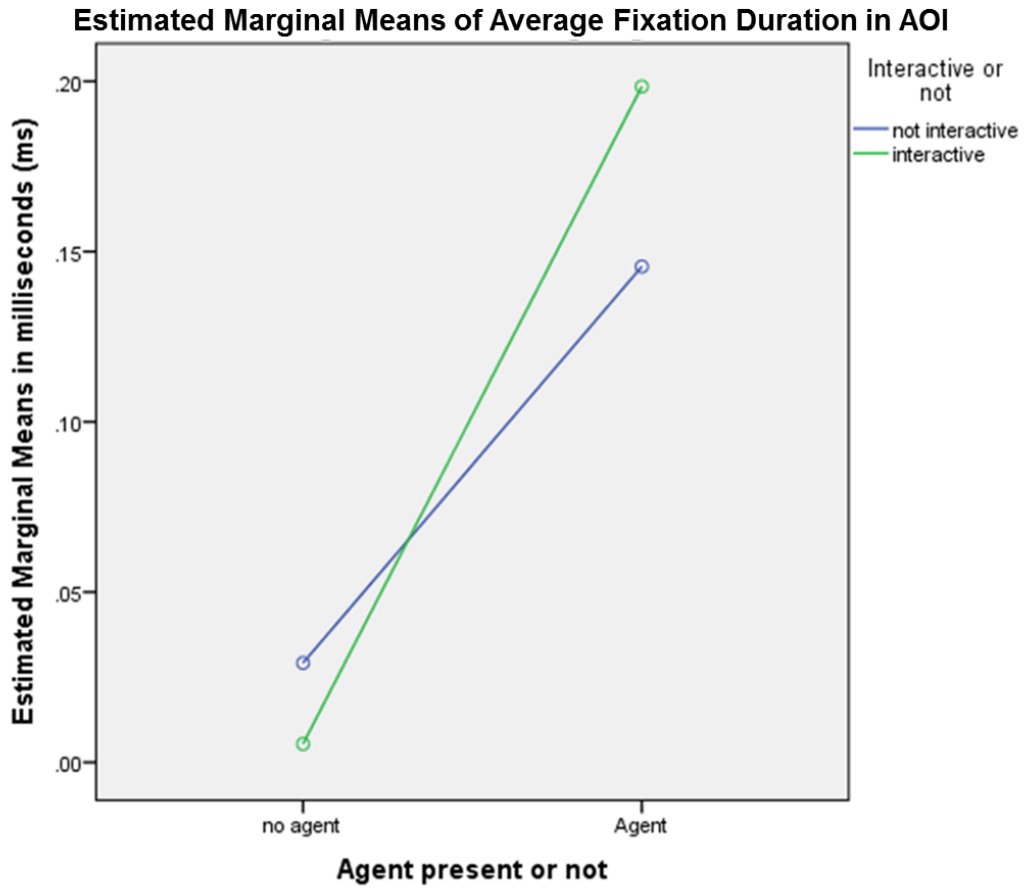
Figure 37 Interaction between agent presence and agent interactivity on Average Fixation Durations being longer within the AOI when the agent is interactive

The ANOVA revealed that there was a significant interaction between agent presence and agent interactivity on average fixation durations within the AOI. Post-hoc analysis suggests that participants' look significantly longer at the agent when it is *(visually)* present and interactive compared to when it is present and not interactive.
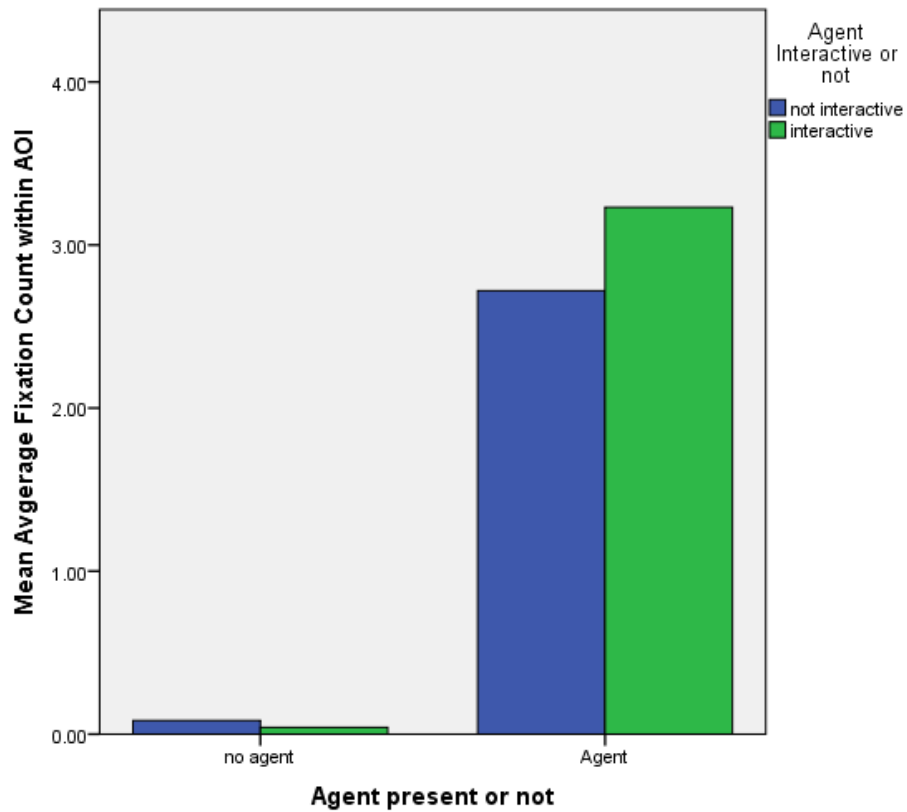
Figure 38 Fixation counts within the AOI for when the agent was present or not and for when the agent was interactive or not

The graph shows that participants in the condition containing an agent had more fixations within the AOI when the agent was *(visually)* present (M=0.6) compared to when it was not (M=3). This was to be expected as participants are less likely to look at this area if the agent is not there. There was no significant effect of agent interactivity on average fixation count within the AOI (t (48) =1.16, p=0.25).
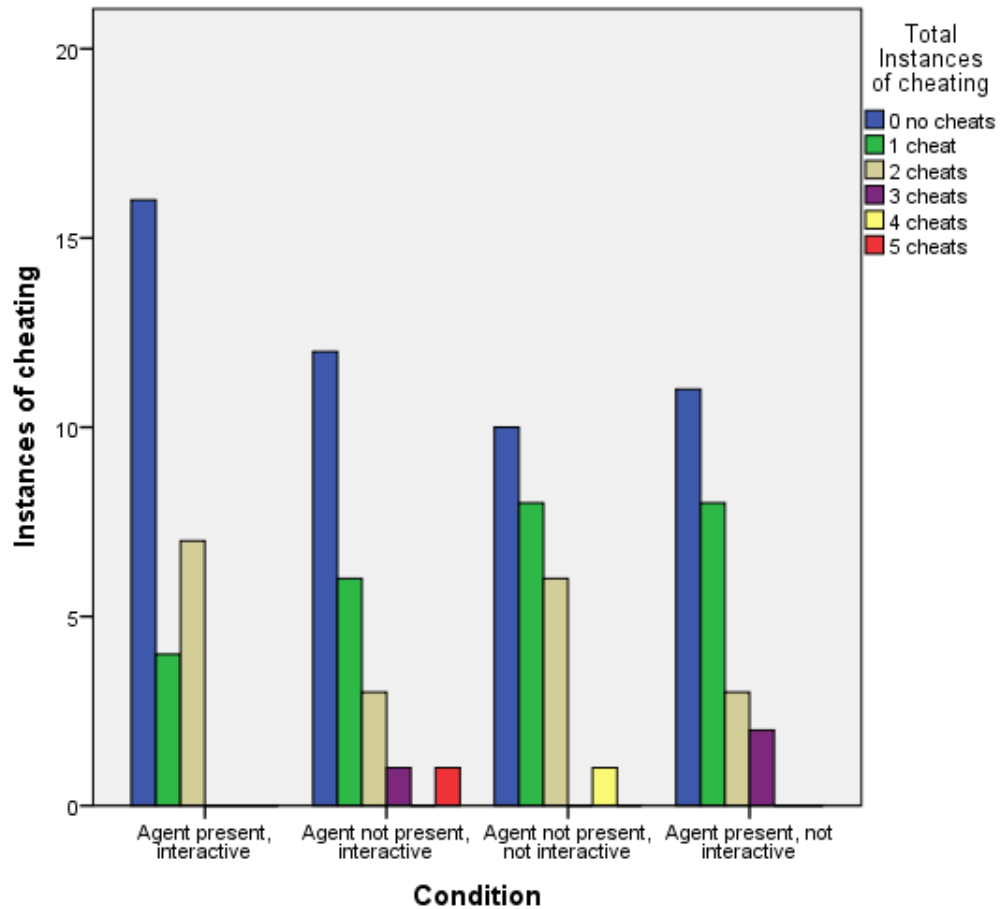
Figure 39 Instances of cheating that occurred within conditions

The graph shows that the highest occurrence of "no cheats" occurred in Condition 1, with agent present and agent interactive, representing a high social presence. Mean scores revealed that on average the most instances of cheating occurred within Condition 4, M=54.32 (Not Interactive-No Agent) and the least in Condition 1, M=46.11 (Interactive Agent). The mean scores for Condition 2 (Interactive-No Agent) was M=48.91 and Condition 3 (Not Interactive-Agent) was M=50.92. However the differences did not reach significance ($x^2(3)$ =1.3, p=0.727).
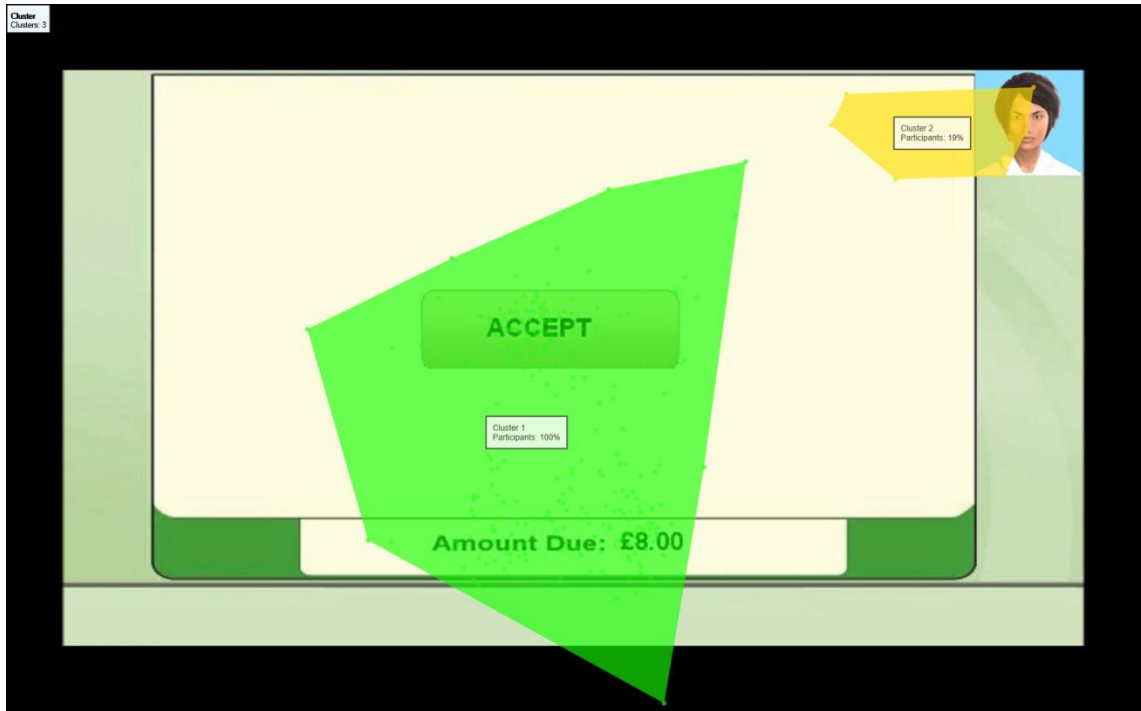
Figure 40 Cluster visualisation showing 19% of participants in condition 1 (agent interactive) were looking at the agent when it was interactive and asking them to accept the total amount due for Basket 1
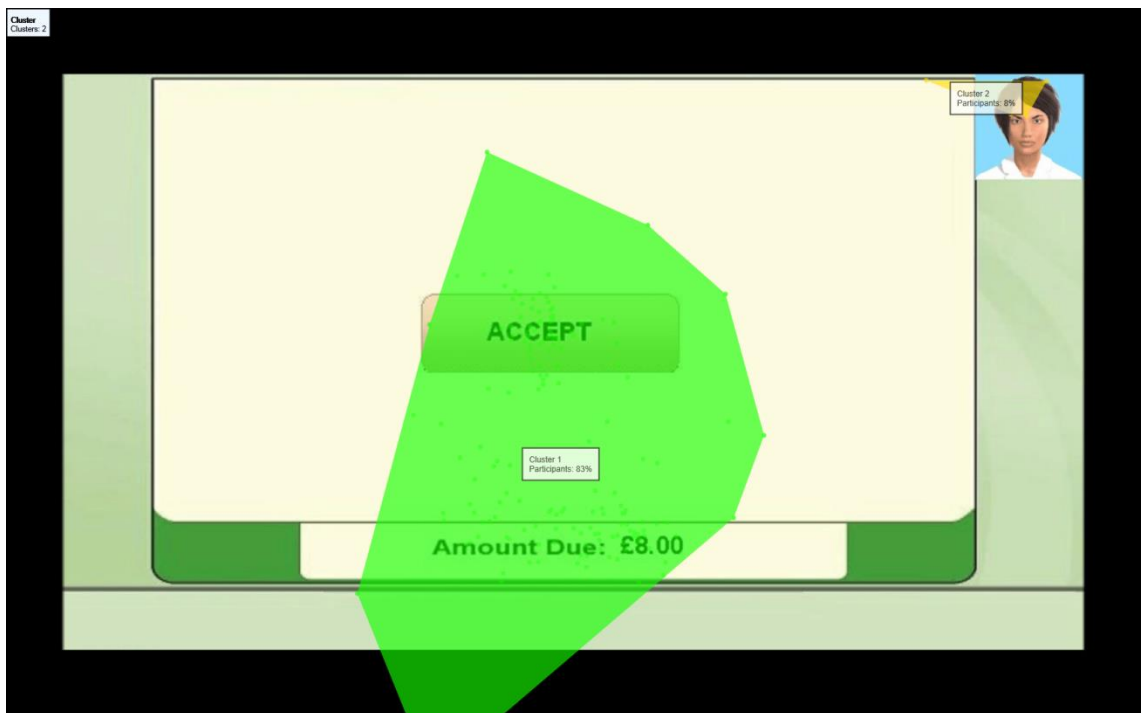
Figure 41 Cluster visualisation showing only 8% of participants in condition 3 (agent non-interactive) were looking at the agent when it was not interactive and asking them to accept the total amount due for Basket1

7.7.1 Analysis of Questionnaire

Lee et al. (2016) found that implementing an anthropomorphic voice resulted in greater levels of social presence being reported, therefore H1c hypothesised that interactive agents will result in greater perceptions of social presence independent of physical

representation. This was examined using an adapted version of Harms and Biocca's (2004) social presence questionnaire. Social presence was conceptualized as six sub-dimensions: co-presence, attentional allocation, perceived message understanding, perceived affective understanding, perceived affective interdependence, and perceived behavioural interdependence. Each question in the questionnaire was on a five-point Likert-scale (1 Strongly disagree, 2 disagree, 3 Neutral, 4 Agree, 5 Strongly Agree) and participant responses to construct each sub-dimension score were averaged. Kruskal Wallis tests were completed for each sub-dimension across the four conditions, however, no significant differences were found between the conditions (see Table 11 for detailed results).

Table 11 Analysis of the NMQ Questions

Sub-dimensions **(overall average score)**	Results report	**(Statistical test)** and conclusion
Co-presence **(4)**	$(x^2 (3)=3.67, p=0.299)$	**(Kruskal Wallis)** No significant effect of Social Presence was found, thus no support for H1b or H1c.
Attentional allocation **(4)**	$(x^2 (3)=0.85, p=0.837)$	
Perceived message understanding **(4)**	$(x^2 (3)=0.63, p=0.889)$	
Perceived behavioural interdependence **(3)**	$(x^2 (3)=0.66, p=0.883)$	
Perceived affective understanding **(2)**	$(x^2 (3)=2.66, p=0.235)$	
Perceived affective interdependence **(2)**	$(x^2 (3)=4.26, p=0.447)$	

Although not significant, the average scores for the sub-dimensions indicate participants' "Agreed" to their being a *co-presence*, i.e. the degree to which the observer believes s/he is not alone; *attentional allocation*, i.e. the amount of attention the user allocates to and receives from an interactant (agent); and *perceived message*

understanding, i.e. the ability of the user to understand the message from the interactant. Participants were neutral to experiencing a *perceived behavioural interdependence*, i.e. the extent to which the user's behaviour affects and is affected by the interactant's behaviour. Participants disagreed to their being a *perceived affective understanding*, i.e. the user's ability to understand the interactant's emotional and attitudinal states and disagreed with experiencing a *perceived affective interdependence*, i.e. the extent to which the user's emotional and attitudinal state affects and is affected by the interactant's emotional and attitudinal states. (Biocca & Harms, 2002; Lee et al. 2016; Leite et al. 2009; Putten et al. 2009). Thus, the system appears to have induced some aspects associated with social presence, co-presence, attention allocation and perceived message understanding. However, they were not significantly affected by the presence of the agent or by levels of interactivity, thus, H1b is not supported.

Questions considering interactivity were developed, using Burgoon et al.'s (2000) qualities of interactivity, to create three sub-dimensions including: Individual involvement, mutuality between individuals and individuation. Each question associated with these sub-dimension in the questionnaire was on a five-point Likert-scale (1 Strongly disagree, 2 disagree, 3 Neutral, 4 Agree, 5 Strongly Agree) and we averaged participant responses to construct each sub-dimension score. Kruskal Wallis tests were completed for each sub-dimension across the four conditions, however, no significant differences were found (see Table 12 for detailed results).

Table 12 Analysis of questionnaire sub-dimensions of Interactivity

	Individual involvement	mutuality between individual	Individuation
Chi-Square	3.000	1.607	1.000
Df	3	3	3
Asymp. Sig.	.392	.658	.801

a. Kruskal Wallis Test

b. Grouping Variable: Condition

Table 13 Kruskal Wallis test on questionnaire explained

Sub-dimensions (**overall average score**)	*p*-Value	(**Statistical test**) and conclusion
Individual involvement **(3)** Mutuality between individuals **(3)** Individuation **(4)**	*p=0.392* *p=0.658* *p=0.801*	(**Kruskal Wallis**) No significant effect of Social Presence via interactivity was found thus no support for H1c.

Overall scores from the questionnaire suggest that individual involvement and mutuality between individuals were limited in their effects, with participant's responses representing neutral scores. Individuation was experienced across all of the conditions i.e. well-defined notions of "me," "you" and "us" rather than vague identities and pseudo- or imagined relationships (Burgoon et al., 2000, p.558). Thus, participants were aware of the system (SCO) and felt that the system was aware of them.

7.8   Discussion

Two studies were presented within this Chapter. Firstly a qualitative study was conducted to obtain a brief overview of customer perceptions of "the voice" at SCOs-before further attention was given to levels of interactivity, via voice implementation, within the empirical study. The findings from customer interviews regarding "the voice" suggest that overall "the voice" was perceived as being helpful, friendly, competent, aware and trustworthy. Additionally, "the voice" was not perceived to be irritating, bossy or invasive. These findings supported the plan for further research using a voice, suggesting that inputting a voice within the empirical study would be considered as an acceptable aspect of an interaction with a SCO, by users. The findings also suggested that "the voice" was not presently perceived as being influential on the customer's behaviour, it was not considered as conversational, it does not monitor customer behaviour and it does not have a personality. These findings suggest that the voice, in its current form, at a standard self-service checkout was not considered as a social actor that monitors customer behaviour as described by Nass and Moon (2000), resulting in human users responding to computers as if they were people (e.g., they

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follow politeness etiquette and gender based rules as they do in human-human interaction). This may also mean that it is not an effective method of social presence in its current form as it may not influence customer behaviour therefore, it does not result in the social responses described by Lombard and Ditton (1997) which occur in response to a particular type of presence. Thus further investigation into increasing the social presence of the voice was of interest, and the effect of interactivity was explored in the empirical study.

Findings from research on interactivity via communication (Burgoon et al. 2000; Tu & McIssac, 2002) and on machine learning, showed that technology with the ability to identify user behaviour has been associated with improving social behaviours (Baur et al. 2015). The ability for technology to identify users has also been suggested to create an impression of a peronsal social interaction, which in turn engenders feelings of engagement or connectedness, and thus may produce feelings of a social presence (Burgoon et al. 2000). These findings were considered for the empirical study in this Chapter. The empirical study aimed to investigate the effect of a social presence in the form of an agent and the effects of agent interactivity of the system on dis/honest user behaviour, using the simulated checkout scenario. The experiment also aimed to explore user perceptions of social presence in relation to agents and interactivity (i.e. personal nature) of the system. It was hypothesised that evaluating a user's perceived social presence, and behaviour, would provide indicators about what features intelligent agents should have to engage a user's interactions and potentially enhance honest behaviours.

Support for the hypothesis was mixed. In the following, the findings are discussed with reference to dishonest behaviour, subjective measures of social presence and attention engagement. The findings did not show a significant effect of social presence via agent presence or agent interactivity on instances of cheating, thus H1a was not supported. However, results did show that the least instance of cheating occurred within the condition that was predicted to represent a high social presence, Condition 1(Agent present and agent interactive) (see Fig. 39), although results did not reach significance. It was hypothesised that higher reported levels of social presence would be found from the NMQ questionnaire in conditions with high social presence, however there were no significant effects of agent presence or agent interactivity on perceived levels of social presence, thus H1b is not supported. Based on the findings from Sameh et al. (2012)

which suggest that speech is more influential than physical representations of an agent, and Burgoon et al. (2000) who suggest that interactivity, i.e. the ability for technology to identify individuals to create an impression of a personal social interaction to engender feelings of engagement or connectedness, it is also hypothesised that interactivity will result in high levels of social presence regardless of agent presence H1c (Hypothesis 1c). As there were no significant effects of agent presence on perceptions of social presence between conditions 1 (Agent present, interactive) and condition 2 (Agent not present, interactive) it may appear that H1c is supported, however as there was also no significant difference in perceived social presence between Condition 2 (Agent not present, interactive) and condition 4 (Agent not present, not interactive), H1c is not supported as interactivity does not result in higher perceptions of social presence. There was no significant difference in perceptions of social presence between condition 3 (Agent present, not interactive) and condition 4 (Agent not present, not interactive), thus in this instance, agent presence did not result in higher levels of perceived social presence. As there was no significant effect of agent presence and agent interactivity the predictions that these would result in higher perceptions of social presence were not confirmed.

Analysis of the fixation data showed that there were no significant main effects for agent presence or agent interactivity on fixation duration or counts. There was also no significant interaction of these factors on fixation counts. However, there was a significant interaction between agent presence and agent interactivity on average fixation durations within the AOI, with participants' significantly looking longer at the agent when it is present and interactive compared to when it is present and not interactive. Interestingly this is the same condition that showed the least instances of cheating, however, this did not reach significance. Eye tracking research consistently suggests that fixation durations represent attentional engagement (Albert & Tullis, 2013; Bednarik, Eivazi & Hardis, 2012; Rayner et al. 1995; Rayner 1998). Ishii and Nakano (2010) acknowledged that in face-to-face conversations, speakers are continuously checking whether the listener is engaged in the conversation by monitoring their eye-gaze behaviours therefore the used eye-gaze (fixation duration) to estimate user conversational engagement. In their analysis, they suggest that duration of looking at the target object contributes to conversational engagement. As there were no significant differences for fixation counts within the AOI between the interactive agent

and the non-interactive agent, when the agent was present (Conditions 1 & 3), the findings suggest that the agent does not make people look more at the agent, but that they look for longer, suggesting they pay significantly more attention to the agent when it is interactive. This is consistent with research which states that fixation durations represent attention allocation (Henderson, 1993; Raynor et al. 1995) and durations will be longer on more informative objects than less informative objects (Antes, 1974; Friedman & Liebelt, 1981; Unema, Pannasch, Joos & Velichkovsky, 2005). This suggests that the object, i.e. agent, becomes more important via its interactivity which was confirmed by the significant effect of longer fixation durations when the agents was present and interactive.

The agents within the interactive and non-interactive conditions were the same and they were placed in the same positions throughout the experiment. The only different between the conditions 1 and 3 was the level of interactivity which would suggest that this influenced the attention participants gave to the agent within the condition. Interestingly the most instances of cheating did occur in condition 4, the lowest representation of social presence, where there was no agent and it was non-interactive and the least instance of cheating occurred in condition 1, the highest representation of social presence, where there was an agent present and it was interactive. Although this did not reach significance, further research on this would be of interest as this was the same condition that resulted in significantly longer fixation durations with the AOI, suggesting more attention was being given to the agent by the participant. The effect of agent presence and agent interactivity did not result in a significant effect on reported receipt amounts with the majority reporting £2.50 which was the correct amount to be reported. However analysis did indicate that people were cheating throughout the experiment with an average of 11 people cheating within conditions. There may be different perceptions on what are acceptable forms of cheating. For instance, participants cheating via selecting buttons on a technological interface, may be perceived as more acceptable than participants cheating via them writing down incorrect amounts of money due to them on a piece of paper. Participants may feel more accountable for cheating when it is in relation to something they have produced, i.e. a written receipt compared to when they cheat using technology as they can blame the technology for any mistakes if they are found out. This finding supports Beck's (2011) theory of the self-scan defence which suggests that people will be more willing to

behave dishonesty when using self-service technology as they can blame the machine for any wrong doing. Customers may feel less accountable for dishonest behaviour at SCOs, as they are not interacting with a sales assistant (a social presence), instead are relying on technology to confirm they have paid for their shopping. Mohr, Cuijpers and Lehman (2011) state that there must be a social presence in order for there to be accountability; thus, incorporating a social presence within self-service technology may reduce the likelihood of dishonest behaviours occurring, as social presence may induce similar feelings to those experienced during a typical sales assistant interaction, i.e., personal responsibility for payment.

The difference between the conditions (agent presence and agent interactivity) and the number of people who accepted the money off voucher was not significant different, however, in the present study the majority of people chose to decline the voucher. This is the opposite finding from the previous empirical study (Experiment 1 & 2, Chapter 6) where most people accepted the £1 off voucher and reported it as being due to them within their receipt. This may be a result of a change in the wording used as the previous experiment stated "*As* you have spent over £10", when they had really only spent £8 pounds whereas this experiment stated "*If* you have spent over £10". This change in text may change the sense of accountability for the participants actions as the previous experiment suggested a fault from the SCO which stated they were due a £1 off voucher, whether they were deserving of it or not. Those who accepted the £1 off voucher and put it on their receipt as being owed to them, did so without stating to the researcher that they may not be due it when collecting their payment. The current experiment, study 5, left the decision in the hands of the participant to make the choice if they were going to accept the voucher or not. Leaving the decision to be honest to the customer in this case appeared to result in more honest behaviours. The wording beforehand, study 4 experiments, may have implied that the machine was at fault. Participants may have felt more deserving of the voucher as they may have done nothing to encourage this fault that they were presented with. This may be the case for customers who steal via frustration at SCOs not working properly, as suggested in studies 1, 2 & 3, as it provides them with a justification for their actions. Thus, participants who accepted the money off voucher in Chapter 6 may have used neutralisation techniques to justify accepting the wrongly presented voucher. Neutralisation has been vastly linked with criminal behaviours and allows perpetrators

to justify their criminal behaviours, whilst being able to return to being an otherwise societal law abiding citizen when they chose (Matza, 1964).

Analysis for the questionnaire averages showed that: co-presence, the degree to which the observer believes s/he is not alone; attentional allocation, the amount of attention the user allocates to and receives from an interactant; and perceived message understanding, the ability of the user to understand the message from the interactant (Harms & Biocca, 2004; Leite et al. 2009), were all perceived by participants across all four conditions, although there were no significant effects of agent presence and agent interactivity on these perceptions. Co-presence, attentional allocation and perceived message understand were perceived more than perceived behavioural interdependence, the extent to which the user's behaviour affects and is affected by the interactant's behaviour; perceived affective understanding, the user's ability to understand the interactant's emotional and attitudinal states; and perceived affective interdependence, the extent to which the user's emotional and attitudinal state affects and is affected by the interactant's emotional and attitudinal states (Harms & Biocca, 2004; Leite et al. 2009). Overall scores on aspects of interactivity from the questionnaire suggest that individual involvement (high cognitive, sensory, visceral, and motor engagement, i.e. a sense of presence, of ``here and now"); and mutuality between individuals (a sense of "connectedness," interdependence, receptivity, collective sense-making, shared understandings, and coordinated interaction, (Burgoon et al. 2000, p.558) were not experience with participant's scores representing "Neutral".

Individuation (well-defined notions of "me," "you" and "us" rather than vague identities and pseudo- or imagined relationships) (Burgoon et al. 2000, p.558) was experienced across all of the conditions. This suggests that participants were aware of the voice being present and that they could understand it. However, as there were no significant effects of agent interactivity on perceptions of Individuation or social presence across the conditions, and there was a lack of individual involvement (sense of presence), it would suggest that the interactivity levels were not varied enough for it to be considered an effective social presence in influencing the users behaviour or emotions (Freeman et al. 2000; Burgoon et al. 2000).

The users' dishonest behaviour was not significantly influenced by the agent, as suggested by the lack of behavioural interdependence, thus H1a was not supported. This may have been increased if the agent were to have mentioned more of the items being bought to increase awareness of the here and now, also increasing the interactivity component of individual involvement. If the voice had been more specific about personal aspects of the shopping experience for instance mention the participant's name it may suggest that they can be identified. This may then increase the sense of presence of the agent (Freeman et al. 2000) and participant may experience increased self-awareness of their behaviour similar to the findings from Mazar and Ariely (2007) who found that asking a child their name increased their self-awareness lead to more honest behaviour.

The present findings were similar to those from Lee et al.'s (2016) study which also found higher ratings for co-presence and attentional allocation for conditions aimed at representing a high level of social presence. Their interpreting suggested that their setting may have been so that it was more encouraging of these particular dimensions of social presence rather than the other sub-dimensions because the manipulations in the study were more related to visual/behavioural changes. The other sub-dimensions including perceived affective interdependency and understanding seemed more associated with verbal communication which they did not adjust in their setting. The present study did adjust them and the voice was noticed, as indicated via the interactive component of individuation and the general questions related to the system which showed participants did notice the voice. However, perhaps the level of interactivity, although noticed, was not varied enough for participants to experience an emotional response to the agent which would reduce the sense of social presence (Burgoon et al. 2000).

Leite et al. (2009) conducted a longer term study that measured perceptions of social presence of an interactive robot over the course of 5 weeks. Their research found that perceptions of social presence of the robot changed at different stages of interaction. Their results also showed that the robot was perceived as more socially present over repeated interactions. As participants became more familiar with the robot behaving in a certain way (i.e., passive or assertive), they increasingly saw it as socially present and thus capable of having mental and emotional states. These findings suggest that a

longitudinal study of the present experiment may present further interesting findings to highlight the effect of agents on social presence. One implication of this is that the ways in which certain social cues are expressed will differentially affect the rate of increase in perceiving the entity as a social agent (Leite et al. 2009), therefore increased levels of interactivity should be examined.

Creating an intelligent interface has been a problematic topic for domains such as computational linguistics, artificial intelligence and cognitive psychology (Schmandt, 1990). An intelligent interface would have to pay attention to the user and understand their implied actions rather than simply responding to direct actions (Schmandt, 1990). Some interfaces can create an illusion of intelligence by making certain responses at specific times. This perception of intelligence can create a sense confidence in the interface, however it is important that this does not raise user expectations that it cannot achieve (Schmandt, 1990). The agent within the present experiment may have raised user expectations which it could not achieve, due to it being programmed to perform rather than it being responsive to the user actions in real-time. This may then have decreased the sense of perceived affective understanding, reducing social presence (Burgoon et al. 2000). This may also have reduced the sense of the interactivity components of individual involvement and mutuality between individuals which would also have decreased social presence (Gunawardena, 1995).

7.8.1   Future research

Further research considering the influence that an interactive voice can have on customer behaviour would be useful as the findings indicate that the interactivity component may make customers pay more attention to the SCO when there is an agent present. Although not significant results indicated that more instances of cheating occurred when there was reduced levels of social presence within the SCO interface (i.e. no agent and non-interactive), than when there were high levels of social presence, (i.e. agent present and interactive), therefore, further research on this would be of interest. Listeners tend to ignore continuous, unchanging sounds (Schmandt, 1990). If the audio output SCOs were to be specific to the item being purchased then customers would be more likely to listen to the audio output as it varies from the standard/expected audio.

Design of an audio output will have to involve careful consideration as a poor design can lead to it be annoying or ignored by the user. Mountford & Gaver (1990) state that sounds can provide redundant information that is potentially useful. When applying this to a SCO situation, the voice could communicate information on store promotions relating to the customers purchased items, or purchase history. This would not only promote products in-store it would also show that there is an awareness of that specific customer and that they can be identified and monitored. This may then increase the sense of social presence and be likely to reduce dishonest behaviours at SCOs.

It must be noted that the voice used within this study is not the same voice from the SCO checkouts within the supermarkets previously involved in the Research. The exploratory study investigated whether people perceive the voice at SCOs which suggested that they do. The current empirical study also found that people perceived the voice suggesting that the voice may be a method of implementing a voice presence as it is noticed.

Adaptive agents that have access to dynamic models of the user (Lee et al. 2016; Laurel, 1990), to distinguish between users and utilise their previous interests or experience with the SCO, are likely to produce positive experiences at SCO as they will be able to interact with the user in relation to how likely the user is to need them or benefit from information it may have. An adaptive interactive agent may also increase a sense of awareness of the individual customer which could increase the sense of social presence. Participants within the present study did not spontaneous report that the agent was "creepy", thus it can be assumed that there was no effect associated with the *uncanny valley* (Mori, 1970; MacDorman, 2006; Mori, MacDorman & Kageki, 2012). However, future studies may want to measure this. Future directions for audio within a SCO may achieve natural-language interaction which would be likely to create the greatest sense of social presence from a computer (Laurel, 1990) and increase the interactivity component of individual involvement (the here and now).

7.8.2   Conclusion

The findings from this study suggest that having a social presence in the form of an agent that is interactive (i.e. personal rather than impersonal) may receive greater levels of user attention. Although not significant, the findings suggested that reduced levels of

a social presence (agent non-presence and non-interactivity) may lead to an increase in dishonest behaviour thus effects of a social presence on opportunistic behaviour should be further explored. If integrated within an SCO, fewer instances of opportunistic behaviour may occur as customers would feel like they are not alone (Biocca & Harms, 2002) which may increase the self-awareness (Mazar & Ariely, 2007) and encourage positive social behaviours (Bateson et al., 2006). The current findings suggest that participants were aware of the SCO and that it was aware of them, however, further research is needed on the influence of interactivity on social presence.

7.9   Chapter summary

This Chapter aimed to examine the effects of added social abilities of computer agents and their potential influence on consumer behaviour. Thus, the effects of a social presence in the form of and anthropomorphic agent and the effects of varying the level of interactivity of the system via the voice was examined. Background literature on socially intelligent agents, i.e. agents that show aspects of human-style intelligence (Dautenhahn, 1999), that can encourage perceptions of social intelligence and social presence was presented. An initial exploratory study on customer's perceptions on the voice at self-service checkouts was conducted. This found that in general, customers do not mind the voice at the SCO, however, they did not feel that it influenced their behaviour suggesting that they did not feel that it was an effective social presence (Baumeister, 1982). This was then followed by an empirical study considering the effects of social presence and interactivity within a SCO, on dishonest user behaviour. The SCO with a voice was found to result in participants feeling a sense of co-presence, attentional allocation and perceived message understanding, however there was no significant effect of social presence on this. Participants also experienced individuation, a measurement of interactivity, however there was no significant effect of social presence on this. The findings suggest a SCO with a voice is able to influence users to feel components related to a sense of social presence and interactivity. The hypotheses which stated that increased levels of social presence and interactivity would result in reduced levels of opportunistic behaviour was unsupported as results were not significant. However, the findings did indicate that the most instances of opportunistic behaviour occurred in condition 4, which represented the lowest levels of social

presence and interactivity and the least instance of cheating occurred in condition 1, the highest representation of social presence, where there was an agent present and it was interactive. Thus, while there was a trend in the predicted direction, the manipulation of the social presence design, agent present or no agent present, and levels of interactivity need to be further examined.

Eye tracking data such as fixation durations were found to be longer on the interactive agent than those on the non-interactive agent in the conditions where the agent was present. Eye tracking research associated fixation durations as an indication of attention application suggesting that participants will apply more attention to an agent when it has greater levels of interactivity and the audio is relative to the individual's interaction (Jacob & Karn, 2003; Fitts et al., 2005; Unema, et al., 2005). This finding supports research on interactivity via communication which states that technology with the ability to identify has been suggested to create an impression of a social interaction, which in turn engenders feelings of engagement or connectedness, which in turn may produce feelings of a social presence (Burgoon et al. 2000). Leite et al.'s (2009) stated that the feeling of social presence towards a particular agent or system motivates users to maintain the interaction. Research also suggest that people act differently when they are surrounded by another person or computer in an attempt to promote a positive impression of themselves (Baumeister, 1982; Swinth, & Blascovich, 2002). Psycho-evolutionary research has shown that the eyes are the most fear-inducing feature in situations of social appraisal by others (Ohman, 1986). Perhaps the presence of an interactive agent made participants give more attention to the agent to establish whether they were being monitored, resulting in longer durations. If interactive agents are able to encourage a sense of social presence, by inducing a sense that they are being monitored at a SCO, it could encourage positive social interactions (Bateson et al., 2006) with customers to assist them in their shopping and reduce the likelihood of dishonest behaviours. The following Chapter will summarise the key findings from the studies presented within this thesis and discuss their implications.

8 CHAPTER 8 Dishonesty and Social Presence in Retail: Discussion, Implications, and Future Research

Based on the triangulation of findings, this final Chapter summarises and discusses the influence of a social presence on dishonest behaviours at self-service checkouts. Social presence is when a user experiences the perception that there is another intelligence or entity within their environment (Short, William & Christie, 1976) and we tend to behave better when in the presence of others (Baumeister, 1982), in other words when there is a high social presence. Innovations in technology such as self-service checkouts (SCOs) allow for customers to scan and pay for their goods independent of a sales employees (Meuter et al., 2003).The independent style of scanning and payment at SCOs has resulted in areas for concern, as customers may take advantage of the lack of employee involvement. The reduction of employee involvement may also reduce the social presence perceived at a SCO. Recent research from Taylor (2016) and Beck and Hopkins (2016) suggests that customers are learning ways in which they can take advantage of opportunities to commit theft whilst interacting with a self-service checkout. Taylor's (2016) research highlights that people who may never have stolen in a retail environment before, are doing so as a result of the opportunity presented to them at a SCO. Social presence research suggests that it can influence pro-social behaviours such as honesty (Bateson et al., 2006; Nettle et al., 2013), and that it can be implemented technologically, for example, a robot can encourage users to cheat less when there are opportunities for personal gain (Han et al. 2016). Various empirical studies have shown people to respond socially to computers and agents as they would respond to other humans (Reeves & Nass, 1996; Gratch, Wang Gerten, Fast & Duffy, 2007; Putten, Kramer & Gratch, 2009). However, little exists in relation to self-service technology, including self-service checkouts (SCOs). Recent research identifies factors that influence the use of SCOs (McWilliams et al., 2016) and the growing issue of thefts occurring at SCOs, (Beck 2011; Beck 2015; Beck & Hopkins, 2016; Taylor 2016), however, research has yet to determine ways in which the technology can be enhanced to induce a sense of social presence to minimise thefts occurring. The lack of research in this field provided the motivation for this thesis. As innovation and the acceptance of new technologies within retail continues to increase (Beck, 2015; Meuter et al., 2003), investigating behaviours associated with SST, including theft, is of interest to the retail

community as measures to reduce theft may be derived. The present research aimed to examine whether a social presence could be applied to SCOs, to result in pro-social behaviours, i.e. reduce theft. The findings suggest that a social presence could potentially be implemented within a SCO to influence pro social behaviours, however, further investigation within this area is required.

The introductory Chapters (Chapters 1-2) provided a background of literature relating to innovations in technology such as SCOs and other self-service technologies. They also highlighted psychological theories of human behaviour and social presence that can be applied to human-computer interaction, in particular, to dishonest behaviours. Social presence has been identified as a key influence of consumer behaviour. Research shows that adding a sense of human touch increases social presence and influences user trust, loyalty and purchase intention (Botha & Reyneke, 2016), yet its role within security as a deterrent of dishonest behaviour has not been explored. Han et al.'s (2016) research on social presence suggests it plays an important role in providing satisfying interactions and relationship building in computer-mediated communication (Kreijns, Kirschner, & Jochems, 2003). Research suggests a social presence can lead to positive engagement within HCI and can promote positive social behaviours (Han et al., 2016; Nowak & Biocca, 2003). If this is the case then it can be presumed that a social presence within a SCO may encourage such pro-social behaviours as honest customer behaviour, thus, reducing thefts.

Retailers are modernising the shopping experience with the introduction of new technologies aimed at enhancing the customer experience. Consumer research directs to the importance of applying psychological theories and research to the implementation of such technologies to enhance both the customer and retailer experience, (e.g. Ahmad, 2016, Argo et al., 2005; Dahl et al., 2001; & Holbrook et al., 1984). Theories such as the rational choice perspective suggest that human behaviours are driven by personal gains and that people are likely to perform behaviours that result in greater benefits than consequences (Becker, 1962; Cornish & Clarke, 1986). For instance, customers who steal at SCOs, may do so as there are little consequences to their behaviours as a result of operational faults leading to difficulties in attributing responsibility, in line with the self-scan defence (Beck, 2011).

Chapters 3, 4 and 5 described a series of qualitative studies to examine customer, staff and security guards perspectives on self-service checkouts and factors that may influence thefts at SCOs. This was then followed by two further Chapters (Chapters 6 & 7) describing both empirical and qualitative research to examine the influence of implementing a social presence within a SCO technologically and its effects on dishonest behaviours. A summary of the key findings will be discussed in relation to the research questions, followed by a discussion on the implications and future research.

8.1 Revisiting the Research Question and a Summary of Key Findings

The focus of this research was to explore dishonest behaviours at self-service checkouts and the impact that a social presence, implemented via technology, could have on theft. Recent research demonstrates the positive impact that a social presence, in the form of an anthropomorphic agent, can have on a user during HCI (e.g. Grange & Benbasat 2017; Haxby, et al., 2000; Lombard & Jones, 2015). This thesis supports the view that there is a need for SCO designers to consider the positives of implementing a social presence within the SCO to reduce the likelihood of thefts and increase productivity for retailers. Five studies were conducted within this dissertation in order to explore the research question of:

What effect does a social presence have on thefts at self-service checkouts and can social presence be effectively implemented via technology?

This research question was split into research objectives which were then addressed by each study. Study 1 addressed research objective 1 (RO1) aimed at *understanding the consumer experience of using self-service checkouts.* Study 2 involved in-depth interviews with staff monitoring customers at self-service checkouts and addressed research objective (RO2), *investigate the nature of dis/honest behaviour with respect to* RO1 *and the perceived effects of a social presence*. Study 3 comprised additional qualitative research methods, interviewing security guards of supermarkets to address research objective 3 (RO3) *explore and recommend improvements to SCOs in the light of* RO1 *and* RO2. Studies 4 and 5 empirically tested the effects of a social presence in view with the findings from RO1, RO2 and RO3. Studies 4 and 5 addressed research objective 4 (RO4), *advance knowledge in theory and methodology within the field of: HCI; psychology; and business.* The studies conducted were to gain a better

understanding of behaviours and perceptions associated with thefts at SCOs, to answer the research question.

The first qualitative study (study 1, Chapter 3) aimed at exploring the retail environment to gain insight into the use of SCOs and the factors that could influence thefts. The key findings from the customer observations and interviews suggested that customers do not have pre-existing negative attitudes towards SCOs and the determining factors of their use can be a result of situational factors, affecting the perceived *convenience* of their use, to the customer. For instance, if customers think that they may be delayed at a SCO due to factors associated with the type of items they are purchasing, they will be unlikely to use them. Situational factors were also found which could lead to customer frustrations, such as unexpected delays due to operational issues, which has been associated with causing thefts at SCOs (Beck, 2011; Taylor, 2016). Frustrations can be a result of factors including: the machine not working properly, limited experience in using the technology causing confusion and delays in the SCO process, such as to having to wait on a staff member for assistance. All customers stated that they had experienced a situation where the SCO did not work properly and they had to receive assistance from a member of staff. Customers were aware of CCTV in stores, however, they did not feel that they were being observed which suggest that it is not currently an effective form of a social presence and it may not influence customer behaviour (Beck & Hopkins, 2016). Findings from this study were deemed useful to identify factors that may lead to thefts at SCOs including customer frustrations and lack of customer interaction with staff, i.e. reduced social presence.

The following study (study 2, Chapter 4) focused on perceptions from SCO staff on customer behaviours at SCOs to explore their views on factors influencing thefts. The key findings from this research were that staff reported that the presence of numerous customers, within a SCO area, increases their perceptions on the likelihood of theft occurring. There was also an uncertainty as to whether or not customers are intentionally stealing at SCOs, or whether thefts occur due to aspects of the technological setup. This highlights that operational issues may be contributing to thefts that occur at SCOs. Knowledge of operational faults may provide those who are tempted to steal, with a justification for their dishonest behaviours via neutralisation techniques, as customers can blame the machine for allowing any wrongdoing (Sykes &

Matza, 1957). This finding is also consistent with Beck's (2011) theory of the self-scan defence which suggests that many thefts occur at SCOs as customers have a ready-made excuse, and attribute blame to failures in the machine. This then creates difficulty in determining those who have stolen as a result of their intent, i.e., those who steal via a mistake; or those who steal as a result of frustration from something not scanning. The rational choice perspective states that behaviours are likely to occur if the benefits are outweighed by the consequences (Becker, 1962). On reflection, study 1 (Chapter 3) suggests that customers are aware that there are machine faults as it can be a factor that influences the non-use of them for some customers, however, it may attract opportunists to use SCOs as the risk associated with being caught may appear reduced as they can blame any wrong doing on machine faults. Staff are also aware that there are machine faults as suggested within study 2 (Chapter 4), therefore if a customer were to take advantage of the knowledge that there are machine faults, their claim would likely be believed by a staff member as they too are aware that there tends to be operational issues with SCOs. This then renders it difficult to prove whether customers are telling the truth or not as staff members have experience times that the machines are to blame. Opportunists may also take advantage of the fact that there tends to only be one member of staff assisting up to ten SCOs. This reduces the likelihood of the customer being individually watched, allowing for potential dishonest behaviours to occur. Staff reported that they felt limited in their ability to produce an effective social presence, particularly when it was busy as they were unable to effectively watch for dishonest behaviours. The key findings from study 1 and 2 (Chapters 3 & 4) highlight factors that encourage use of SCO, in particular the convenience to the customer. This is of particular interest when considering an opportunistic customer, as the negatives associated with SCO use, such as machine faults, delays in assistance from staff and lack of social presence from staff are factors that make the SCO experience more appealing to an opportunistic customer. Thus, the findings from these two studies suggest that a social presence within a SCO may be useful in assisting staff in their role, as their experiences of being busy and unable to watch customers' leads to an increase in thefts from SCOs.

The next qualitative study (study 3, Chapter 5) examined views of store security guards on the perceived influence of a social presence on thefts at SCOs and the factors associated with a theft at a SCO to explore their attitudes towards self-service checkouts

and their role in relation to theft at self-service checkouts. The results clearly suggest that security guards feel security measures for reducing thefts at SCOs could be improved. They recognised that thefts can occur for a number of reasons at SCOs, including by mistake, for instance, if the machine has not scanned something properly, which is consistent with the views of SCO staff. However, they feel that the reality is that thefts can be conducted easily at a SCO, whether intentional or non-intentional, which may predispose individuals to repeat this behavior as they may experience benefits and no consequences. Thus, their perceptions are consistent with the rational choice perspective which states that behaviours resulting in benefits that outweigh the consequence, are likely to occur (Becker, 1968). This finding is also consistent with recent research from Taylor, 2016 and Beck and Hopkins (2016) who highlight that the opportunity to steal at a SCO is encouraging customers who would perhaps not have stolen in the past, but will now steal at a SCO as the opportunities are presented to them. It should be considered by retailers that perhaps the 'first' theft is the important one that should be avoided for that reason. Security guards also highlighted that more thefts occurred at the SCOs when the supermarket is busy as a result of a lack of surveillance as both they themselves and the staff are unable to watch everyone. This is consistent with findings from the staff research, (Study 2 Chapter 4), and, taken together, points to social presence – or rather – the lack of social presence as a critical factor for the likelihood of theft occurring, which was explored in the empirical studies (Chapters 6 & 7). Researchers have suggested that the implementation of social presence has a positive effect on human behavior when implemented technologically (Han et al., 2016; Reynald & Elffers, 2009), which has been suggested to be a result of increased self-awareness (Pfattheicher & Keller, 2015). Human-like interfaces may result in users applying similar impression-formation and management techniques to those that would be expected in human-to-human communications (Küster, et al. 2015). Thus, it was then predicted that a social presence, with human-like features, within a SCO may result in similar findings to research which demonstrates that social presence can have positive influences on behaviour such as increased cooperation (Parise et al. 1999) which can result in fewer instances of opportunistic behaviour (Dautenhahn & Billard's, 2002).

To explore this prediction, experiments within studies 4 and 5 (Chapter 6/7) adopted an empirical approach to examine the potential influence that a social presence within a SCO, in the form of a computer designed agents, could have on customer behaviours.

The experimental setup involved users scanning shopping items in a simulated checkout scenario and in this process being exposed to multiple opportunities of cheating. This set up also was identical for all empirical studies in this Thesis. Eye tracking data were used to assess if and how customers engaged attentionally with the social presence. Psycho-evolutionary research has shown that the eyes are the most fear-inducing, critical feature in situations of social appraisal by others (Ohman, 1986). Experiment 1 investigated whether social presence in the form of eyes was sufficient to induce social presence. The findings showed that having a high level of social presence in the form of eyes, could affect the likelihood of opportunistic behaviour occurring, however, further exploration of this was required as the findings from the high social presence, although appeared to reduce instances of theft, did not significantly differ from the control condition. Additionally, cartoony eyes were used in this experiment, and this may not have been sufficient to induce a strong sense of social presence. Experiment 2 investigated whether agents containing eyes, with varied humanness levels (ranging from a realistic agent being assumed the most human, to cartoony agents including an embodied social agent and a logo with eyes) would create a social presence and affect levels of dishonest behaviour. The findings from Experiment 2 suggested that there may be a relationship between increased social presence and increased levels of humanness. Findings from the Experiment 2 showed that significantly more people cheated in the condition with the lowest levels of humanness compared to the condition containing the highest levels of humanness. However, the findings suggested that the effective level of humanness was difficult to determine as instances of cheating did not differ significantly between the Human and the embodied social agent (ESA) condition (lower social presence). Nonetheless, these findings suggest that an increased social presence in the form of a human agent may result in fewer instances of cheating compared to a less anthropomorphic design, such as a LOGO or ESA. This is consistent with research which suggests increasing levels of anthropomorphism in agents enhances social interactions as users respond socially to them as they would in a human-human interaction (Reeves & Nass, 1996; Gratch et al., 2007; Putten et al., 2009). It also supports findings which suggest that a social presence can lead to positive engagement and promote positive social behaviours (Han et al., 2016).

Eye tracking data showed that customers looked at the area containing the social presence suggesting that if an interface agent were to be integrated within a SCO, it

would be looked at by customers. Eye tracking measurements did not indicate any significant differences in the attention given to the agent as there was no significant effect of social presence on fixations durations. As there was no significant difference in dishonest behaviours between the Human and ESA conditions, it suggested that there may be other (or additional) factors that affected the level of perceived social presence than anthropomorphic physical features.

The focus for the final study (Study 5, Chapter 7) was to examine other features of the SCO that could be enhanced to produce an effective social presence that reduces the likelihood of thefts, such as the agent's behaviour. Burgoon et al. (2000) suggest that interactivity, i.e. the ability for technology to identify individuals to create an impression of a social interaction engenders feelings of engagement or connectedness, thus may influence perceptions of a social presence. Research suggests that speech is more influential than physical representations of an agent (Lee et al., 2015; Sameh et al., 2012). Thus, the effects of a social presence in the form of an anthropomorphic agent and the effects of agent interactivity of the system (i.e. personal vs impersonal), via the voice, were examined. An initial exploratory study (Study 5, Chapter 7) on customer perceptions of the voice at SCOs in supermarkets suggested that research focusing on this would be worthwhile as customers perceived the voice and generally found it helpful, however they did not find that it influenced their behaviours. This suggested that the voice is not an effective social presence in its current, implemented form, and thus would benefit from research exploring this. The previous Chapter (6) supported the use of a social presence in the form of an anthropomorphic agent within a SCO. Study 5 (Chapter 7) explored the social presence effects via 2 manipulations, the first consisting of the agent being either (visually) present or not (visually) present, and the second manipulation being agent interactivity via interactive or non-interactive speech. Research suggests that interactivity via speech (i.e. personal vs impersonal) can be more effective in creating a social presence (Burgoon et al., 2000; Sameh et al., 2012). An adapted version of Biocca and Harms' (2002) measure of social presence, the Networked Minds Questionnaire was used to examine participant perceptions of social presence as a subjective measure was also considered to be important to ascertain social presence perceptions on part of the participants. There was evidence again within Study 5 to suggest that a social presence may influence thefts at a SCO as most instances of opportunistic behaviour occurred in the condition representing the lowest levels of

social presence (Agent not present, not interactive) and the least instance of cheating occurred in condition representing the highest level of social presence (Agent present, interactive), although this did not reach significance. However, there was a significant interaction of social presence (agent presence and agent interactivity) in average fixations durations within the area of interest, with fixations being longer when the agent was present and interactive compared to when it was present and not interactive. This finding suggests that interactivity has an effect on levels of attention given to an agent as fixation durations are associated with levels of engagement and attention (Jacob & Karn, 2003; Fitts et al., 2005; Unema, et al., 2005). Thus, levels of interactivity of an agent may be of greater importance in terms of it social presence effects on customer behaviours than the physical anthropomorphic features of an agent. Further research considering the effects of an interactive agent on perceived social presence and customer behaviour would be of interest to examine its potential in reducing thefts at SCOs.

Thus to fully address the research question: *What effect does a social presence have on thefts at self-service checkouts and can social presence be effectively implemented via technology?* The findings from both staff and security guard research (Study 2 & 3) suggest that a social presence, in the form of customers being watched or having them feel like they are being watched, reduces thefts at SCOs. The empirical research also suggests that a social presence containing eyes may reduce thefts at SCO, as instances of theft were at their lowest when there was a high social presence, although some of these findings did not reach significance. Can a social presence be effectively implemented via technology, the research presented suggests that the answer to this is maybe. The research described within these Chapters offers a foundation for future research to build upon with the aim to determine an effective social presence for integration within self-service checkouts. The following sections summarised the main findings in relation to the implications of these findings, the limitations of the research and the potential areas for future research. This Chapter will conclude with a reminder of the contributions and the significance of this research within HCI, psychology and business research.

8.2 Implications of a Social Presence within a SCO

The findings within this thesis have important implications to consider for research on the effects of a social presence, in particular within a SCO. Findings from Chapter 7 suggest that a social presence may be implemented technologically within a SCO, as the questionnaire found that participants reported feeling dimensions of social presence when interacting with a simulated SCO including; *co-presence*, i.e. the degree to which the observer believes s/he is not alone; *attentional allocation*, i.e. the amount of attention the user allocates to and receives from an interactant (agent); and *perceived message understanding*, i.e. the ability of the user to understand the message from the interactant. However, the manipulation of agent presence and agent interactivity did not result in significant differences of perceived social presence deeming it difficult to determine what factors were responsible for the dimensions experienced. Thus, further research is needed to establish what factors of the interaction are responsible for the perceived social presence reported and its suggested influence on dishonest behaviour. Findings from Experiment 3 did however suggest that a high level of social presence may result in fewer instances of cheating, as the results showed fewer instances of cheating within the high social presence condition (agent present, agent interactive). This suggests that the manipulations of social presence that were put in place were able to influence dishonest behaviours to some extent. Thus, if findings were to be replicated, a practical implication of this would be for SCO designers to consider implementing a social presence, technologically, to reduce instances of dishonest behaviour at SCOs within retail.

Findings within Study 4 and 5, which suggest that a social presence can be implemented technologically to reduce dishonest behaviours are similar to those found within research from Hoffman et al. (2015), who found also found that participants cheated less when presented with a technological social presence, i.e. a robot. Hoffamn et al. (2015) suggest that a social presence, may increase our moral awareness and, as a result, reduce the dishonesty of individuals compared to when they are in a setting with no monitoring or presence. Hoffman et al. (2015) states that initial effects of a social presence may reduce if people learn that they are not being monitored and that the risk of repercussions is limited, similar to the rational choice perspective, thus future research may also want to consider ways of implementing a social presence that

maintains its effects on positive social interactions. If people learn that a social presence will monitor, record and report their behaviour, the social presence effect, as an agent evoking honesty, and may remain consistent as the perceived repercussions/consequences will increase (Bateson et al., 2006; Cornish & Clarke 1986). On the other hand, if a social presence is implemented only to discourage cheating, people will likely discover that fact and eventually ignore its presence. The findings from Experiment 3 (Chapter 7) found that participants paid more attention to the interactive agent, when it was present, which may have been to determine whether or not it was monitoring their behaviour. Participants may have been influenced by the interactive agent to some extent, reducing instances of cheating within the high social presence condition (agent present and interactive), however they may have discovered that it was not fully aware of their behaviours, resulting in some instances of theft. Agents that are dynamic to the customer's behaviours may result in greater levels of attention, via fixation durations as found within Study 5 (Chapter 7), thus cause higher levels of engagement between the customer and the SCO (Albert & Tullis, 2013; Bednarik, Eivazi & Hardis, 2012; Rayner et al. 1995; Rayner 1998). In terms of a practical implication, the findings from the exploratory study within Chapter 7 on the voice highlight that it is not perceived to monitor customer behaviour or influence it. Thefts happen at SCOs in their current design suggesting that the voice of assistance does not presently perform as an effective social presence in reducing thefts. Thus, implementing a voice that promotes perceptions that customers are being monitored may result in an increase in engagement with the SCO and encourage moral awareness, resulting in reduced dishonesty (Hoffman et al., 2015).

The research presented has implications for the psychological theories of behaviour in relation to a social presence including, the rational choice perspective (Becker, 1962) and theories of neutralisation, as they may explain ways in which opportunistic thieves justify and determine whether they will commit dishonest behaviours at SCOs. Cornish and Clarke (1986) apply the rational choice perspective in criminology as playing a role in thefts as people are likely to mentally weigh out the benefits of the act, such as monetary gain, against the negatives, for instance getting caught by a member of staff . Findings from the qualitative research presented within Studies 2 and 3 (Chapter 4 & 5) support suggestions form Beck and Hopkins (2016) which state that thefts at SCOs may occur as a result of behaviours associated with the rational choice theory. For instance,

the perceived benefits of a theft at SCO, such as monetary gain, outweigh the potential consequences, such as apprehension, as there are so many excuses that can be made to refuse responsibility for the theft, resulting in it being unlikely that those who commit a theft at a SCO will be punished. An additional important factor to consider is that the lack of social presence at a SCO may encourage opportunists to view theft at a SCO as a victimless crime. Removing a victim of a crime, often associated with property, removes a sense of blame or wrongdoing for the offender. This may also relate to Gneezy's (2005) research on the deception of perceived wealth which showed that a difference of perceived wealth of an opponent had an effect on the amount of deception that occurred. Customers may perceive supermarkets as wealthy opponents who will not be effected by the odd theft at a SCO, thus encouraging opportunistic behaviour. Research suggests that this finding is the result of people having a tendency to refrain from harming those to whom they can relate to on a personal level (Smigel, 1970). These findings are consistent with earlier research considering ethical behaviour and perceptions of wealth. Greenberg (2002) conducted research focusing on employee thefts when participants believed that they would be stealing money from a company compared to a few individuals (managers). Their study involved participants completing a survey and paying themselves $2 from a bowl of money left on a table. Their results showed that participants stole significantly less when they believed that the money had come from a few individuals compared to when they believed it had come from a company. Greenberg (2002) interpreted this finding as being a result of participants deeming stealing from a few individuals as inappropriate social behaviour, suggesting that they do not feel the same towards stealing from a company. Thus, there may be a perception of moral consequences associated with stealing from individual/s compared to companies. This could be an important practical implication for retailers to consider as the reduced personal interaction associated with SCOs may result in customers feeling that their interactions are with a company and not with an individual/s which may influence their perceptions on what is/not appropriate behaviour. Increasing a sense of a personal interaction via a social presence may encourage customers to feel like they are interacting with an individual rather than a company, thus encourage 'appropriate', pro-social behaviours (Greenberg, 2002; Nettle et al., 2013) by increasing perceived consequences of opportunistic behaviours (Becker, 1968; Cornish & Clarke, 1986).

The research within this thesis supports the suggestion that customers steal at SCOs (Beck & Hopkins, 2016; Taylor 2016). This may be a result of customers feeling like they have earned the right to a discount when using a SCO as they have had to scan their own products. Justifying an act of dishonesty, via neutralisation, as something that they deserved and diminishing awareness of a victim is likely to reduce feelings anticipation which are meant to positively influence social behaviours (Sykes & Matza, 1957). Research suggests promoting awareness of ethical behaviours can encourage positive social behaviours (Greenberg, 2002; Mazar et al., 2007). Thus, having a social presence that is able to highlight negative factors associated with theft in a retail setting, such as shrinkage and the influence it can have on prices (Beck, 2011), may encourage those who are tempted by opportunities of theft at SCOs to be more aware of their behaviour, morals and the potential victims of theft, i.e. potentially them, if they have to endure price increases as a result of shrinkage. This may then increase the perceived consequences of a theft a SCOs, reducing the likelihood of opportunistic behaviour occurring (Becker, 1968; Cornish & Clarke, 1986).

Mayhew et al.'s (1976) *Crime as Opportunity* states that opportunities may somewhat encourage the idea of entitlement. One of the basic principles behind situational crime prevention is to reduce the opportunities for criminal behaviour to occur (Cornish & Clarke, 1986). The situational theft prevention has been redeveloped in other formats including Hayes and Cardone (2006) "theft triangle" that discusses the variables that lead to a theft identifying those that can be managed in order to reduce theft. The variables include the motive behind the theft, the perceived level of personal risk and the level of opportunity. Applying theories such as the theft triangle to a retail environment may help to reduce thefts. Implementing a social presence within the interface of a self-service checkout may influence motives behind theft, for example, if their motives were a result of customers feeling like they were interacting with a company rather than an individual, a social presence could enhance feelings of co-presence and encourage customers to experience perceptions of personal interaction which have been suggested to promote pro-social behaviours (Nettle et al., 2013; Smigel, 1970). The perceived personal risk may be enhanced with a social presence that is able to identify customer behaviours as customers may feel an increased sense of surveillance, or feelings associated with being watched, which have been suggested to positively influence behaviours (Bateson et al., 2006; Nettle et al., 2013; Ohman 1986).

A social presence, implemented technologically within a SCO, may also reduce perceived levels of opportunity. The findings from Studies 2 and 3 (Chapters 4 & 5) suggest that customers steal as a result of a lack of social presence, being watched by a member of staff or security. Social presence is the sense that there is another intelligence within the environment (Biocca et al., 2003), thus, if a social presence is effectively implemented within a SCO it may lead to customers feeling like they are being monitored, reducing the likelihood of dishonest behaviours (Hoffman et al., 2015).

Lee (2010) suggests that adding more fundamental human characteristics to the human-computer interaction, like use of language, interactivity, and conversing using social roles, were shown to evoke more social responses (Nass & Moon, 2000). Rettie (2003) discusses the focus of creating a sense of connectedness via communication which can create "awareness moments" within an interaction. Such moments have been related to those experienced by users of instant messenger who have been found to monitor other users' availability even when they do not want to exchange messages with them (Nardi et al. 2000, p.79). This finding supports theories of connectedness as the requirements to feel part of something or a social group (Smith & Mackie, 2000). Applying relevant communication within a SCO such that it personalises the shopping experience may encourage feelings of connectedness and belonging which may reduce the likelihood of thefts at SCO as customers would not want to affect their group status and its effects of sharing, belonging and intimacy (Ijsselstein et al. (2003). Ijsselstein et al. (2003) also states that connectedness and social presence are complimentary to each other and even when social presence is low there can be psychological involvement via connectedness. This may be a useful consideration when designing an agent for a SCO as customers may experience reduced salience of the agent, however, if they still have feelings of connectedness to the agent via audio and visual output information displayed, i.e. voice, then this may maintain an awareness of the agent thus, a self-awareness (Mazar & Ariely, 2007) and encourage positive social behaviours (Bateson et al., 2006).

Analysis of research discussing thefts at SCOs highlights 3 key reasons behind thefts at SCOs: easy (thefts require little or no effort), low risk (perceived low chance of be caught or apprehended) and frustrations (such as difficulty scanning items or waiting on assistance if the machine stops working) (Taylor, 2016). The findings from Chapters 3,

4 and 5 support these suggestions. Reducing the antecedents of theft such as frustrations resulting from technology anxiety or machine faults (section 3.2.1.2.4) will likely reduce frustration being an influencing factor of thefts at SCOs. Taylor (2016) discussed research from companies including Watchmywallet.co.uk who report as much as 30% of 4952 participants admitted to stealing at SCOs with frustrations being displayed as the main reason behind these thefts. VoucherCodes.co.uk reported just under one fifth of their participants group of 2634 reported to having stolen at SCOs and again frustrations with items not scanning was the most reported reason behind thefts occurring (57%). This was closely followed by people stating that they would be less likely to get caught stealing at a SCO (51%), the machine is easy to fool (47%), didn't have enough money (32%), at the time I didn't realise it hadn't scanned. The most common items stolen for both survey administered as discussed by Taylor (2016) was fruit and vegetables. This is consistent with findings from this Study as staff often referred to the scanning of other items as involving people putting items through as loose vegetables. As frustrations appear to be a consistent factor driving thefts at SCOs, it would seem practical to apply further research/attention into reducing the situations that lead to frustrations, to minimise thefts that occur at SCOs.

An important finding from Studies 2 and 3 (Chapters 4 & 5), for retailers to consider is one that is consistent with previous research from Taylor (2016), which suggests that there is no stereotype for a SCO shoplifter. Taylor (2016) states that shoplifting is not solely associated with the economically and socially disadvantaged groups. The supportive finding also appears to support nature theorists who that suggest people steal as a result of innate motives which encourage them to enhance their property (Goodenough & Decker, 2009). However, not all customers who use SCOs steal at them, suggesting that nurture must play a part in behaviour as customers show socially accepted behaviour, such as paying for items or waiting for assistance when required. Findings from Study 3, with retail security guards, suggested that many thefts at SCOs are from middle classes and there have been stories of famous chefs stealing at SCOs, who are unlikely to be doing it due to their low income. Those who are generally associated with the middle class and will consider stealing at SCOs may feel like they have the advantage of a defence of "why would I steal when I don't need to"? Such behaviours may occur as a result of perceptions related to economic theories. Smith (1999) discusses economic theories regarding the effect of external incentives and states

that the economic human is a rational, selfish human being who is interested in maximising his/her own payoffs. Zhou et al. (2009) suggest that money provides people with a confidence that individual needs can be met, therefore, customers who steal at SCOs may be influenced by the potential monetary gain that can occur if they behave in an opportunistic manner. Customer may also feel like they are owed a discount for their items as they have had to work, i.e. scan items, in order to get them. This relates to the equity theory which states that individuals seek to maintain equity between their inputs and outputs (Adams, 1965). Steenhaut and van Kenhove (2005) state that people are motivated by fairness and that if individuals feel they are getting a fair deal they are likely to behave in appropriate ways. Retailers may want to consider a reward scheme for customers who use SCOs to enhance perceptions of personal gain from using them. This may then reduce those who are influenced to steal by promoting feelings of an achieved equilibrium of inputs, i.e. scanning, bagging and paying, with their outputs, i.e. owning their items, plus additional complimentary rewards.

Another important finding for retailers to consider comes from the findings within Study 3 (Chapter 5) which support suggestions from Beck and Willis (1999) who state that CCTV is no longer an effective method of surveillance in its current form. The findings suggest that CCTV is not effective in the detection of thefts but rather that its main benefit is for the confirmation of a theft. This tends to be due to their being limited security staff on duty, who are able to watch the CCTV to monitor for suspicious behaviours, who have several other tasks and responsibilities to attend to in-store. This then results in CCTV being viewed *after* a theft has occurred which can often be when the perpetrator has left the premises resulting in little consequences for the thief. Both security guards and staff thought that an onscreen camera within the SCO would result in fewer thefts at SCOs by opportunistic thieves, as it would increase their perceived risk of being caught. It was viewed that customers would be more aware of CCTV, and the potential that they were being watched, if there were to be an onscreen camera at SCOs. Thus, retailers and designers may want to explore increasing perceptions of surveillance from CCTV at SCOs, via onscreen cameras.

8.3 Limitations and Suggestions for Future research

The Study used a mixed method approach to investigate the relationship between social presence and dishonesty. As with all study methods applied, each method comes with its advantages and disadvantages. One limitation within the qualitative research that involves the researcher as part of the customer journey (Chapter 3, Study 1), is that she may be noticed by the participant and could have been considered as a social presence within the environment, potentially biasing the participant to behave in a socially accepted way. Measures were taken to reduce this, including covert observations at SCOs to minimise the potential influence that the researcher could have on customer behaviours. The true nature of the journey was kept until after leaving the supermarket to minimise effects of the researcher's presence on customer behaviour, however, it is difficult to exclude perceived demand characteristics on part of the participant.

The qualitative findings from Studies 1, 2 and 3 suggest that both staff and customers are aware that there are sometimes operational issues with SCOs which makes it difficult to prove a customer's intent to steal. This also makes it difficult for store policies to guide their staff and security on how to handle a potential theft at a SCO. Future research should focus on ways in reducing operational faults within SCOs to reduce opportunity, and help define where there was intent to behave dishonestly.

As with all empirical research, it is difficult to fully generalise the findings. The manipulations that occurred within the empirical tests would have been difficult to measure using a real SCO, within a retail environment. Gaining permission to use a SCO for test purposes, within a retailers environment would have ideally allowed for the findings to be ecologically valid, however, it was not feasible for testing purposes measuring user responses to manipulated faults in the system. Manipulating the audio that is currently used within the SCOs in stores was also not possible, thus, the audio within Study 5 had to be separately recorded. Ideally, future research would manipulate the voice using a voice that is currently used within an actual SCO to allow more confidence in the ecological validity of findings. The research presented did not consider individual differences including; gender, age and personality type to establish whether or not behaviours were reflective of specific character traits. Future work may want to incorporate such tests to identify any relationships between these and dis/honest behaviours in order to generalise to a wider population.

Adler and Brett's (1998) theory of social interest states that social relationships can be enhanced by inducing feelings of connectedness, a psychological concept closely related to social presence. Connectedness underlies social behaviours and promotes social relationships (Adler & Brett, 1998). Connectedness is defined within social psychology research as the need for an individual to belong to a social group to promote social relationships and mental health (Adler & Brett 1998; Smith & Mackie, 2000). If SCOs were to induce feelings of social presence via technical methods, such as a computer agent, it could potentially induce feelings of connectedness and have positive outcomes for the users and for the retailer, such as an increase in honest customer behaviours (Bateson, et al., 2006; Hoffman et al., 2016). While the overall findings provide mixed support for this expectation, there is partial support from the empirical research that a social presence, if implemented within a SCO, may reduce the likelihood of dishonest behaviour. Connectedness has been linked to engagement (Burgoon et al., 2006) thus, these findings may have been a result of participants feeling more engaged with the SCO when it had a high social presence. This is supported by the findings from Study 5 (Chapter 7) which showed longer fixation durations on an agent when it was present and interactive. However, a limitation within the present research is that it did not specifically measure perceptions of connectedness, thus future research may want to consider a measurement for this to attribute findings to connectedness in particular.

Research from Leite et al. (2009) focused on changes in perceived social presence over long-term human-robot interactions. They examined children's perceived social presence of an iCat robot in a game playing context over a 5-week period of time. Their results showed a decrease in perceived social presence over time. Hoffman et al. (2015) suggest that initial effects of a social presence, such as promoting honest behaviour, may diminish over time as users become aware of its capabilities, i.e. if it is monitoring them or not. The empirical studies within this thesis only tested participants on the one occasion. Future research may want to conduct a longitudinal Study to measure the effects of a social presence over a longer period of time. Future research may also want to consider ways of maintaining social presence effects over a period of time using a mixed design, with between subjects for conditions but within subjects for intervals of testing, as this may provide a clear picture of factors that change in relation to social presence, over time. This will also help to determine factors that can inform designs of a social presence that can maintain its effects on a user.

The findings form Study 5, (Chapter 7) suggest that an interactive agent can lead to greater user engagement. Future research should consider what are effective factors associated with interactive agents and how these can be implemented within a SCO to increase social presence and influence user behaviour. For instance, agents that can use information provided by the user use algorithms to apply the details to future interactions (Burgoon, et al., 2000). An agent that learns from previous user data and utilise this information for future interactions with a customer may present itself as an intelligent interactive agent, and thus enhance perceptions of social presence. Further examining what are considered to be intelligent agents within a retail environment would be of interest for potentially reducing thefts at SCO.

8.4 Conclusion

This research considered the factors and perceptions associated with thefts at SCOs and the potential influence of a technologically implemented social presence. This is the first exploration of its type of social presence within this domain. The findings provide new insight into the potential relationship between thefts at SCOs and a social presence, in triggering behaviours associated with psychological theories such as the rational choice perspective. A mixed methods approach was adopted as it is argued that it provides an expanded understanding of research areas (Tashakkori & Teddlie, 2010; Creswell, 2013). The present research is based within Human-computer interaction (HCI), however, it also considers social and human sciences fields of research which have been supported and encouraged to use a mixed methods approach (Teddlie & Tashakkori, 2009). Additionally, retail and consumer research often uses a mixed method approach to gain richer perspectives of consumer behaviours and explore the impact of new technologies (Arora & Stoner, 2009; Bhattacharya, 2012). Thus, the methods applied within this thesis are consistent with methodology used within the fields of HCI, psychology and business.

The findings suggest there is a need for further research on ways of reducing thefts at SCO as it is an area that is difficult for staff and security to monitor, leaving them feeling dissatisfied in their ability to fully perform their role as an effective social

presence. Empirical findings suggest that implementing a social presence via an interactive agent will enhance user engagement and could lead to reduced acts of opportunistic behaviour. The research also highlights the need for the current designs of SCOs to be updated to reduce operational issues which could be contributing to thefts occurring at SCOs via customer frustration or opportunism. Distinguishing between accidental and intended theft will remain difficult with the current designs of SCOs as they offer ready-made excuses for those willing to take a chance at behaving in an opportunistic manner. Theft has been and continues to be a major issue in retail, and is motivated by a number of factors. Future research has yet to show how shrinkage, via theft at SCOs, can be effectively addressed for the benefit of retail.

The research contributes to the field of HCI as the findings provide an initial insight into the potential benefits of a technological social presence on dishonest customer behaviours at a SCO. The findings also contribute to HCI by providing perceptions of theft at SCOs, from individuals who work with the technology in a retail setting. The application of psychological theory within this research provides an understanding of how theories of behaviour can be applied to dishonest behaviours at SCOs. The application of social presence theory within this domain provides insightful findings to be further explored with the aim of reducing thefts at SCOs, thus ultimately benefiting retailers and honest customers.

Appendices

Appendix 1 Customer Journey Mapping

Customer Journey Mapping

Customer Persona	Who (gender, age), When (time of shop, day of week), Why (what is their goal)
Touch points	Object type Needs/ Attitudes/ Behaviours/ Interactions
Actions	Why specific action?
Thoughts	Perceptions/Expectations (Actionable insights)
Feelings	Emotions shown-the highs and lows-when and where these occur
Usable data	Where data could be used to increase user experience
Qualitative	Customer story/experiences/disappointments/surprises-document feelings
Quantitative	Match with publically available material-previous surveys etc

Appendix 2 Semi Structure interview Study 1

A typical semi-structured interview after a customer journey

Q. When you enter the supermarket do you know if you are going to use a self-service checkout or a manned checkout or when do you decide?

Q. Why?

Q. Do you always go for that choice?

Q. Why wouldn't you go to a self-service checkout?

Q. Are there any other items that you wouldn't take to a self-service checkout?

Q. Do you consider queue size of either?

Q. Has there ever been a time that you have been using a self-service checkout and something hasn't scanned properly and you have had to decide whether to go ahead and take it or seek help?

Q. Have you ever felt tempted to steal at a self-service checkout?

Q. What do you think about CCTV in general?

Q. What do you feel about it when you are in a store?

Q. Do you feel that people perceive that they are being watched via CCTV in a supermarket?

Q. How do you feel when you have to get help from a member of staff at a self-service checkout?

Q. How confident do you feel about using self-service checkout on your own?

Q. How do you feel your confidence in using a self-service checkout affects feelings towards a staff member helping you?

Q. Would you take a trolley into a self-service checkout?

Q. Do you have any uncertainties of taking a trolley into a self-service checkout?

Q. Do you have any preferred checkout or do you just go to anyone that is available?

Participant Information Sheet

The Customer Journey

Susan Siebenaler

Abertay University

Dundee

You are invited to participate in a research project. The following information is to help you decide if you want to take part. You can discuss this with people out-with the project if you want. You do not have to decide straight away.

Background to the Study

My name is Susan Siebenaler and I am a PhD student at Abertay University, Dundee. I am investigating customer experiences and behaviours that occur during a shopping experience. I will be wearing spy glasses to record the shopping experience for later analysis. All recordings will be confidential. I would be grateful if you would take part in my research as your shopping experience may help shape the future for customer experiences and interactions.

What you will be asked to do

You will be asked to conduct your usual shop within ……….. I will record your journey throughout the store and may ask you to discuss reasons behind certain behaviours. Only experimenters involved in the Study will have access to the recordings and we not use actual recordings in publications. The recordings will not be made available to anyone else as we are bound by data protection. You will be paid £5 for taking part in the Study.

What will happen to the information collected in the Study?

The information collected will be analysed by myself and stored securely. Data will be allocated a code so that information will be anonymised. Any identifying information will be stored separately. It will not be possible to identify any individual who takes part in this research. All raw data will be stored securely at Abertay University and then destroyed after 5 years.

Participation is voluntary

Participation in this Study is entirely voluntary and you are free to withdraw from the Study at any time, during or after taking part, without giving a reason.

Are there any risks? There are no known risks for you in this experiment.

Confidentiality/Anonymity:

The data collected will not contain any personal information about you and your identity will be kept confidential.

What happens now?

If you agree to take part you will be asked to complete a consent form.

This research has been approved by the Research Ethics Committee of the School of Science, Engineering and Technology, Abertay University, Dundee

Contacts

If you have any questions or would like to discuss this research further please contact me directly, Susan Siebenaler email: 0804355@live.abertay.ac.uk or my supervisor Andrea Szymkowiak email: a.szymkowiak@abertay.ac.uk

Thank you very much for taking the time to read this information sheet.

Yours Sincerely,

Susan Siebenaler

Appendix 4 Consent form

Title of Project: The Customer Journey

Name of Researcher: Susan Siebenaler

Please tick box

1	I confirm that I have read and understood the information sheet with the heading "The Customer Journey". I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	☐
2	I understand that my participation is voluntary and that I am free to withdraw at any time during or after the Study, without giving any reason, without any medical care or legal rights being affected.	☐
3	I understand that the information from this Study will be stored anonymously in a locked cabinet. This information will be held by the researcher until the end of the Study, following which it will be stored securely at Abertay University for 5 years, and then destroyed.	☐
4	I understand that the information collected in the Study will be used by the researcher to help develop the consumer experience. It will also be used as part of the principal investigators PhD	☐
5	I understand that all data will be used anonymously for research presentation and publication.	☐
6	I agree to take part in the above Study	☐

_____ _____

Name of participant   Signature   Date

<u>Confirmation of Payment</u>

Participant's signature Amount paid   Date

_____ _____ _____

Appendix 5 Debrief from customer journey

The research that you have just taken part in is part of PhD research focusing on Customer Behaviour at Self-service Checkouts. I am interested in general behaviours and interactions through the customer journey and dishonest behaviours at self-service checkouts. I am hoping that the information provided by you can help inform future designs of self-service checkout systems, to reduce the likelihood of someone stealing and inform ways of increasing the likelihood of self-service checkouts being used. All recordings from this Study will remain confidential and will only be used by the experimenters involved. The recordings will be securely stored at Abertay University and destroyed after 5 years.

Thank you for participation in this research.

Participant Information Sheet
Project Title: Customer Behaviour at Self-service Checkouts
Susan Creighton
Abertay University
Dundee

You are invited to participate in a research project. The following information is to help you decide if you want to take part. You can discuss this with people outwith the project if you want. You do not have to decide straight away.

Background to the Study
My name is Susan Siebenaler and I am a PhD student at the Abertay University, Dundee. I am investigating customer experiences and behaviours that occur at Self-service Checkouts. I am interested in general behaviours including: frustrations with the checkouts, appreciations for them, dishonest behaviours and honest behaviours. I would be grateful if you would take part in my research as your experience of working with self-service checkouts can help shape the future for customer experiences and interactions.

What you will be asked to do
You will be asked some questions relating to your experiences with self-service checkouts. For example "What are the most common mistakes made by customers?" or "Do you feel customers like/dislike self-service checkouts?" This will last around 15 minutes. I will record your answers to the questions on an audio recorder but I will not record any identifiable information on. Only experimenters involved in the Study will have access to the recordings and we not use actual recordings in publications. The recordings will not be made available to anyone else as we are bound by data protection.

What will happen to the information collected in the Study?
The information collected will be analysed by myself and stored securely. Data will be allocated a code so that information will be anonymised. Any identifying information will be stored separately. It will not be possible to identify any individual who takes part in this research. All raw data will be stored securely at Abertay University and then destroyed after 5 years.

Participation is voluntary

Participation in this Study is entirely voluntary and you are free to withdraw from the Study at any time, during or after taking part, without giving a reason.

Are there any risks? There are no known risks for you in this experiment.

Confidentiality/Anonymity:
The data collected will not contain any personal information about you and your identity will be kept anonymous during the recording.

What happens now?
If you agree to take part you will be asked to complete a consent form.

This research has been approved by the Research Ethics Committee of the School of Science, Engineering and Technology, Abertay University, Dundee

Contacts
If you have any questions or would like to discuss this research further please contact me directly, Susan Siebenaler email: 0804355@live.abertay.ac.uk or my supervisor Andrea Szymkowiak email: a.szymkowiak@abertay.ac.uk

Thank you very much for taking the time to read this information sheet.

Yours Sincerely,

Susan Siebenaler

Appendix 7 consent form Study 2

Name of Researcher: Susan Creighton

Customer behaviour at SCOs

Please tick box

1	I confirm that I have read and understood the information sheet with the heading "Customer behaviour T Self-service checkouts". I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
2	I understand that my participation is voluntary and that I am free to withdraw at any time during or after the Study, without giving any reason, without any medical care or legal rights being affected.	
3	I understand that the information from this Study will be stored anonymously in a locked cabinet. This information will be held by the researcher until the end of the Study, following which it will be stored securely at Abertay University for 5 years, and then destroyed.	
4	I understand that the information collected in the Study will be used by the researcher to help develop the consumer experience. It will also be used as part of the principal investigators PhD	
5	I understand that all data will be used anonymously for research presentation and publication.	
6	I agree to take part in the above Study	

_____ _____

Name of participant   Signature   Date

Appendix 8 A typical semi-structured interview for SCO Staff at Supermarkets:

- Demographics-Age, Gender, Experience
- SCO Training received?
- How do you feel Self-Service Checkouts have affected customers if at all?
- How do you feel Self-Service Checkouts have affected Staff if at all?
- What is the most common mistake made at Self-service Checkouts?
- Have you noticed whether people steal at Self-Service checkouts?
- Do you feel that you can you tell when someone is going to steal at a Self-Service Checkout?
- Do you feel various factors affect the likelihood of theft at a SCO?
- Do you feel anything would reduce the likelihood of someone stealing at a Self-service Checkouts? If so what?
- Do you feel that customers being watched when using Self-Service Checkouts would reduce thefts? If so why?
- Do you feel that an onscreen camera for CCTV within the SCO would affect thefts at SCOs?

Participant Information Sheet for Security Guards

Project Title: Customer Behaviour at Self-service Checkouts

Susan Creighton

Abertay University

Dundee

You are invited to participate in a research project. The following information is to help you decide if you want to take part. You can discuss this with people outwith the project if you want. You do not have to decide straight away.

Background to the Study
My name is Susan Siebenaler and I am a PhD student at the Abertay University, Dundee. I am investigating customer experiences and behaviours that occur at Self-service Checkouts. I am interested in general behaviours including: frustrations with the checkouts, appreciations for them, dishonest behaviours and honest behaviours. I would be grateful if you would take part in my research as your experience of working with self-service checkouts can help shape the future for customer experiences and interactions.

What you will be asked to do
You will be asked some questions relating to your experiences with self-service checkouts. For example "What are the most common mistakes made by customers?" or "Do you feel customers like/dislike self-service checkouts?" This will last around 20 minutes. I will record your answers to the questions on an audio recorder but I will not record any identifiable information on. Only experimenters involved in the Study will have access to the recordings and we not use actual recordings in publications. The recordings will not be made available to anyone else as we are bound by data protection.

What will happen to the information collected in the Study?
The information collected will be analysed by myself and stored securely. Data will be allocated a code so that information will be anonymised. Any identifying information will be stored separately. It will not be possible to identify any individual who takes part in this research. All raw data will be stored securely at Abertay University and then destroyed after 5 years.

Participation is voluntary
Participation in this Study is entirely voluntary and you are free to withdraw from the Study at any time, during or after taking part, without giving a reason.

Are there any risks? There are no known risks for you in this experiment.

Confidentiality/Anonymity:
The data collected will not contain any personal information about you and your identity will be kept anonymous during the recording.

What happens now?
If you agree to take part you will be asked to complete a consent form.

This research has been approved by the Research Ethics Committee of the School of Science, Engineering and Technology, Abertay University, Dundee

Contacts
If you have any questions or would like to discuss this research further please contact me directly, Susan Siebenaler email: 0804355@live.abertay.ac.uk or my supervisor Andrea Szymkowiak email: a.szymkowiak@abertay.ac.uk

Thank you very much for taking the time to read this information sheet.

Yours Sincerely,

Susan Siebenaler

Appendix 10 consent form for security guards

Name of Researcher: Susan Siebenaler

Customer behaviour at SCOs security perceptions

Please tick box

1	I confirm that I have read and understood the information sheet with the heading "Customer behaviour T Self-service checkouts". I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
2	I understand that my participation is voluntary and that I am free to withdraw at any time during or after the Study, without giving any reason, without any medical care or legal rights being affected.	
3	I understand that the information from this Study will be stored anonymously in a locked cabinet. This information will be held by the researcher until the end of the Study, following which it will be stored securely at Abertay University for 5 years, and then destroyed.	
4	I understand that the information collected in the Study will be used by the researcher to help develop the consumer experience. It will also be used as part of the principal investigators PhD	
5	I understand that all data will be used anonymously for research presentation and publication.	
6	I agree to take part in the above Study	

_____ _____

Name of participant   Signature   Date

Appendix 11 Security Guard Questions

- How long have you worked as a security guard within supermarkets?
- Do you work for the store?
- What does an average day at work involve for you?
- Does your daily routine change according to the different days of the week?
- Does your routine change at different times of the day?
- Do you feel there are any differences between SCOs and staffed checkouts in terms of theft?
- Do you feel you can tell when someone is going to steal at self-service checkouts i.e. stereotype?
- Do you feel thieves have changed as designs of checkouts change? (Have stereotypes changed? Are thieves getting smarter?)
- Are the people caught stealing at self-service checkouts usually alone or in a group?
- Do customers who have been caught stealing claim it was an innocent mistake? Do you feel that it was /was not?
- Do you feel there has been an increase in thefts with SCO being introduced?
- Do you feel there has been a change in the type of products that are being stolen since self-service checkouts were introduced?
- Do different times of the day affect the likelihood of theft at SCOs/ different days of the week?
- What are the most common methods of theft at SCOs?
- What happens when you catch someone stealing at a SCO/the door alarms go off?
- Can you tell when someone will steal at a SCO?
- Does the busyness of shops affect thefts at SCOs?
- Do you feel anything would reduce thefts at SCOs?
- Do you feel that being watched reduces thefts?
- Do you feel that having a greater promotion in store of CCTV would make a difference to thefts occurring at SCOs?
- Do you feel that an on-screen camera would reduce thefts occurring at SCOs?
- Anything about the design you feel affects thefts at SCOs?
- Any other comments/important experiences?

Appendix 12 Methods of theft at SCOs from security guards perceptions

Method of theft	Description
1 Bag on the floor	Customers pretend to scan an item and put it in a bag either on the floor or in the trolley, thus avoiding the weight detection scales on the SCO. Unless customer is being watched by staff or security guards they tend not to get caught.
2 Conceal item	Conceal an item either on their person or in a bag they have without attempting or pretending to scan the item.
3 Pretend to pay	This can be when a customer selects the options for payment (they often select card payment) and will put their card in, pretend to press their pin number, take their card and shopping and leave the store. Others may pretend to have paid by cash and may even put some money into the machine but not enough to cover the total. This then makes it difficult to prove whether or not their actions were on purpose or a sincere mistake. SGs state that SCOs do not alert staff members quickly enough that a payment has not been completed thus thieves are able to leave the store before anything is noticed by the staff member.
4 Scan cheap bag expensive	This is when a customer will scan a cheap item and bag a more expensive on. The SCOs will not always notice that there is a weight difference to alert the staff member which means that opportunists may be more likely to try this method again and again as there is a chance they will not get caught and if they do they can declare innocence which is then difficult to prove otherwise.
5 Swap Labels	This is when a customer will take a sticker from a reduced item and place it on a non-reduced item in order to get money off their selected item.

6	Walk without paying	Some customers will scan and bag all of their items and then walk off before any form of payment is made. The SCO has a delay before alerting the staff member of non-payments, allowing time for the thief to exit the store. If they are stopped before they exit the store they have not yet committed an offence, according to the store policy, thus are given the opportunity to say it was a mistake or leave the shopping items instore and say they will return to pay them but often do not return. This indicates that they were being opportunistic and were originally trying to steal the items.
7	Weight tricks	Customer can place any item on the SCO scales and then select from a range of fruit and veg from the SCO interface. This creates opportunity for customer to select a lower priced item than their original selected item. For example one reported abuse of this method is placing a steak on the scales and selecting "loose onions" which will cost much less than a steak.

Appendix 13 Customer Experience of theft at a traditional checkout and a SCO
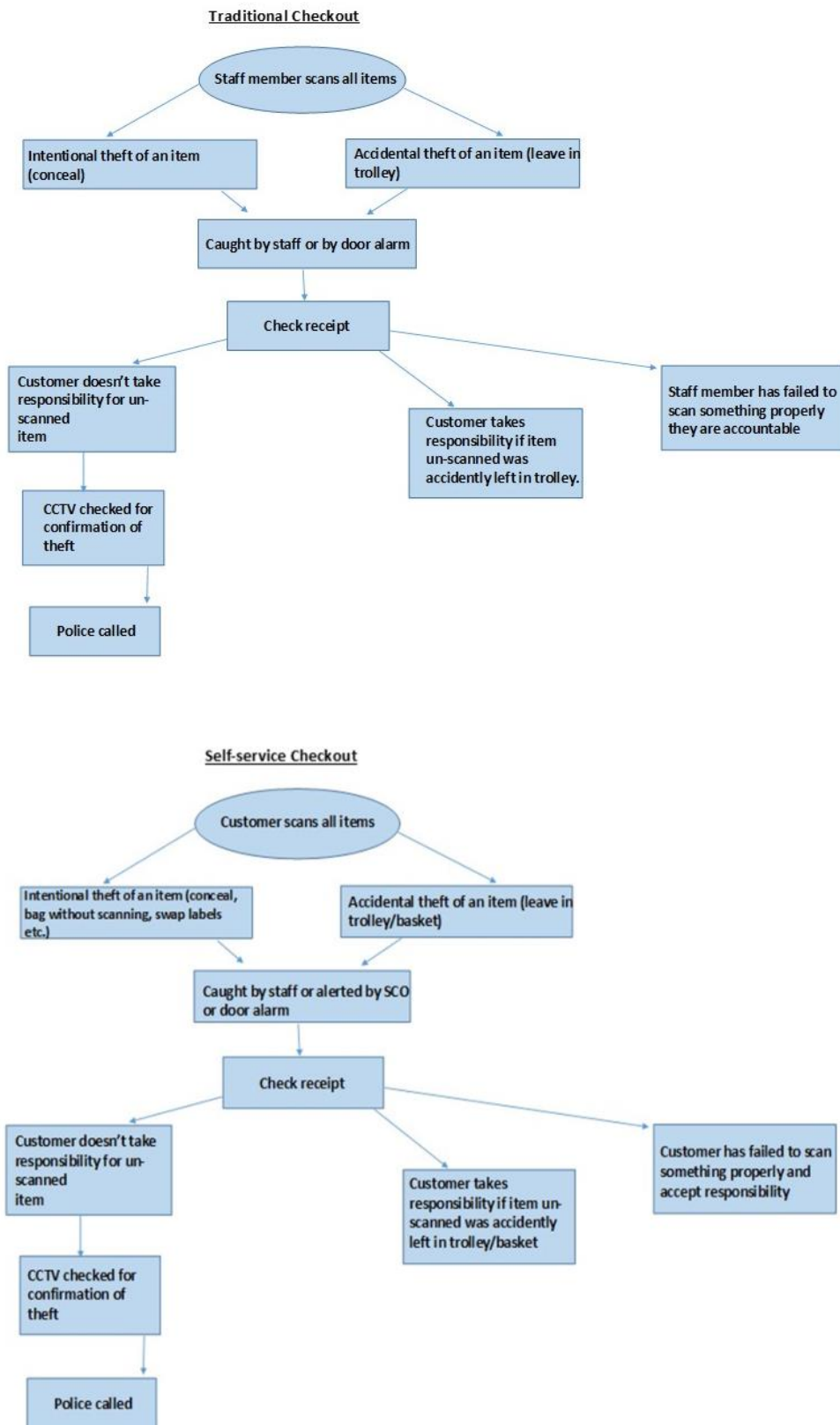
Figure 42 Flowcharts of a traditional (manned) checkout and a SCO

Appendix 14 Grey areas of thefts at a SCO

Self-service Checkout grey areas
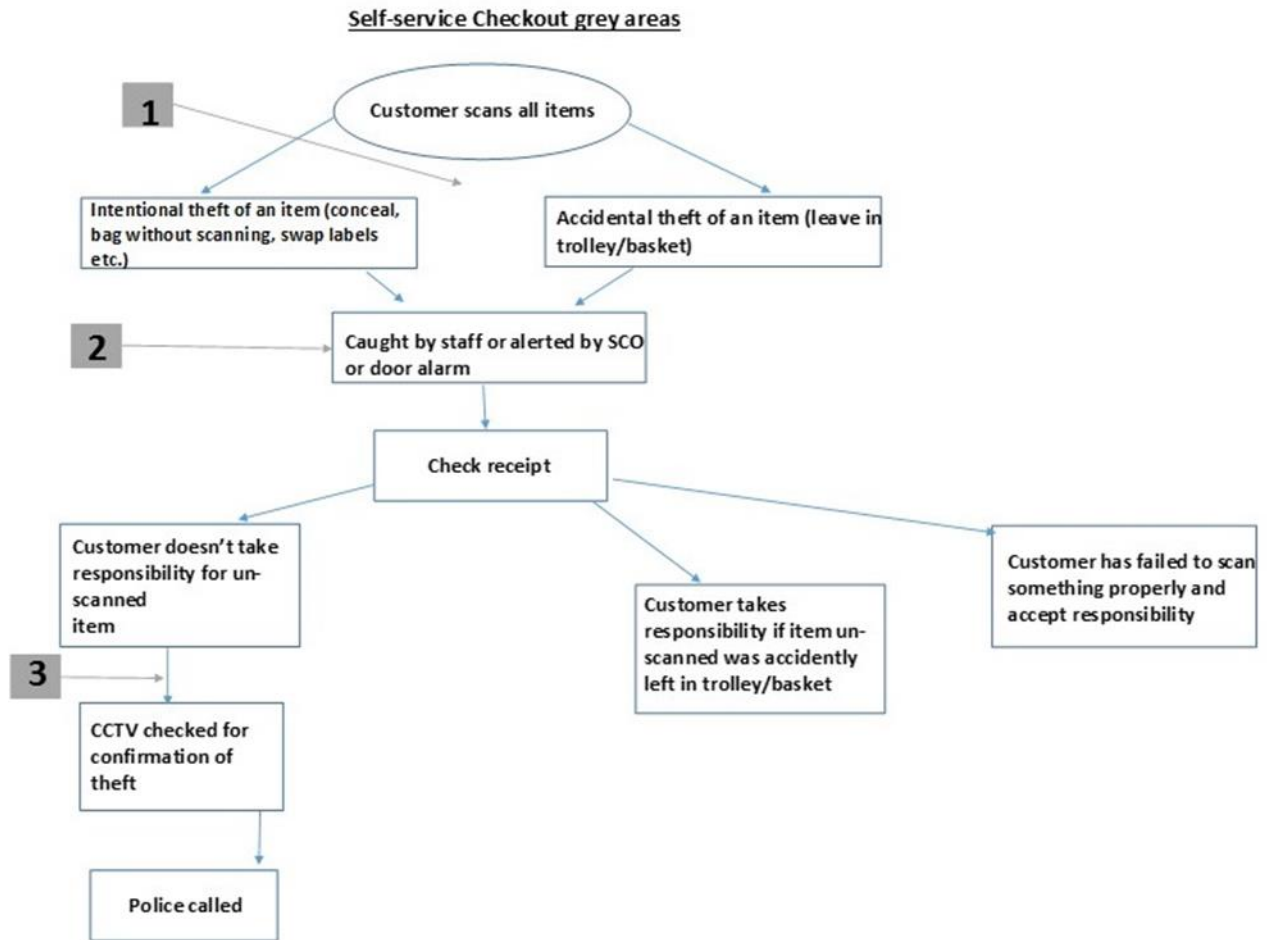
Figure 43 showing grey areas in security at self-service checkouts

Grey areas in security

Presuming customers know how to scan their items.
1. There is no way of knowing if customers are stealing on purpose-they may think they have done it properly and will always have self-service defence.

2. They may never be caught-according to previous research carried out-staff and security guards state that there is a higher likelihood of thefts occurring at SCOs and may never be noticed as there is no social interaction only shrinkage data can reflect an idea of thefts occurring.

3. Self-service defence – checking CCTV may prove to be useless if they have pretended to pay thus providing them with an excuse to either blame the machine or protest ignorance. This may be the point that most of the people caught with unpaid items from the SCO, are given an additional opportunity to behave honestly (take back their dishonest behaviour before it leads to a negative consequence). Security guards may feel inadequate as no justice is being done to those they predict have purposely stolen at the machines. Store policies are a "one size fits all" makeup which is not effective for situations that occur in relation to thefts at SCOs. There are so many variables that can influence the theft of an item at SCO in comparison to traditional checkouts. Polices should consider these variables in order for security guards and staff to be efficient and effective in their roles as employees and deterrents of dishonest behaviour.

School of Engineering, Computing and Applied Mathematics

Participant Information Sheet.

Project: <u>**Barcodes and System software**</u>

Purpose of the Study: To examine whether a new optical machine reading data design would be suitable for reading barcodes of store items.

What will I be asked to do?

You will be asked to scan a range of products by placing the barcode on the scanner and instructing it to scan via the scan button.

There will also be some products that have a weight or where you have to select number of items. You will be asked to select the appropriate weight or number as the cost of these items will depend on their weight/number. This might be different from what you typically experience in a supermarket checkout, however, we are using different designs of checkouts to evaluate how useful consumers find them.

As a thank you from the international company funding this research you will receive the change from **£10** from the total of the shopping bill (ranging from **£1-£5**, depending on the products you have to scan and the checkout design that you are testing).

Time Commitment: This Study will take around 15minutes

Must I take part?

No, participation is entirely voluntary. You may decide to stop being a part of the research Study at any time without explanation.

Are there any risks? There are no known risks for you in this experiment.

Confidentiality/Anonymity:

The collected data will be linked to a participant number and are thus stored anonymously. Thus, you can withdraw your data only up to the point when the

experiment is finished and you are still in the presence of the experimenter. As the data are stored anonymously we cannot retrieve them, should you want to withdraw them at a later date.

We also adhere to the Data Protection Act and only researchers involved in this project have access to the data, which remain confidential. If findings are published they will only refer to average or group figures.

Further Info about this project:

If you require further information about this Study you can contact the researcher Susan Siebenaler Email; 0804355@abertay.ac.uk

or my supervisor Dr Andrea Szymkowiak email; a.szymkowiak@abertay.ac.uk

Appendix 16 Informed Consent

Project: Barcodes and System software

By signing below you are indicating that you have read and understood the Participant Information Sheet and that you are willing to participate in this research Study.

Participant's Name   **Date**

---   --------------------------

THE SCHOOL OF ENGINEERING, COMPUTING AND APPLIED MATHEMATICS RESEARCH ETHICS COMMITTEE HAS REVIEWED AND APPROVED THIS RESEARCH STUDY.

Confirmation of Payment

Participant's signature   **Amount paid**   **Date**

-----------------------------------   --------------------   ----------------------

Appendix 17 Participant Debrief

The experiment that you have just taken part in is not looking at a new barcode reader but instead it considers behaviours associated with self-service checkouts. As none of the weights in the Study were correct it will look at what choices people will make.

There are 3 conditions involved in the present Study one of which involves no bag, the other involves a bag and the other has a bag with eyes and a logo. The variable of interest in this Study was the extent to which people would chose to benefit them self financially. For example, choosing to scan a lesser number of items than what are actually present or choosing to accept a voucher that you do not deserve, in this case would be considered as opportunistic behaviour. It is expected that people will act in a less opportunistic manner when there is a human-like feature on screen such as eyes.

All results from this Study will remain anonymous and eye tracking data will be measured to examine whether or not people notice a social presence if one were to be put in place. I would ask that you do not discuss this research with anyone as they may be a potential participant and it could affect the findings from the research. Thank you for participation in this research and please feel free to ask the experimenter any questions that you may have.

Appendix 18 Additional influencing factors, interpretations and advice for retailers.

Themes were allocated to certain influencing situational factors when two or more of the customers commented on something relative to that theme. This insight can be used by retailers to minimise the negative effects they may have on the use of SCOs Table 14. Situational factors that influence the use of SCO.

Table 14 Situational factors that influence use of SCO

Situational Factor	Interpretation	Advice to retailer
➢ **Obstructions**	Such as barriers at SCOs will influence method chosen as they may be viewed as an inconvenience, particularly to customers with trolleys.	Layout issue. Make path to payment at self-service easily accessible for customers to encourage use.
➢ **Confusion**	Some customers were unsure whether they are allowed to use self-service checkouts with a trolley. Supermarkets vary in their attitudes towards this.	Clear signage, encouragement to use them if welcomed by the store either from staff or by signage. Use a welcome poster to invite customers to use them.
➢ **Negative staff attitudes**	If using SCOs or 10 items or less with a trolley.	Clear signage and training for staff to promote use of all available methods of payment. Inconsistencies cause confusion for customer
➢ **Hesitations**	Due to lack of confidence in decision, may produce stress and reduce intentions to use.	Clear signage, promotions of people with trolleys using SCOs, encouragement form staff all may reduce this
➢ **Social interactions**	Social interactions with staff or other customers may influence method of payment. For example, the may avoid SCOs due to fear of being viewed in a negative manner by other customers if they have lots of items and don't want to hold up other customers by taking too long scanning/bagging items at a SCO. Conversely they may avoid traditional checkouts as they would feel uncomfortable interacting with a staff member.	Encourage use of both traditional and SCOs for customers with large numbers of items to make it the norm and socially accepted. Encourage staff to assist with bagging at traditional checkouts to avoid customers worrying about taking too long to bag items.

	Specific; weekly shop for a household; a browse, may all affect the use of SCOs. Intended purchase of larger shopping items may encourage the use a trolley which may influence additional purchases.	Promote and cater for ease of use of self-service checkouts for all types of items being purchased.
➤ **Type of purchase**		
➤ **Position of payment method in store**	If customers are finishing their shopping journey at the back of the store and there are only traditional checkouts available there then it may result in them using them as they are conveniently positioned.	Position SCOs at various points along the store where customers may be more likely to finish their shopping journey. This may encourage the use of them as they will appear as being convenient.
Additional themes	**Interpretation in relation to findings**	**For the Retailer**
➤ **Reason for use of Trolley/basket**	Generally, baskets are used when the customer intends on buying a small number of items and trolleys when there are many items. However, customers may choose a basket when they don't want to have to return a trolley after putting shopping in their car. If customers do not have a £1 coin which is required for some trolleys then they may use a basket. They may rely on a trolley for balance, they may not be able to carry their shopping bags back to their car. Accessibility of either could influence e.g. if trolleys are closer to them when entering a store they may be likely to take one.	Using trolleys will likely influence buying behaviour and it removes inconvenience of carrying items. Easily available trolley banks or trolley collectors could reduce inconveniences that may be associated with returning trolleys. Purchase size (number of items) may influence what method of payment customers choose, SCO or traditional, thus if encouraging the use of trolleys retailers should also encourage the use of SCOs and make them easily accessible.
➤ **Supermarket layout**	The supermarket appears to use their first aisle for promotions & offers.	This may influence customer behaviour and encourage customer interest to find more deals throughout store, increasing the number of items they purchase which may influence their use of SCO.
➤ **Use of technology**	Customers used smartphones throughout the shop to link in with family, check product names, & check recipes.	Suggests greater acceptance for SST technology involvement within a shopping environment. Possible opportunity for store app to connect with families

		to assist in search for products in store. Allowing customers to scan products via their mobile maybe encouraging for user interactions and could be a method of attaching a social presence to the experience as customers would be registered and known to the supermarket via their mobile.
➢ **Social acceptance of products**	Customers may buy the same products that they see other customers select in store.	Humans are influenced by others behaviour as we are social animals (Batson, 1990) Applying theories such as Nudge theory* may encourage purchases. This can also be applied when guiding customers to use SCOs. Images of others using SCO, easy access can be used as social nudges.
➢ **Special offers**	Special offers may attract shoppers depending on situational influences such as: their usefulness to the customer, saving on product, personal circumstances of shopper (can they afford unplanned buys, do they have birthdays/Christmas gifts to think about).	Display should be targeted at all customers with easy to read signage, wide variation of products. Store promotions or tactics to draw attention need to be clear and not to confuse customer. For example the store in the present research had bright yellow labels for their reduced items, to catch user attention no doubt. Products that were not reduced had white labels. Methods like these will influence buying behaviour (ref) which may then influence use of SCO.
➢ **Motivation to pay**	Some customers' reason for deciding to finish their shopping and go and pay was due to their basket becoming an inconvenience as it was too heavy after they purchased items that they had not originally planned to purchase.	Have an option of trolleys throughout store. Trolleys tend to be placed outside store which can bet an inconvenience to go and get one. Having some in store may encourage those who chose to leave as a result of a heavy basket, to continue shopping.

➢ **Customer routines**	Some customers' had a method of how they liked to shop when they are in a store e.g. up and down every aisle or straight to their intended items. Some also had particular ways in which they packed their bags.	This could influence their likelihood of seeing offers-signage. Have multiple signs and perhaps additional tannoy announcements on offers. Retailers should take into consideration that customers have personal differences. Staff should be encouraged to assist with these.

Appendix 19 The voice questionnaire

Do you notice the voice on the self-service checkout?

Do you like or dislike the voice?

Do you feel that it is helpful or unhelpful? Why?

Do you feel that it is friendly or unfriendly?

Would you describe the voice as warm or cold?

Do you find the voice Irritating or not irritating?

Do you feel that it is competent or incompetent in providing a service? Why?

Do you feel that it is aware or unaware of your actions?

Does the voice influence your behaviour or not?

Do you feel that it is trustworthy or not trustworthy?

Do you feel that the voice is conversational or not conversational?

Do you feel it is bossy or not bossy?

Do you feel that it is invasive not invasive?

Do you feel that the voice monitors your behaviour or does not monitor it?

Is there anything about it that could make it more useful for you?

How do you feel about it in general?

Is it male or female?

What age group do you think the voice represents?

Does it have a personality?

Appendix 20 Social presence and Interactivity Questionnaire (questions explained)

C. Harms and F. Biocca. Internal consistency and reliability of the networked minds measure of social presence. In Annual International Presence Workshop, pages 246–251, 2004.

Attention Allocation

3. I was easily distracted from the system when other things were going on

6. The system remained focused on me throughout our interaction

7. The system did not receive my full attention

10. The system was easily distracted from me when other things were going on

11. I remained focused on the system throughout our interaction

15. I did not receive the system's full attention

Co-presence

1. I noticed the system

2. My presence was obvious to the system

4. The system noticed me

5. The system's presence was obvious to me

21. I caught the system's attention

26. The system caught my attention

Perceived Message Understanding

8. My thoughts were clear to the system

9. It was easy to understand the system

12. The system found it easy to understand what I was scanning

16. Understanding the system was difficult

18. The system's thoughts were clear to me

19. The system had difficulty understanding what I was scanning

Perceived Affective Understanding

17. The system could tell how I felt

20. My emotions were not clear to the system

22. I could tell how the system felt

24. The system's emotions were not clear to me

29. I could describe the systems feelings accurately

35. The system could describe my feelings accurately

Perceived emotional Interdependence

14. The system's feelings influenced the mood of our interaction

23. I was sometimes influenced by the system's moods

25. The system's mood was sometimes influenced by my moods

28. The system's attitudes influenced how I felt

32. My feelings influenced the mood of our interaction

39. My attitudes influenced how the system felt

Perceived Behavioural Interdependence

30. My behaviour was often in direct response to the system's behaviour

31. The behaviour of the system was often in direct response to my behaviour

34. I responded to the system's actions

37. The system's behaviour was closely tied to my behaviour

38. The system responded to my actions

40. My behaviour was closely tied to the system's behaviour

General Agent Questions

43. Was the voice male or female?

44. Did you associate the voice with the system?

45. Was there a face on the system?

46. If there was a face was it male or female?

Interactivity Questions

Individual involvement

36. My actions were directly impacting on the system

41. The system had a sense that I was present in the here and now

47. The system's actions were directly impacting on me

49. I had a sense that the system was present in the here and now

Mutuality between individuals

27. I coordinated my actions with the system

33. I connected with the system

42. The system coordinated its actions with me

50. The system connected with me

Individuation

13. The system was aware of me during the interaction

48. I was aware of the system during the interaction

51. I was aware of myself during the interaction

52. The system was aware of itself during the interaction

Appendix 21 Additional analysis

Table 15 Additional Analysis on Accept and Decline voucher buttons

Accept or Decline Voucher	*p*-Value	**(Statistical test)** and conclusion
Fixation Durations between conditions Accept button Decline button	 *p=0.900* *p=0.433*	**(One-way Anova)** tests were completed to examine fixation durations for the "Accept" voucher button, however there were significant no differences found between conditions. Similar results were found for the "Decline" button.
Fixation Durations for Accept and Decline within Conditions Condition 1 Condition 2 Condition 3 Condition 4	 *p=0.242* *p=0.979* *p=0.508* *p=0.969*	**(Independent samples t-tests)** were conducted within conditions to examine fixation durations between the Accept and Decline buttons. No significant differences were found between the buttons within the conditions.

Table 16 Additional analysis on weight buttons within the SCO interface

Weight Buttons	*p*-Value	**(Statistical test)** and conclusion
Fixation Durations within conditions		**(One-way Anova)** tests were completed to examine

		fixation duration between the weight buttons **within** each of the **slides** for condition 1, however there were significant no differences found within the slides.
Condition 1 Slide 27	*p=0.613*	
Condition 1 Slide 28	*p=0.649*	
Condition 1 Slide 32	*p=0.153*	
Fixation durations for the weight buttons on the slides within the condition		**(One-way Anova)** tests were completed to examine fixation duration for the weight buttons **within** the **conditions**, however there were significant no differences found within the conditions.
Condition 1	*p=0.591*	
Condition 2	*p=0.165*	
Condition 3	*p=0.293*	
Condition 4	*p=0.708*	
Fixation Durations for the weight buttons between conditions		**(One-way Anova)** tests were completed to examine fixation duration for the weight buttons **between** the **conditions**, however there were significant no differences found between the conditions.
All Conditions	*p=0.145*	

Table 17 Analysis of instances of cheating within scenarios 1 and 2

Scenario (Basket) 1 & 2 analysis	*p*-Value	**(Statistical test)** and conclusion
Scenario cheats between conditions		**(Kruskal-Wallis)** tests were completed to examine the

Scenario 1 Scenario 2	*p=0.461* *p=0.176*	instances of cheating within scenario 1 & 2, between conditions, however there were significant no differences found between conditions.
Scenario cheats within conditions Condition 1 Scenario 1 vs 2 Condition 2 Scenario 1 vs 2 Condition 3 Scenario 1 vs 2 Condition 4 Scenario 1 vs 2	*p=0.082* *p=0.29* *p=0.343* *p=0.000*	**(Independent samples t-tests)** were conducted within conditions to examine the instances of cheating within scenario 1 & 2. Although all of the mean scores showed there to be on average more cheats in scenario 1, no significant differences were found within conditions 1,2 & 3 however there was a significant difference between instances of cheating between scenario 1 &2 within condition 4 (Not interactive-no agent).

There were no significant differences of cheating from baskets 1 and 2 across conditions. Only in condition 4 (No Agent and non-interactive) was there a significant difference between scenarios 1 and 2 with mean scores showing that there were significantly more cheats in scenario 1 (select weights). This finding is interesting as all condition showed that there were more cheats in scenario 1 compared to scenario 2 (however only condition 4's difference was significant). This finding of significance links in with the result from the analysis of "total instances of cheating" which showed that condition 4 again had the highest average of cheating across conditions (although this did not reach significance). This condition was designed to be the condition with

the lowest level of social presence (no agent and non-interactive) thus further investigation of this area would be of interest.

Similar to work from Fiore et al. (2013) who examined social presence along two dimensions: self-attributions regarding the system and other-attributions about the mental states of the system. Items on the networked minds measure of social presence (Harms & Biocca, 2004) with the participant as subject (e.g., "The systems thoughts were clear me") were categorised as "self," and questions where the participant was the object t (e.g., "My thoughts were clear to the system") were categorised as "other". Thus additional analysis considered the NMQ questionnaire questions in terms of self and other to examine potential effect on responses.

Table 18 Self and other scores

Self and other scores of social presence	*p*-Value	**(Statistical test)** and conclusion
"Self" & "other" scores for Interactive and Non interactive conditions	*p=0.920*	**(Kruskal Wallis)** test was completed to examine scores of social presence for attributes of "self" and "other" for interactive and non-interactive conditions. There were no significant results for differences between scores.
"Self" & "other" scores for Agent and No-Agent conditions	*p=0.879*	**(Kruskal Wallis)** test was completed to examine scores of social presence for attributes of "self" and "other" for agent present and no agent present conditions. There were no

"Self" & "other" scores for all conditions	*P=0.646*	significant results for differences between scores. **(Mann Whitney U-test)** Was conducted to examine scores of social presence for attributes of "self" and "other" for all conditions. There were no significant results for differences between scores

Appendix 22 Study 1 coded material

The coded material that was used to generated key themes discussed with Study 1 were based on customer transcripts from the customer journey and the questionnaire within the customer journey. Comments were coded and then allocated to the key themes. Examples of these are shown below. The related questions are from the questionnaire within Appendix 2.

Theme-Decision points for payment method

Codes: no pre-existing decision, pre-existing decision.

Related question: *Q. When you enter the supermarket do you know if you are going to use a self-service checkout or a manned checkout or when do you decide?*

Examples:

"*When I go to pay*" (Male, 26). Coded as (no pre-existing decision)

"I don't really think about it-which ever one is easiest" (Female, 25) Coded as (no pre-existing decision).

""*Never use self-service to pay for larger shops*" (Female, 37). Coded as (pre-existing decision)

Theme-Factors influencing use of SCOs

Codes: convenience, purchase size.

Related question: Why?

Examples:

"I*f there is no queue at a normal* [traditional] *checkout then I will just go to that for quickness*" (Male 36). Coded as (convenience)

"I*t usually just depends on what one I'm closest to that's free* [available]*"* (Female, 64). Coded as (convenience)

"*I decide* [what checkout to use] *based on how much I'm going to buy*" (Male 26). Coded as (purchase size)

"*If I have a trolley full of stuff then I'll tend to use the normal* [traditional] *checkouts*" (Female, 55). Coded as (purchase size)

Theme-Factors influencing the disuse of SCOs

Codes: type of item-requiring assistance.

Related question: Why wouldn't you go to a self-service checkout? Are there any other items that you wouldn't take to a self-service checkout?

Examples:

"*If I know there's something that's going to require someone to step in and do something with it then I will maybe sometimes go to a manned checkout*" (Female, 25). Coded as (type of item-requiring assistance)

"*Alcohol because if you are buying alcohol it's easier to just go to a till because if you go to self-service you have to wait on someone to come and check it for you*" (Female, 64). Coded as (type of item-requiring assistance)

"Anything like clothes or that I can't be bothered waiting for someone to come and get the stuff [tags] off so I would just go to a [traditional] checkout" (Female, 37). Coded as (type of item-requiring assistance)

Theme-Customer perceptions of SCO staff

Codes: no negative attitude towards staff, machine fault.

Related question: How do you feel when you have to get help from a member of staff at a self-service checkout?

Examples:

"*Most staff are pretty good and helpful, if there are like 10 or 12 self-service checkouts and there's one member of staff and you have to wait you are better going to a manned checkout*" (Female, 39). Coded as (no negative attitude towards staff).

"D*oesn't bother me, as long as I don't have to wait for ages*" (Male, 36). Coded as no negative attitude towards staff-machine fault".

"*It's annoying when it won't pick up the weight and you have to wait but it's not the staff it's the machine*" (Male, 26). Coded as (no negative attitude towards staff-machine fault)

Theme-Customers and SCO theft

Related question: Has there ever been a time that you have been using a self-service checkout and something hasn't scanned properly and you have had to decide whether to go ahead and take it or seek help? Have you ever felt tempted to steal at a self-service checkout?

Codes: No to stealing

Examples:

"*No…not at all*" (Male, 36). Coded as (No to stealing).

"*No, I would be too afraid that I would get caught*" (Female, 64). Coded as (No to stealing).

"*No, you can't really steal the weights pick it* [un-scanned item] *up*" (Female, 55). Coded as (No to stealing).

Theme-Customer attitudes towards CCTV

Related question: What do you think about CCTV in general? What do you feel about it when you are in a store? Do you feel that people perceive that they are being watched via CCTV in a supermarket?

Codes: not aware of CCTV, CCTV accepted

Examples:

"*I'm never really that aware of it I think it's become so common that you are under CCTV wherever you go that you kind of forget about it almost*" (Female, 55). Coded as (not aware of CCTV).

"*I think it's a good thing to have incase anything were to happen*" (Male, 36). Coded as (CCTV-accepted).

"*I don't really think about it but I suppose I would if I was someone who was gonna steal something*" (Male, 26). Coded as (not aware of CCTV).

No. of participants interviewed= 26

No. of Supermarkets attended= 4

N.B: SSCO refers to self-service checkouts

Key themes were generated from the staff transcripts from the questionnaire within Study 2. Comments were coded and then allocated to the key themes where frequencies were noted. The related questions are from the questionnaire within Appendix 8.

Table 19. How do you feel self-service checkouts affect customers if at all?

Main Theme	No. of mentions	No. of shops mentioned same issue
Negative (frustrating, stressful, don't like)	29	4
Depends on the Customer	13	3
Positive (like them)	10	3
Age (older people don't like)	6	3
Take away jobs	4	3
Weight Issues	3	3
"Fast lane" issues	3	3
"Voice" don't like	1	1

Figure 44. How do you feel self-service checkouts affect customers if at all?

Clustered Bar Chart showing results for how self-service checkout staff feel customers are affected by self-service checkouts. The most common answer, mentioned 29 times from staff in all 4 shops that were visited, was that customers were affected in negative ways such as feeling frustrated, getting stressed or did not like them. For example one staff member stated that "some hate it they get frustrated with the noises and with the weights". The graph also shows that there was a high frequency of staff saying that only some customers were effected by them as "some like them some don't". This was mentioned 13 times by staff in three of the shops visited. This finding seems to be supported by other staff comments as there were 10 positive comments from 3 of the shops stating that customers like them.

Staff from 3 of the shops mentioned 6 times that older people do not like self-service checkouts for example one stated "older customers don't like them" whilst another said "older people have to be helped" which they then stated led to frustration. There were 4 mentions from 3 shops that customers feel the self-service checkouts take away jobs. There were also 3 mentions from 3 shops that customers have many issues with the scales on the self-service checkouts and that they should not be called the Fast-lane as they are not fast.

Table 20 How do you feel self-service checkouts affect staff if at all?

Main Theme	No. of mentions	No. of shops mentioned same issue
Not Really	17	3

	15	4
Negative Stressful/Difficult		
Customers treat you worse	3	2
Age (older people don't like)	3	2

Figure 45 How do you feel self-service checkouts affect staff if at all?

Clustered Bar Chart showing results for how self-service checkout staff feel they are affected by self-service checkouts. The most common response from all 4 shops visited was "Not Really" or "it's just part of the job". This was closely followed by comments from staff in 3 of the shops stating negative comments such as "it can be stressful" or "difficult when busy". Three staff members from 2 shops stated that customers are not as nice to staff at SSCOs for example two stated that "customers treat you different" at self-service checkouts compared to staffed checkouts and another said "customers get angry" meaning towards the staff member for any disruptions that the SSCO causes. There were also 3 comments from staff in 2 shops stating that older customers do not like self-service checkouts which can lead to moaning from the customers to the staff.

Table 21 Prefer Staffed or SSCO?

Main Theme	No. of mentions	No. of shops mentioned same issue
Prefer SSCO	12	4

Positives (more interaction, not repetitive)	12	4
Negatives (too hard to watch all when busy)	20	4
Prefer Manned	8	3
Positives not as lonely, better CS	8	3
Nicer customers	2	1
Negatives boring too repetitive	4	2
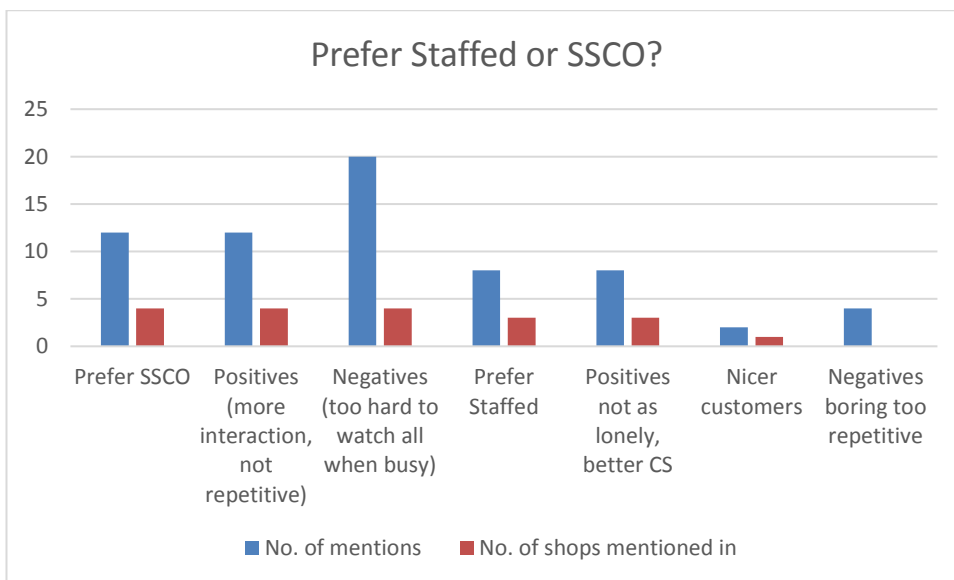
Figure 46 Prefer Staffed or SSCOs?

Clustered Bar Chart showing results for whether self-service checkout staff prefer working at self-service checkouts or working at the staffed checkouts. The most common response from staff in all 4 shops involved a negative comment such as "it is too hard to watch them all when it is busy" or "self-service checkouts can be lonely". Nonetheless 12 staff from 4 of the shops stated they preferred working at SSCOs. The reasons for this were interpreted via positive comments from staff in 4 shops stating that there was "more interaction with customers" and that it was "not as repetitive" as working at the staffed checkouts. The positive comments given in regards to the staffed checkouts included comments such as it "provides a better customer service" and that it

is "not as lonely as the SSCOs". Two comments from one of the shops stated that you get nicer customers at the staffed checkouts, however, there were 4 comments from 2 shops that the staffed checkouts were boring and repetitive.

Table 22 What are the most common mistakes made by customers at SSCOs?

Main Theme	No. of mentions	No. of shops mentioned same issue
Payments	8	4
Weights	30	4
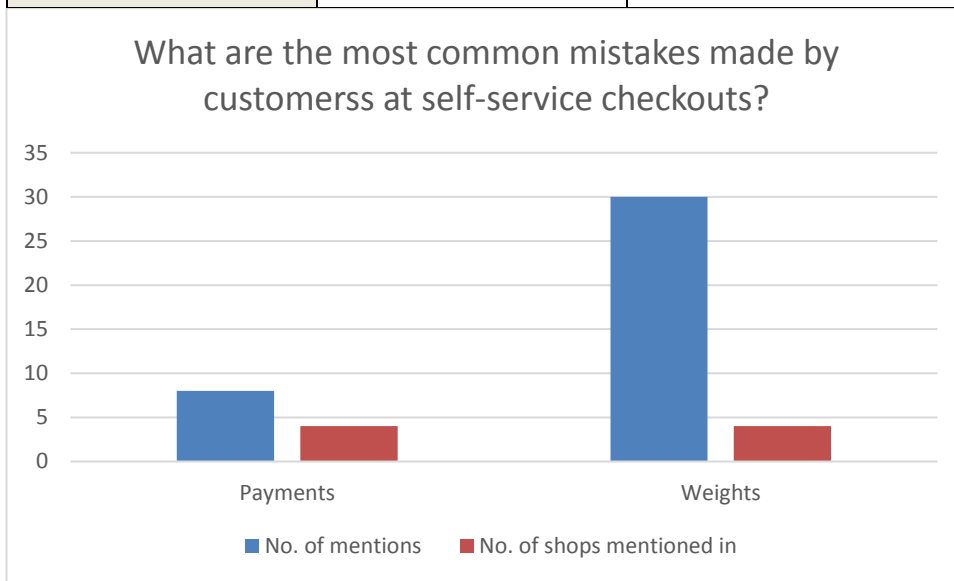
Figure 47 What are the most common mistakes made by customers at SSCOs?

Clustered Bar Chart t showing results for what self-service checkout staff feel are the most common mistakes made by customers at self-service checkouts. The most common mistake mentioned 30 times across the 4 shops was in relation to the weights and scales at the SSCOs. This included things such as "not putting items in the bag properly" and "putting stuff on weights that shouldn't be there". The next most common mistake mentioned was in relation to making payments which was mentioned 8 times across the 4 shops. For example one comment stated that customers put money in the wrong place".

Table 23 Have you noticed whether or not people steal at SSCOs?

Main Theme	No. of mentions	No. of shops mentioned same issue
Yes	18	4
No	8	3

Figure 48 Have you noticed whether people steal at SSCOs?

Clustered Bar Chart showing results for whether self-service checkout staff have noticed people stealing at self-service checkouts. Eighteen of the staff across 4 shops had noticed people stealing and 8 staff across 3 of the shops had not witnessed people stealing. There were also 7 comments from 2 shops which stated that the staff were "too busy watching other checkouts" when stuff was stolen.

Table 24 In what ways do people steal?

Main Theme	No. of mentions	No. of shops mentioned same issue
Walk without paying	15	4
Scan Cheaper item bag expensive	12	3
Scan really fast and bag	7	2
Put reduced stickers on non-reduced items	4	2
Usually innocent	9	4
Try their luck	7	1

Figure 49 In what ways do people steal?

Clustered Bar Chart showing results for ways in which self-service checkout staff know people steal from self-service checkouts. The most common reported method of stealing mentioned 15 times across the 4 shops was customers walking away without paying for their items. The second most common method mentioned 12 times across 3 of the shops visited was customers scanning cheap items but bagging expensive items in their place. There were 7 mentions in shops of customers scanning items really fast in attempt to steal items so that their weights would not be detected. There were also 4 mentions in 2 of the shops that people put reduced stickers from one item onto a more expensive item that has not been reduced. Throughout the interviews there were 9 comments in the 4 shops which stated they thought that it tended to be an innocent mistake in relation to customers bagging un-scanned items. This was in relation to the SSCOs experiencing many weight issues for example on comment stated that it was "not on purpose it was caused by weight issues". Whether this was the case or not cannot be proved. There were 7 comments from 1 shop that it was people "chancing their luck".

Table 25 What happens with information when thefts occur?

Main Theme	No. of mentions	No. of shops mentioned same issue
Tell supervisor/security	26	4
Information sharing	3	1

No information sharing	23	3
Security can't do anything really	5	2
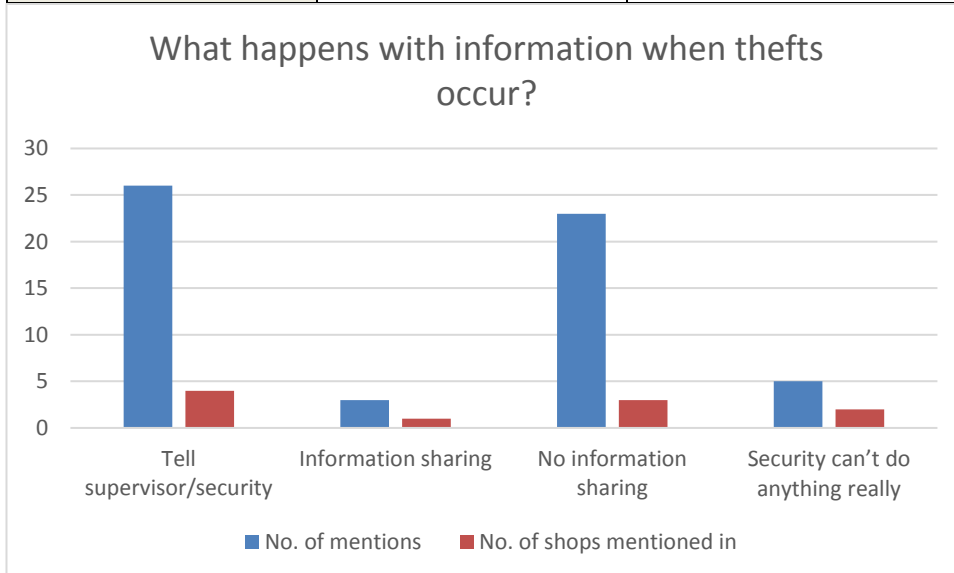
Figure 50 What happens with information when thefts occur?

Clustered Bar Chart showing results for what happens to information when thefts occur at self-service checkouts. All of the staff interviewed stated that they would tell their supervisor and alert security. Three of the staff interviewed from one shop stated that if a new method of stealing occurs then this will be shared with other staff to increase aware through an information sharing process. This involves all staff having to sign a written statement regarding the method of thefts to confirm that they have read and understand what it is they have to be aware of. None of staff from the other shops followed an information sharing process other than telling their supervisor or security. There were 5 comments made in 2 of the shops that the security guards do not have much authority when someone stealing other than phone the police for example one stated "security can't really do anything".

Table 26 Do you feel you can tell when someone is going to steal at a SSCO?

Main Theme	No. of mentions	No. of shops mentioned same issue
No	21	4
Yes (body language, shifty)	7	4

Usually Stereotype	8	3
Not a Stereotype	16	4
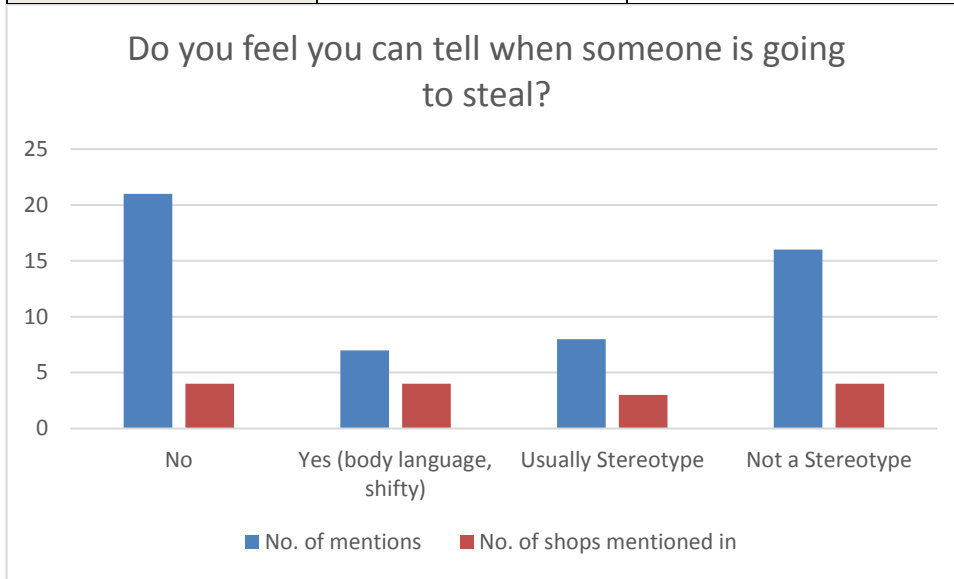
Figure 51 Do you feel you can tell when someone is going to steal at a SSCO?

Clustered Bar Chart showing results for whether staff feel they can tell when someone is going to steal at a self-service checkout and whether it tends to be a stereotype of not. There were 21 comments from the 4 shops stating that they cannot tell when someone is going to steal. However there were 7 comments from the 4 shops stating that you can tell when someone is going to steal. Eight comments from staff from 3 shops stated that it is usually a stereotype that steals for example one comment stated "drug addicts stand out". However 16 comments from staff at all 4 shops stated that it is not a stereotype as "no it can be anyone".

Table 27 Do various factors affect the likelihood of thefts occurring at SSCOs i.e. the busyness of the shop/the number of staff present?

Main Theme	No. of mentions	No. of shops mentioned same issue
Too hard for 1 staff member when busy	14	4
Easier to steal when busy	26	4
No people will try no matter what	7	2
More thefts when busy	23	4

Figure 52 Do various factors affect the likelihood of thefts occurring at SSCOs i.e. the busyness of the shop/the number of staff present?

Clustered Bar Chart showing results for whether staff feel that various factors affect the likelihood of thefts occurring at a self-service checkout for example the busyness of the shop or the number of staff present. All staff interviewed said that it was "easier for customers to steal when the shop is busy" and 23 comments from the 4 shops stated that "more thefts occur when it is busy". There were 14 comments from all 4 shops stating that it is "too hard for one person to watch all of the self-service checkouts when it is busy". There were 7 comments from 2 of the shops which stated that it wouldn't matter how busy it was or how many staff were present, there would always be people who will try and steal.

Table 28 Do you feel anything would reduce the likelihood of thefts occurring at SSCOs?

Main Theme	No. of mentions	No. of shops mentioned same issue
More presence/vigilance	14	3
CCTV at every checkout	2	2
No people will try no matter what	6	2
Fix weight issues to reduce frustrations	2	2

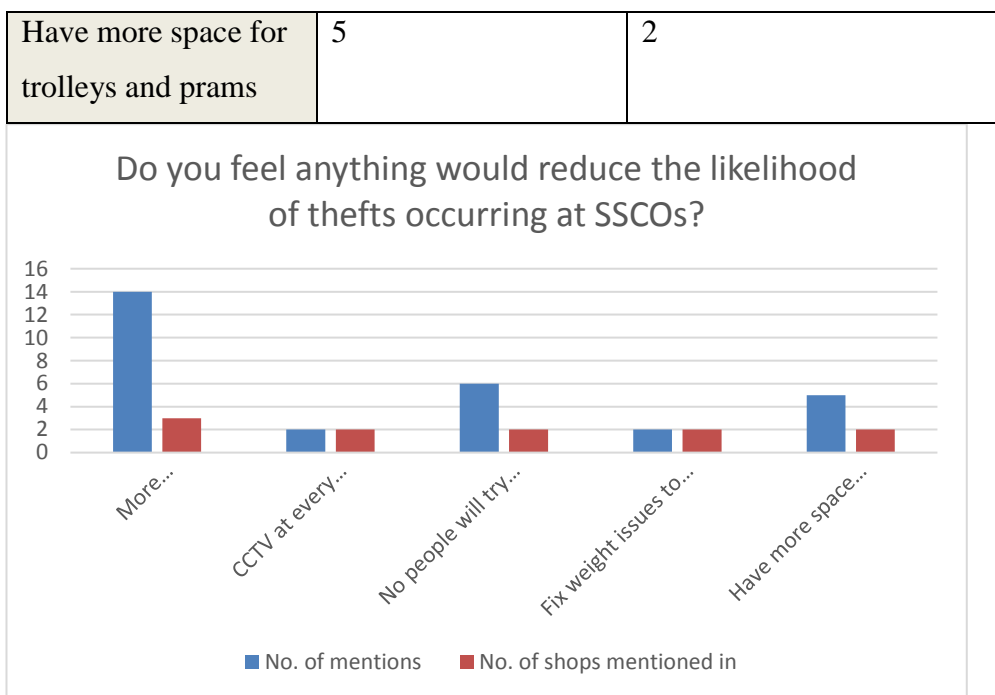|		
Have more space for trolleys and prams	5	2

Figure 53 Do you feel anything would reduce the likelihood of thefts occurring at SSCOs?

Clustered Bar Chart showing results for whether staff feel that anything could reduce the likelihood of thefts occurring at a self-service checkout. There were 14 comments from 3 of the shops which stated that more vigilance would reduce thefts for example some comments stated "more staff present" or "more security guards". Six comments from 2 shops stated that nothing will reduce the likelihood of thefts occurring as there will always be thief's. There were 5 comments form 2 shops which stated that there should be more space at the SSCOs for prams and trolleys as this would make it easier to see if people are stealing. There were 2 comments from 2 shops which stated there should be CCTV at every checkout and there were also 2 comments from 2 of the shops which stated that the weight issues should be corrected and this would reduce thefts as "weight issues are the main problem".

Table 29 Do you think that if customers felt they were being watched it would have any effect on the likelihood of thefts occurring?

Main Theme	No. of mentions	No. of shops mentioned same issue
Yes reduce thefts	23	4
No people will still try	5	2
May reduce use	7	3
Need more security	2	2

311
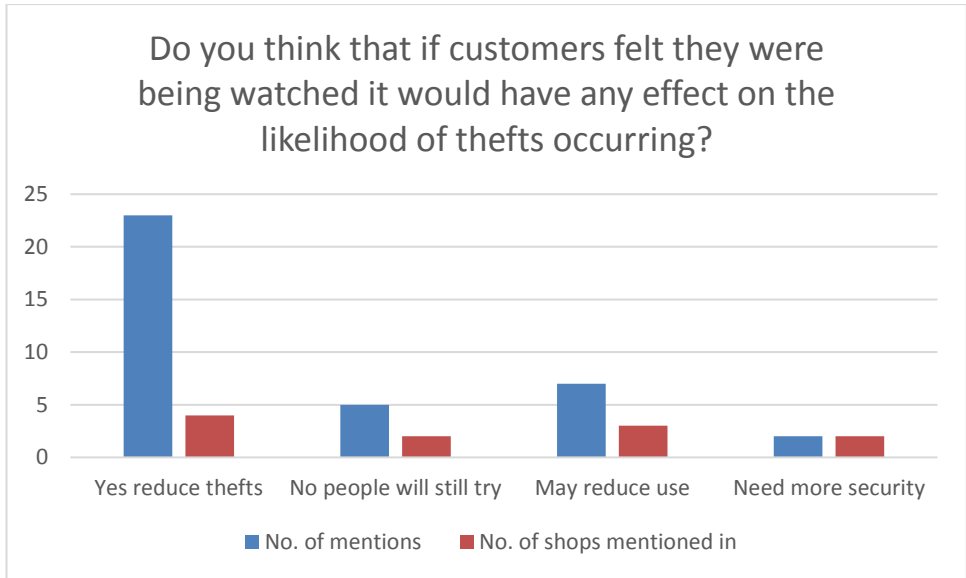
Figure 54 Do you think that if customers felt they were being watched it would have any effect on the likelihood of thefts occurring?

Clustered Bar Chart showing results for whether staff feel that customers feeling they were being watched would affect the likelihood of thefts occurring at a self-service checkout. There were 23 comments from the 4 shops which stated if customers felt they were being watched then it would reduce thefts occurring as they would feel "less likely to get away with it" or "would feel paranoid they will get caught". There were 7 comments in 3 of the shops which stated that it may reduce thefts. Five comments from 2 of the shops stated that it would not make a difference as people would still steal and there were two comments from 2 shops which stated they need more security staff.

Table 30 Do you think that an onscreen camera showing what was is being scanned and bagged would have any effect on the likelihood of thefts occurring/and the use of the machines?

Main Theme	No. of mentions	No. of shops mentioned same issue
Yes reduce thefts	17	4
No people will still try	6	1
May reduce use	6	3
Would only reduce thieves using them	3	2
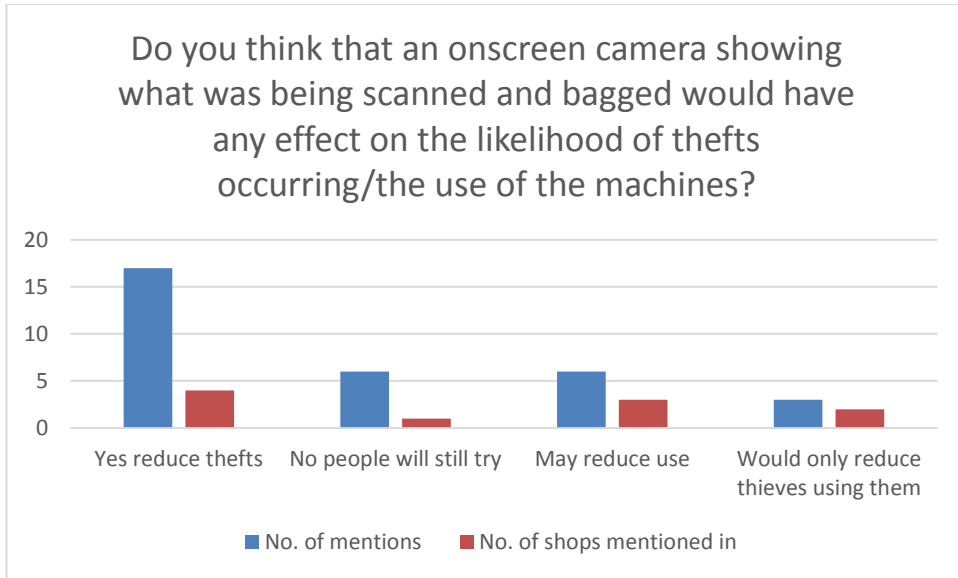
Figure 55 Do you think that an onscreen camera showing what was is being scanned and bagged would have any effect on the likelihood of thefts occurring/and the use of the machines?

Clustered Bar Chart showing results for whether staff feel having an onscreen camera, showing what was being scanned and bagged, would have any effect on the likelihood of thefts occurring at a self-service checkouts. There were 17 comments from the 4 shops which stated that "yes it would reduce thefts" having onscreen cameras on SSCOs. There were 6 comments from 3 of the shops which stated that "it may reduce thefts". There were 6 comments from one of the shops which state that it would "not make a difference" as people would still try. There were also 3 comments from 2 of the shops stating that it would reduce thieves using them.

Table 31 Do you think that an onscreen welcome message from the staff would have an effect on the likelihood of thefts occurring/and the use of the machines?

Main Theme	No. of mentions	No. of shops mentioned same issue
No people will still try and would bypass message	26	4
People hate the voice	6	4
Would be useful to show who assistant was	4	2

313
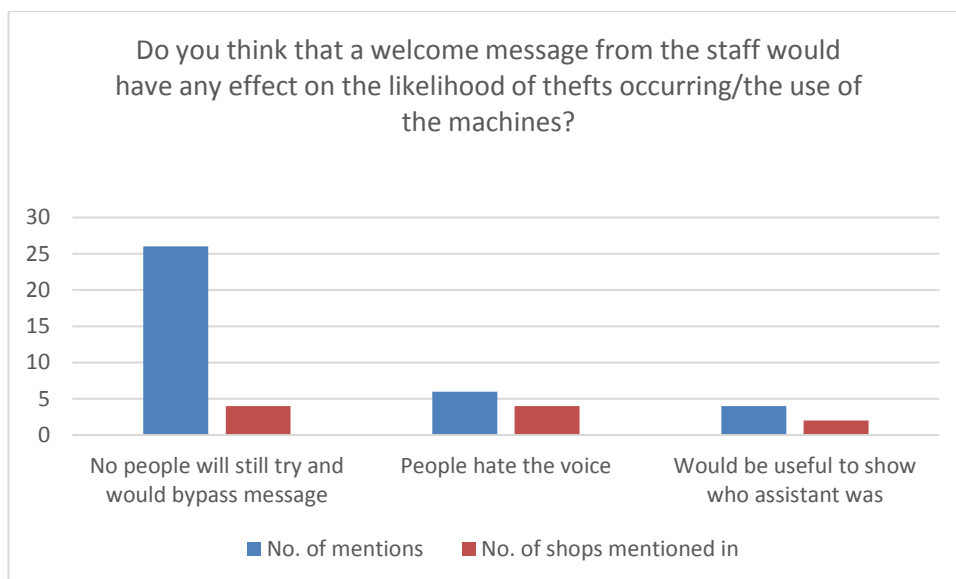
Figure 56 Do you think that an onscreen welcome message from the staff would have an effect on the likelihood of thefts occurring/and the use of the machines?

Clustered Bar Chart showing results for whether staff feel having an onscreen welcome message from the staff would have any effect on the likelihood of thefts occurring at a self-service checkouts. All of the staff interviewed did not think this would be a good idea as people would either ignore or bypass the message if given the choice. There were 6 comments made from the 4 shops stating that customers hate the voice from the SSCOs. There were 4 comments made from 2 shops which stated that "it would be useful to show who the assistant for the self-service checkout is".

Table 32 If you make any changes to the design or layout of the SSCOs what would you change?

Main Theme	No. of mentions	No. of shops mentioned same issue
Bagging area	8	2
Make them strictly for 15items or less	2	2
Weight/scales	9	4
Easier payments	2	2
More vigilance	3	2
Change layout as gets too congested	11	2
Exit & entrance signs	5	1
Woman's voice	6	3
Semi-circle design	4	2

Customer training	3	2

Figure 57 If you make any changes to the design or layout of the SSCOs what would you change?

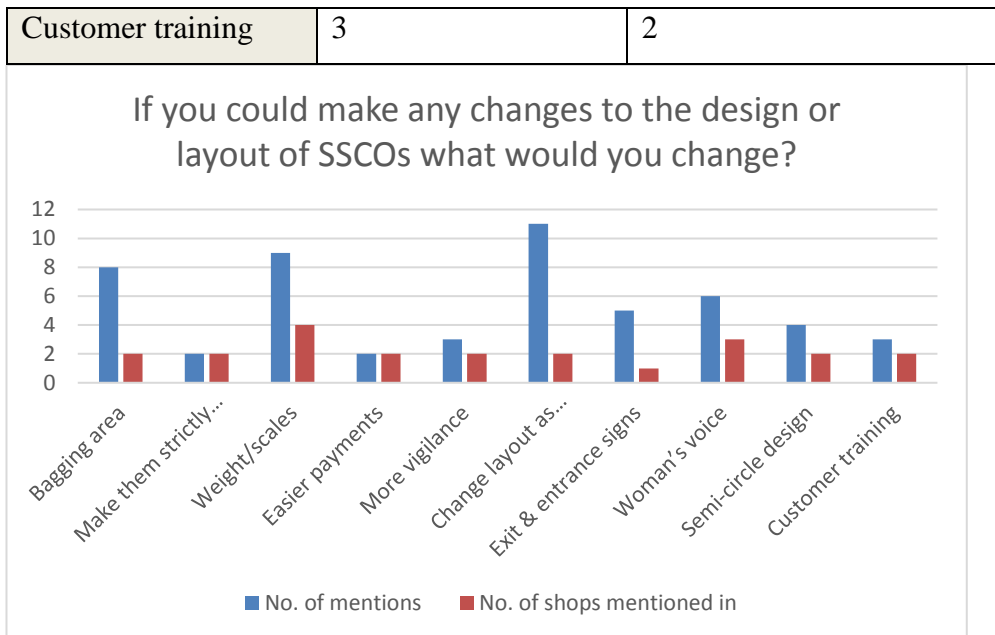Clustered Bar Chart showing results for changes the SSCO staff would make to SSCOs. There were 8 comments from 2 of the shops which stated that they would change the bagging area to accommodate more shopping for example "add a belt" to the bagging area to move shopping down. There were 2 comments from 2 shops stating that they would make the SSCOs for "strictly 15 items or less" to reduce congestion. Nine comments were given from 2 shops stating that something had to be done about the weights as they cause so many issues for both the staff and customers for example one comment stated "scales never work properly and cause frustration".

Two comments were made from 2 shops stating that payments should be made easier for the customer. Three comments were made from 2 shops stating that there should be more vigilance at SSCOs. This was in relation to thefts but also because staff may find it too hard to work all the SSCOs if it is busy as "staff are constantly at screens doing one on one". Eleven comments were made from 2 shops in relations to there being a need for more space at SSCOs for "prams and trolleys". It was suggested that the layout should be changed to create more space. One comment suggested "a turn when queuing and exiting" to reduce congestion. Five comments were made in 1 of the shops which stated there should be "Entrance" and "Exit" signs at the SSCOs as it is too confusing to watch customers come in at both ends when the shop is busy. There 6 comments from 3 of the shops which stated that the voice from the SSCO should be changed. Four comments were made in 2 of the shops stating that a "semi-circular design" may be easier for staff to watch for thefts occurring but "only if there was the space for trolleys

and prams to get through". There were 3 comments from 2 of the shops which mentioned customer training may be good for reducing stress in customers.

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