

ALMOST CERTAIN LOSS:
THE PSYCHOLOGY OF PYRAMID SCHEMES

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ABSTRACT

This thesis investigates investing in pyramid schemes. Study 1 explored the relationships between people's perceptions of investment options and their investment decisions. These options included a bank, a pyramid scheme, stock market and a safe. In this study, participants imagined they could invest money in any of the options and rated their perceptions of each option on various scales. When investing money, participants invested larger amounts in the options that they rated more positively. Compared to other investors, pyramid investors had higher positive correlations between their ratings of the pyramid scheme and how much money they invested. In Study 2 participants indicated how much money they would invest in each option and how risky they perceived the investment. As the perceived risk of an investment option increased, people invested less money. However, participants did not identify the pyramid scheme as the most risky option and rated it as being no more or less risky than the stock market. In both Studies 1 and 2 about half of the participants were willing to invest in the pyramid scheme. In Studies 3 and 4, participants imagined they had invested money in a pyramid scheme and were recruiting new target investors. Two experimental conditions were devised. In the first condition, participants were not informed of the potential for monetary loss, whereas in the second condition, monetary loss was made explicit. Potential target investors varied in the closeness of their rated relationship to the participant. When in the early non-loss condition, participants selected targets that were close to themselves, but in the loss condition they favoured targets that were less close. Furthermore, when in the non-loss condition, participants persuaded those targets they were closer to invest, whereas in the loss condition they persuaded them not to invest. Studies 5 and 6 found that there was no difference in sensation seeking propensities or intellect between pyramid scheme

investors and non-investors. One clear finding for the research is that many people did not select the pyramid scheme as the poor investment that it is, a result which indicates its present illegal status is justified.

CHAPTER 1

An Introduction to Understanding Pyramid Schemes

These unhappy times call for the building of plans... that build from the bottom up and not from the top down, that put their faith once more in the forgotten man at the bottom of the economic pyramid (Franklin D Roosevelt, 1932).

The research in this thesis has been conducted from within the theoretical framework of economic psychology. Because this approach has never, to my knowledge, been applied to the study of investing in pyramid schemes, the current thesis focuses on relating economic psychology to pyramid schemes. First a brief outline of what is currently known about pyramid schemes is presented. Given the absence of published research on pyramid schemes, most of this first section will be descriptive. Second, the topic of deception will be introduced because of its importance in defining pyramid schemes.

In Chapter 2 a brief overview of the study of risk will be presented as this concept is of general importance in understanding investments of any kind. Subsequently, an outline of the most favoured method of measuring risk will be presented as a justification of my choice of assessment tool. Consideration will be given to the suitability of a measure of risk for predicting and explaining why people invest in pyramid schemes. Sensation seeking, age and gender will all be addressed. Brief evolutionary and sociological explanations for gender differences in attitudes towards risk are presented. A particular focus of this chapter will be on how risks impact on economic decision making, as this provides a basis for exploring investing in pyramid schemes.

Chapter 3 will conclude the introductory chapters by presenting brief discussions of sunk cost and intelligence. These two constructs are also considered to offer potential explanations of why people invest money in pyramid schemes and how they behave once they have invested. Because several predictions and hypotheses will be advanced in the introductory chapters, these are cumulated and presented at the end of Chapter 3.

Pyramid schemes

Pyramid schemes are so named because of the hierarchical structure that is formed by their investors or recruits. These schemes will typically begin with initiators recruiting a number of investors who are then expected to recruit the same number of new recruits to receive their expected monetary returns. Each subsequent level of new investors make payments to those above them and likewise receives payment from those below, thus producing a scheme that essentially redistributes money. The continuation of this investment pattern is the means by which the scheme acquires its revenue and is a distinguishing characteristic of pyramid schemes (Blaylock, 1998; Commerce Commission, 1997, 1999). Consequently, for this investment design to work, the number of new recruits at each level of the pyramid must increase by an exponential factor, which is determined by how many new recruits each investor is required to enlist.

For example, if each person must recruit five others, then at level one there would be one, level two there is five, level three there is 25, level four there is 125, level five there is 625 etc.

Pyramid schemes differ from multi level marketing (MLM) in that MLM involves commercially viable products (e.g. jewellery, clothing, health products), which have real

income earning potential through repeat sales to clients (Commerce Commission, 1999). A widely cited example of such MLM is Amway, which Schwartz (1999) considers unethical because of its pyramid type structure, but due to its reliance on viable goods is still a legal enterprise in New Zealand (Commerce Commission, 1997). However, pyramid schemes are similar to Ponzi schemes, which are another type of investment scam, because they both promise large returns on investments that are unachievable because they are solely derived from new investor funds (Blaylock, 1998; Entombed Albania's Pyramids, 1997). Fundamentally, the key difference between pyramid schemes and Ponzi schemes is in the destination of new investors' money. Investors in a Ponzi scheme typically send their money to either a central investment house, or a person which is supposed to send the promised returns back to investors. However, new pyramid investors give their money directly to the people above them (Blaylock, 1998). However, due to Ponzi schemes reliance upon a continuous supply of investor's funds to meet the promised returns to earlier investors, these two schemes are very similar and the terms are often used interchangeably (Goldstein, 1997). Hence, as these two definitions are essentially based on the same concepts, the current thesis will include the term Ponzi within the parameters of pyramid schemes.

The obvious incentive for investors recruiting new investors into pyramid schemes is the expected monetary gain as they progress up the levels of the pyramid and the number of new investors below them increases. However, like the parable of doubling a grain of rice on the consecutive squares of a chessboard, which by the last square exceeds the number of grains of sand on a beach, the pyramid scheme soon runs out of new investors due to the world's limited human population (Teeter, 1999). Consequently, in pyramid schemes the majority of investors occupy the lower levels of the pyramid and receive no monetary

return on their investments, while only a minority can occupy the higher levels and receive exponentially greater financial returns for a limited period.

The fact that most recruits are not told that they are destined to lose their money in these schemes is the reason why pyramid schemes are illegal. The recruiting of people into investment schemes is legal, and so is the giving of money to other people, but it is the deception of the investors about their expected financial returns that determines the illegality of pyramid schemes (Carroll, 1998; Commerce Commission, 1997).

Fundamentally, deception exists because new investors are typically recruited on the promise that they will receive progressively larger financial returns on their investments. However, as already noted, the ability to fulfil this promise is logically flawed because of the finite human population.

The pyramid scheme that ran in Albania during 1995-1997 is a notable example of a pyramid scheme in which people invested and consequently suffered a financial loss. In this instance the scheme quickly spread through Albania and engulfed most of the populace. The debt incurred by Albanian citizens was estimated at one billion dollars, which if the Albanian government had reimburse would have produced bankruptcy (Entombed Albania's Pyramids, 1997). Investors in this scheme were promised returns of 50% per month on their investments and people were motivated to sell assets in order to invest cash for the expected monetary returns. For a short period of time the returns were achieved and a few people did well, but, as with all pyramid schemes, the supply of new investors ran out and consequently further payments were dishonoured, thus leaving investors in financial ruin. Hence, people can experience severe economic hardship

because of the attraction and adherence to the directives of pyramid schemes. These experiences, of course, are another reason why the schemes are worthy of investigation.

Although not as large in terms of monetary loss, pyramid schemes are still run in New Zealand and result in considerable amounts of money being lost by investors nationally. The Ministry of Consumer Affairs estimates the financial loss to be over ten million New Zealand dollars per annum (Commerce Commission, 1997) and, like the Commerce Commission, produces pamphlets that warn and educate people about the hazards of these schemes. For example, the Commerce Commission (1997) stated the following:

Suppose a scheme requires you to recruit ten people who each recruit 10 people etc. By the sixth level, 1 million people will have to join the scheme to keep it going. The next step requires 10 million people. People joining a well established scheme will have difficulty finding enough recruits to recover their investment. (p. 5).

Similarly the ministry has a website and links (www.consumeraffairs.govt.nz) partly devoted to pyramid schemes, which attempt to stop investors being drawn into such investment schemes by supplying information about how to identify them. However, psychological research into investing in pyramid schemes, to the best of my knowledge, has not yet been undertaken.

The nature of every pyramid scheme is such that the individual investor plays a key part in fulfilling the scheme's promises. Unlike investing in banks or stock markets, investors in pyramid schemes need to recruit other people to ensure they make money on their original investments. Hence when a person joins a pyramid scheme, it is their ability to

get new investors that determines their success at making money. If they are able to attract new investors then they might be one of the very few who make a profit. More likely, however, as pyramid schemes grow, most people who have invested money will find it extremely difficult to find new investors and will lose their initial investment. Given these facts, the question arises as to why people are still drawn into such schemes and why they continue to occur in almost all countries and walks of life. In fact, although pyramid schemes are illegal in most countries, their appeal is still strong. It is an interesting question as to whether people's behaviours change when the difficulties are realised. Once people realise they are likely to lose their money, will they be more likely to deceive potential new investors to help ensure they invest?

Deception

The semantics surrounding deliberately misleading people includes such phrases as white lies, bluffs, and fibs, but essentially all equate to deception (Hyman, 1989). The definition of deception encompasses all the previous terms, but here it is confined to the parameters of deliberate economic behaviour. Cheating and dislike of it display themselves cross culturally. People perceive it to be a socially unacceptable behaviour and react adversely to known cheaters (Sigmund, 1993). Consequently, a cheater must assess the possible gains and risks associated with cheating before engaging in deceptive behaviour (Sigmund, 1993; Wokutch & Carson, 1999). As such, the outcomes associated with cheating influence both an individual's choice to engage in deceptive behaviour and the reactions of others if this behaviour is discovered (Hyman, 1989; Ridley, 1997). Arguably, either deliberate or unintentional deception is required for the successful recruitment of investors to pyramid schemes. The studies that follow focus mostly on deliberate deception because it is more easily measurable.

Reaction to, or interpretation of the seriousness of, deceptive behaviours often results from the perceived relationships between agents and targets. The theory of the scope of justice and numerous decision making models (Jones, 1991; Singer & Singer, 1997) demonstrate that the degree to which a person interprets a behaviour to be serious, or unethical, has a positive relationship with the perceived closeness of the agent to the target. The intensity of a person's reaction to deception is mediated by the relationship between the agent and the target (Brockner, 1990; Opatow, 1990; Ridley, 1997; Singer & Singer, 1997), which influences the agent's decisions about who to mislead. People who are closer and are deceived react more severely. This closely relates to the principle of evolutionary psychology that asserts people are more likely to act altruistically to people who are members of their kin group and are themselves more likely to reciprocate (Ridley, 1997; Sigmund, 1993). Therefore determining how these relationship factors affect people's economic behaviours is a worthwhile area to research, especially in respect to deception-based pyramid schemes.

Deception carries with it a negative connotation. We do not admire deceivers. How often have you heard someone being praised for their ability to deceive another? It also seems reasonable to assert that such a compliment would be rare and difficult for the recipient to graciously accept. However it is not uncommon for people claim that "lies keep friendships together"; or that "no one wants to know the truth all the time". Perhaps this argument is sometimes valid. However, such a claim is dependent on how the agent (person deceiving), or target (person being deceived) are affected by deception, which could result in negative, positive or neutral outcomes. I accept that in certain

circumstances an act of deception could be perceived as something positive. For example, consider the following scenario:

Jason receives a gift of money from Alison, who is very special to him.

Unfortunately, the amount is much less than he expected, but Jason still thanks Alison and states that it is very much appreciated.

In this brief example, deception has occurred because Jason deceived Alison about his true feelings. But it is possible to see this act positively rather than negatively because Alison's feelings could have been hurt by the truth. Of course, such value judgements depend on a person's ethical perspective and the seriousness of the consequences resulting from acts of deception, which can range from miniscule to extremely large. However, it is possible to see that a person may hold the view that deception can at times be a beneficial action and not always something to be condemned (Gralton & Sandford, 2002). However, once pyramid investors have realised it is nearly impossible for the scheme to guarantee money, it is difficult for them to justify recruiting new investors and few would find such behaviour admirable.

The consequences of actions can determine their perceived seriousness. For instance harm caused to 10 people, when compared to harm caused to one person is typically judged to be more serious because of the larger number of people affected (Pojman, 1989). Likewise, losing one dollar is less serious than losing \$10,000. In a similar way that the judged seriousness of outcomes increases with the size of a loss or harm, beneficial outcomes produce favourable assessments. And when people are asked to determine the seriousness of acts of deception their judgements are found to depend on the consequences caused by the deception (DePaulo & Kashy, 1998).

Furthermore, when people consider holding others responsible for acts of deception, they take into consideration the agent's intent and knowledge of the consequences (DePaulo & Rosenthal, 1979). For example, a person who knowingly deceives others to invest their life savings in a fraudulent company is judged more harshly than someone who ignorantly advises someone to invest. Such distinctions about level of social undesirability are reflected in the law and are used to determine fraud.

Backbier (1997) used a scenario based study to demonstrate that people have malleable attitudes towards the acceptability of lying or misleading others. The manipulated variables in this study were the reason for the lies, if the situation was important or unimportant, and the closeness between the agent and target. The data showed that deception became more tolerable when the importance of situations increased and the deception was in the interests of those being deceived. Conversely when deception was in the interests of the agent, deception became less acceptable. In this particular study the participants were all female, but other research (Gordon & Miller, 2000) has shown males to respond in the same way.

A number of studies have considered the different settings where deception occurs (DePaulo, 1992). The broad range of studies into deception has, for example, included investigations into individual criminals trying to avoid prosecution in legal cases (Miller & Stiff, 1992), prime ministers and politicians trying to avoid answering questions that may show up their mistaken actions (Ekman & O'Sullivan, 1991), and deception at home and work (Ekman & O'Sullivan, 1991). For a review see DePaulo (1988). Deception is also widely used in the design of social psychology experiments. In this context, it is

often necessary for participants to be deceived about the true purpose of an experiment to ensure unbiased results (Brehm, Kassin, & Fein, 2005).

Langenderfer and Shimp (2001) used psychological principles to explain vulnerability to deceptive selected schemes or scams. However, in their paper, pyramid schemes were not substantively featured. Instead, their paper focused on the vulnerability of older people to telemarketing scams. It relied heavily on survey information from the American Association of Retired People, an organisation that argues for retired people's rights. Langenderfer and Shimp proposed an untested model to explain people's involvement in scams. The model was based on visceral factors, which were defined as drive states and proposed to effect how motivated someone might be to attend to scam cues (Langenderfer & Shimp, 2001).

Given the widespread occurrence of deception, one should not be surprised that a large number of psychological studies have explored it. Often such studies have required participants to engage in deceptive behaviours and have measured the accuracy of people in detecting instances of deception (DePaulo et al., 2003). Typically in this research an agent makes a false statement and a target or observer who is isolated from the agent, assesses the veracity of the statement. To increase generalisability, some experimental designs have allowed for interactions between agents and targets. These interactions are intended to better reflect how people interact with each other in real world settings (Feldman, 1992; Stiff & Miller, 1986).

Research into deception has revealed interesting and at times disturbing facts about the ability of people to detect when others are being deceptive. DePaulo, Charlton, Cooper,

Lindsay and Muhlenbruck (1997) performed a meta analysis of studies of the accuracy of the judiciary in detecting deception and how confident they were in their judgements.

Although no statistically significant relationship was found between the judges' accuracy in detecting deception and confidence in their judgements, a significant positive relationship was found between confidence and perceptions of truthfulness. Thus it appears that the judiciary were confident in their ability to detect deception; but this belief was not borne out by the data. The general population are also very poor at detecting deception. Ekman and O'Sullivan (1991) found that 15% of ordinary people (students) were very poor at detecting deception (levels below chance) and 59% were close to or at chance. The remaining 26% had higher accuracy than had previously been reported.

However there are instances where people have performed at levels above chance in detecting deception. For example, DePaulo and Rosenthal (1979) performed an experiment in which the stimuli consisted of filmed people giving testimony about other people. This testimony presented agents' feelings about other target people under discussion, which at its simplest was categorised as either being true or false testimony. Participants were required to state the veracity of the testimony and to identify how the agents felt towards the targets. DePaulo and Rosenthal found that participants were able to detect deception at levels above chance, although this was a very small effect ($d\text{-prime} = 1.64$). However, when asked to identify the agents' real feelings they performed at non-significant levels. Rather than discovering that people are experts in detecting instances of deception, research has revealed that as a rule, most people can only correctly detect deception at levels close to or less than chance.

Although people are not very accurate at detecting deception, the skill can be improved with training. Porter, Woodworth and Birt (2000) conducted an experiment which measured the effectiveness of parole officers in detecting misleading and deceptive statements made by inmates seeking parole. Disturbingly, the data showed that before training, the officers' baseline performance at detecting deception averaged at 40.40% accuracy, which was significantly less than chance. Porter et al. (2000) suggested that this finding was due to the parole officers using and relying on inaccurate cues of when deception had occurred. These beliefs included those that deceptive prisoners smiled less, gestured less and gave shorter answers when interviewed. However, while accurate deception detection was difficult, and prisoners with more at stake were more manipulative, the researchers also demonstrated that deception detection was a skill that could be improved by training and feedback. If parole officers were instructed on the empirically based differences of verbal and non-verbal behaviour between deceivers and non-deceivers and were made aware of the myths about liars, then the errors in accurately detecting deception could be reduced (Porter et al., 2000). At the end of the study parole officers were performing at 76.6% accuracy. Thus research into deception can assist in helping people make more accurate decisions.

Gender differences

Gender differences in detecting deception have been studied. Research in this area has frequently tried to identify if men and women differ in the behaviours they display when being deceptive, and what they observe and use in deciding if someone else is being deceptive (Burgoon, Buller, Grandpre, & Kalbfleisch, 1998). However, inconsistent findings have been reported. Bente, Donaghy, Suwelack (1998) and Burgoon et al. (1998) show that, in some instances, men have been found to detect deceptive displays at

higher incidences than women; and, when being deceptive, men tend to engage in more bodily movements than women. Conversely, in other instances Burgoon et al. (1998) reported it has been women that have displayed the greatest number of behavioural cues and detected more instances of deception. After Burgoon et al. (1998) reviewed the relevant literature and research articles, they came to the conclusion that men and women were at the same level in encoding and decoding deception; which is normally less than chance (Ekman & O'Sullivan, 1991). It was argued that given the similarity of human history, the recognized advantages of deception have resulted in the genders being equal in their ability to detect it.

Tyler and Feldman (2004) studied 208 university students and found gender differences in the frequency and nature of deception. Participants communicated with partners of the same or opposite gender in two experimental conditions (ten minutes in each). Participants were told that the purpose of the study was to test how people communicate with strangers. In one condition they were told they would not interact with the partners again, in the other they were told they would interact on three more occasions. When they were led to believe they would meet their partners again, females lied more than males. Females averaged 2.65 lies per 10 minute conversation, which was significantly greater than males at 1.71 per 10 minute conversation. This difference between males and females was explained as females were more concerned with pleasant interactions and used deceptive behaviour to endear themselves to the recipient.

The likelihood of finding a gender difference is difficult to predict because of contradictory research findings. However, despite Burgoon's et al. (1998) summary, given that some previous research has found gender differences (Tyler & Feldman,

2004), it would seem negligent not to test for them when studying investing in pyramid schemes.

Economics

Wokutch (1999) suggests that business people accept deception as part of most economic transactions and it is often justified by those engaged in it. Wokutch argued that this tolerance results from its common place in economic transactions. This common occurrence of deception in business or finance is thought to result from the advantages it produces (Lewicki, 1993; Lewicki & Litterer, 1985; O'Connor & Carnevale, 1997).

These benefits can result in monetary rewards for the deceiver (O'Connor & Carnevale, 1997). Of course, the risk of being caught out as a deceiver is also likely to result in monetary loss, because future investors or traders will shun someone who is deceptive, because they fear losses themselves.

Suggesting that deception in economic transactions is an accepted practice runs counter to the intolerance that wider societies hold towards deception (Callahan, 1988). In fact, Culliford (2002) argued that lying and deception in business or economic transactions, as in any other circumstance, is risky and simply unacceptable. Furthermore, just because something is frequently practiced, this does not make it acceptable (Callahan, 1988; Culliford, 2002). However, whichever moral perspective is taken on the actual behaviour, there is general agreement that deception is often but not always a part of financial and business transactions.

Tax evasion, defined here as the deliberate withholding of income taxes, is another form of economic deception (Elffers, 1996; Cowell, 1992). This type of deception is faced by nearly all governments and significantly reduces the government's ability to fund its services (Hasseldine, 1990). Understanding how to reduce tax evasion is therefore an important social issue (Cowell, 1992). Consequently this type of deception has received much attention and studies have focused on "attitudinal explanation of tax evasion, on measurement and on experimental issues" (Elffers, 1996, pp. 289-290). Although the associated improvements in tax compliance have been difficult to ascertain, understanding the underlying constructs of tax evasion and advertising the costs and benefits of tax to society are still important in curtailing this form of deception (Elffers, 1996; Hasseldine, 1990).

There seems to be an almost unlimited number of situations where deception may occur. Probably no one could have escaped being deceived in their lifetime (Fiedler & Walka, 1993; Turner, Edgley, & Olmstead, 1975). Trying to identify behaviours as useful indicators of deception is a vexed area of study where agreement is still difficult (Horvath, Jayne, & Buckley, 1994), and even though people are faced with decisions about the truthfulness of others every day, they still are not very good at detecting it (DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996). Although there are abundant studies into detection of deception, Steinel (2004) stated few have addressed the conditions "that foster or inhibit people's tendency to be truthful and accurate or dishonest and inaccurate". (p. 419).

Given the widespread nature of deception, especially in financial transactions, it is warranted that it be considered when exploring pyramid schemes. Part of the current

thesis extends this line of research by measuring deception in people asked to imagine they have invested in a pyramid scheme. Two experimental conditions are developed to reflect the nature of pyramid schemes. In each condition, participants imagine they have invested money in the pyramid scheme and are looking for new investors to make money. The difference between these two conditions is that, in the second, participants will be made aware of their potential financial loss and difficulty in recruiting new investors to receive any monetary returns. How does this difference affect whether people will try to deceive others?

Closeness and Deception

People behave differently towards others depending on how close they are to them. One way to avoid the pitfall of assuming certain types of relationships are necessarily close is to simply ask people to give a subjective rating of how close someone else is to them (DePaulo & Kashy, 1998). DePaulo and Kashy (1998) performed two diary studies exploring the incidences and respective effects of lies that agents told targets, while controlling for closeness between agents and targets, which was measured on a 15-point scale. DePaulo and Kashy found that targets that are less close are told the greatest number of lies and agents report they are less uncomfortable when telling them.

Moreover, the lies that were told to closer targets were more altruistic than those lies told to strangers. For example, an agent told a friend, "...she was nice looking even though she wasn't". To make her feel good"; whereas, a stranger was told, "that if she likes the jeans that way, they aren't too tight", because the agent wanted to sell the jeans. (p. 68).

Over the course of five experiments Tice, Butler and Stillwell (1995) also found that interactions between people (agents & targets) varied as to whether the target was a

friend or stranger to the agent. Results from this study showed that when given the opportunity to present oneself in either a modest or self enhancing manner to friends, or strangers, agents were more modest with friends. It is argued that people tell fewer lies to those people closest to them because the familiarity means they are better at determining each other's veracity. Other studies show that people you are closer to are perceived as being more trustworthy (Siegrist, Cvetkovich, & Roth, 2000); and are offered more financial assistance (Kirchler, 2001; Zhang, 2001).

Evolutionary principles of relatedness offer an explanation as to the importance of closeness in making economic decisions. Central in this explanation is Hamilton's inclusive fitness theory which states that natural selection favours characteristics that result in a person's genes being passed on. Note that this means that the survival of the organism itself is not the first consideration (Hamilton, 1972). Hence, when someone needs assistance, people have a tendency to assist relatives, which ultimately increases the chances of their own gene survival (Hamilton, 1972). Support has been found for Hamilton's theory in explaining why people make certain financial decisions. For example, Smith, Kish and Crawford (1987) performed a study exploring 1000 wills to determine if estates are left in accordance with evolutionary principles. These results support the evolutionary theory showing that benefactors favour close relatives over distant relatives and those relatives of higher reproductive value. Kemp and Hunt (2001) found similar results when they analysed 248 wills in Christchurch, New Zealand. Overwhelmingly, bequests of money and possessions were restricted to family members. Relatives of equal status (e.g. siblings) were also found to be equally favoured in what they received from the deceased. It appears that, when making economic decisions, genetic links are often considered more important than other non-genetic social

relationships, thus supporting Hamilton's theory of inclusive fitness (Coleman & Ganong, 1998; Judge & Hrdy, 1992).

Webster (2003) also showed that relatedness affects how people allocate money to recipient targets. In this study, participants/agents were required to allocate fictional lottery winnings to recipient targets as they saw fit. Depending on the amounts of lottery winnings participants were assigned (\$10,000, \$100,000 or \$1m), each participant was assigned to one of three possible groups. Targets were defined in terms of being blood relatives to agents; and the variable of cohabitation time spent together factored for. As predicted, the results show that targets who have greater relatedness receive greater economic benefits. The findings further show that if people have less resources (lesser amounts of lottery winnings), then more conservative evolutionary investment strategies are adopted that favour closer blood relatives.

When one deceives people who are close, it clearly goes against the openness and trustworthiness which people consider as important factors in close relationships (DePaulo & Kashy, 1998; Granhag & Stroemwall, 2000; Parks & Floyd, 1996). Also, when making economic decisions, closeness is an important factor in that one favours those people who are considered closest. I researched the two constructs of deception and closeness by studying them together. As DePaulo (1998) suggest, closeness of targets is ascertained by asking participants to give subjective ratings. I explored whether closeness plays a part in possible deceptive behaviours when investing in pyramid schemes. The questions to be addressed are: Will people select target investors for pyramid schemes depending on how close they are rated and will deceptive behaviours vary accordingly?

CHAPTER 2

An Introduction to Understanding the Importance of Risk

Over the last 25 to 30 years, risk taking has been extensively researched. The nature of risk and how it is perceived makes it a central component in how people make decisions and it affects the courses of action they choose (Slovic, 1987). Of course, before exploring the concept of risk taking in any great depth, it is important to attempt to define it, although the numerous meanings that are associated with the concept of risk (Larkin & Pines, 2003; Slovic, 1987) make the task of definition somewhat difficult.

Yates (1992) stated that there were three essential and interactive elements involved when people decided to take risks. These were identified as the existence of potential losses, the significance of these losses and the uncertainty of the losses occurring. It is how these elements interact and is perceived that determines risk and whether a person is likely to engage in risk taking. Sitkin and Pablo (1992) also reduced the necessary elements for risk taking down to three. They suggested that people make riskier decisions when “(a) their expected outcomes are more uncertain, (b) decision goals are more difficult to achieve, or (c) the potential outcome set includes some extreme consequences.” (p. 11). Hence the defining attributes of risk taking involve the likelihoods and outcomes of positive and adverse events (MacCrimmon, Wehrung, & Stanbury, 1986).

The extent to which people perceive something as risky is an important consideration when making decisions. In essence, decisions to take certain courses of action are largely dependent on how risky something is considered (Slovic, 1987). In instances where

different perceptions of risk exist between individuals or groups, differences in opinion about what actions should be taken is likely (Slovic, 2000). These perceptions, when deciding on whether to engage in risky behaviours, are often the determining factors on what decisions are made (Finucane, Slovic, Mertz, Flynn, & Satterfield, 2000; Flynn, Slovic, & Mertz, 1994; Slovic, 1987).

Decisions in behavioural economics

My goal is to extend the research in economic decision making by determining if there are relationships between sensation seeking and peoples' decisions to invest money in pyramid schemes. As with any type of risk, a degree of uncertainty of the probable outcomes is necessary before risk exists at all (McInish & Srivastava, 1984). If people invest money that eventuates in economic gains or losses, financial risk taking occurs (Tversky & Fox, 1995). These potentials, especially for losses, are a reality of all pyramid schemes. Some people may perceive a particular financial risk as highly risky, whereas other people may perceive there is little associated risk. I will test if people with a propensity to engage in risky pursuits are more likely to invest in pyramid schemes.

Predicting peoples' decisions to engage in risk seeking behaviours is not an exact science (Grable, Lytton, & O'Neill, 2004). Several decision theory models have been proposed to explain and predict people's decisions to engage in risky behaviours. Some focus on rationality, where it is assumed decisions are made independent of framing and are based on basic principles of optimal choice. Normative models are similar to decision theory models in economics and finance (Von Neumann & Morgenstern, 1944). Within normative models it is assumed that people are risk averse in that they would choose a sure option over a gamble of an equal expected value (Ingersoll, 1987). For example

when given a choice between a sure option and a lottery of an equal expected value, they prefer the former. Such risk averse choices, according to Zaleskiewicz (2001) are “assumed to be rooted in the curvature of the utility function, which is concave for gains.” (p. 106). Overall, however, people’s actual investment decisions frequently differ from what might be expected from rational decision makers (Kahneman & Tversky, 1979; Zaleskiewicz, 2001).

Economic models presume that risk aversion is a common human disposition (Warneryd, 1996), and that any differences in attitude towards risk can be predicted by the curvature of the utility function (Zaleskiewicz, 2001). However, people do not necessarily follow the rational economic theory of decision making, thus suggesting that other variables play important parts in determining willingness to take risks. People’s decisions to invest are often found to be frame dependent (Ingersoll, 1987; Kahneman & Tversky, 1988); (Kahneman & Tversky, 1988) sensitive to heuristic driven biases (Tversky & Kahneman, 1981); situation dependant (Zaleskiewicz, 2001); and differ with different affective states (Au, Chan, Wang, & Vertinsky, 2003). Hence when explaining and predicting people’s decisions to take risks, the principles of utility theory are often inadequate.

When tested, the principle of invariance is perhaps the greatest challenge to rational choice models. Invariance states that “different representations of the same choice problem should yield the same preference. That is, the preference between options should be independent of their description.” (Hagarth & Reder, 1987, p. 69). However this principle is frequently violated. A common means of demonstrating this violation is to construct scenarios that differ in their descriptions of choices while keeping the outcomes constant. These scenarios are presented to participants and the proportions of people

choosing each scenario recorded. Usually the differences between descriptions are framed in terms of gains (positive outcomes), whereas the other is framed in terms of losses (negative outcomes). An example of how a study might demonstrate this effect follows. In this example participants indicate their preferred decision.

Example:

Decision (i) Choose between:

- A. a sure gain of \$250
- B. 25% chance to gain \$1000 and 75% chance to gain nothing

Decision (ii) Choose between:

- C. a sure loss of \$750
- D. 75% chance to lose \$1000 and 25% chance to lose nothing

(Hagarth & Reder, 1987, pp 70-71)

When scenarios are framed like those in this example, greater proportions of people opt for the sure gain, thus being risk averse. However most do not opt for the sure loss, thus being risk seeking, Unless the probabilities of winning or losing are small, a greater proportion of people are risk averse when choices involve gains and risk seeking when they involve losses (Hagarth & Reder, 1987; Ingersoll, 1987; Kahneman & Tversky, 1979, 1988; Zaleskiewicz, 2001). People perceive equal size gains and losses differently.

Given that decisions to take risks often deviate from what might be expected from rational interpretations of value and utility, alternative models are required (Warneryd, 1996). The prospect theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992) is

one of “the most generic and well known” of these theories (Earl & Kemp, 1999, p. 398). It attempts to model how people actually behave when faced with risky decisions rather than what they should do if they followed a rational decision model. A feature of the model is that people have different attitudes towards different types of risk: “risk aversion for gains and risk seeking for losses of high probability; risk seeking for gains and risk aversion for losses of low probabilities” (Tversky & Kahneman, 1992, p. 1). Put simply this theory takes into account the subjective nature of how people make decisions.

Fundamentally the prospect theory focuses on gains and losses from decisions where loss aversion is a prevailing concept. Important in understanding this theory is how people perceive monetary outcomes. "An individual views monetary consequences in terms of changes from a *reference level*, which is usually the individual's status quo", and these vary according to how a problem is framed (Hastie & Dawes, 2001, p.294). Risk aversion is defined as a “preference for a sure outcome over a prospect with an equal or greater expected value... Risk seeking is exhibited if a prospect is preferred to a sure outcome with equal or greater expected value" (Tversky & Fox, 1995, p. 269). This theory states that a loss is perceived as being greater than a gain of an equivalent value (Earl & Kemp, 1999; MacFadyen & MacFadyen, 1986). Thus the negative feelings from losing \$100 are greater than the positive feelings of gaining \$100. As Earl and Kemp (1999) distinctly wrote, “money lost carries the greatest weight.” (p. 250). People are therefore risk averse when prospects are perceived as gains; risk seeking when prospects are perceived as losses. They also overestimate the likelihood that small probabilities will occur and underestimate moderate and high probabilities (Antonides, Raaij, & Maital, 1997; Kahneman & Tversky, 1988). For example, people will accept very small probabilities to win large amounts of money from lotteries and these probabilities are often more

attractive than greater probabilities of winning smaller amounts of money (MacFadyen & MacFadyen, 1986).

Similarly, people place different subjective values on income from different sources and have different attitudes towards paying the respective income taxes (Smith & Kinsley, 1987). People are less willing to pay taxes on the income that they have earned from entrepreneurial activity, which required extra effort, than on income that was derived from other sources (Earl & Kemp, 1999). However, Ellfers (1996) suggested that applying the principles of the prospect theory to paying taxes would reduce tax evasion. Ellfers argued that if slightly “deliberately too high advance levies (wage tax, provisional tax assessment)” were imposed on each payer, he or she would find themselves “on the verge of gain” (p. 292). Hence this gain-outcome would increase the likelihood that people would choose a risk free strategy to obtain the refund. Therefore taxes would be calculated more accurately and the incidences of tax evasion reduced.

Framing options in terms of gains or losses affects how much risk people are willing to take. When framed in terms of gain they are likely to choose to avoid risks whereas a loss frame would more likely result in risk taking (Nelson, Oxley, & Clawson, 1997; Roszkowski & Snelbecker, 1990). These differences in how losses and gains are perceived must be considered when constructing a study’s investment decisions. Given the same objective alternatives within investment options, simply altering the description of uncertain situations can affect people investment decisions (MacFadyen & MacFadyen, 1986). Such effects will be controlled for in my studies.

Risk and sensation seeking

It is common practice to measure a person's desire for sensation seeking as an indicator of their individual propensity to take risks (Hammelstein, 2004; Zuckerman, 1994). Initially, Zuckerman (1979) defined sensation seeking as a "trait defined by the need for varied, novel and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experience." (p. 10). Since this definition was originally produced, Zuckerman and Kuhlman (2000) have omitted the term 'need' and sensation seeking has now been redefined as "seeking of varied, novel, complex and intense sensations and experiences and the willingness to take physical, social, legal and financial risks for the sake of such experience." (p. 1000). Zuckerman and Kuhlman (2000) proposed this alteration because they believed that need implied compulsion. Unfortunately, as Hammelstein (2004) suggests, removing need from the concept of sensation seeking restricts the ease of its understanding.

Inherent in Zuckerman's (1979; 1994) conceptualisations of sensation seeking is the willingness of a person to take risks. These risks can be either physical or psychological. A very frequently used tool to measure sensation seeking is Zuckerman's Sensation Seeking Scale Version five (SSS-V), which is the fifth modified version of the original scale constructed in 1979 (Zuckerman, 1994). This scale is a survey instrument that contains 40 items that aim to measure differences between individuals in their preferences for finding novel and stimulating pursuits, attitudes, and values. The SSS-V has four subscales (10 items in each), that aim to measure the different components of sensation seeking. The Disinhibition (DIS) factor measures nonconformity with standards of acceptable social behaviour (e.g. drinking, gambling, & gender). Disinhibition in accepting risky financial decisions has been linked to feelings of self efficacy (Slanger &

Rudestam, 1997) and investment decisions (Hunter & Kemp, 2004). A high score on this factor may mean a person gambles in excess of acceptable social norms. An item pertaining to this factor is, “I like to have new and exciting experiences even if they are a little unconventional or illegal” (Zuckerman, 1994, p. 32). The Boredom Susceptibility (BS) factor measures aversion to routine in one's life and intolerance of boring people. A question addressing this factor has the participant choose between “The worst social sin is to be a bore” and “the worst social sin is to be rude”. (p 32). The Thrill and Adventure Seeking (TAS) factor measures preference for the thrills inherent in risky activities (e.g. car racing, sky diving). Because they address rarely engaged in activities, most of these questions are expressed as intention, for example “I sometimes like to do things that are a little frightening”. (p. 31). Finally, the Experience Seeking (ES) factor addresses the preference for mentally arousing activities and a nonconforming lifestyle. For example, “I enjoy the company of real swingers”. (p. 390). Summing scores on these subscales produces overall sensation seeking scores which because of the level of correlation among them indicates the presence of a domain general, risk seeking personality type.

People with higher sensation seeking scores on Zuckerman's SSS-V are more likely to seek riskier pursuits than low sensation seekers (Zuckerman & Kuhlman, 2000). Some examples of how the SSS-V has been utilised and significantly correlated with risky behaviours include gambling (Chiu, 1997; Eckel & Grossman, 2002; Hammelstein, 2004), sports (Franques et al., 2003), drug and alcohol use (Franques et al., 2003; Lejoyeux, Feuché, Loi, Solomon, & Adès, 1998; Satinder & Black, 1984), general behaviour (Gonzalez et al., 2005), vocational choices (Roberti, 2004), fashion innovations (Stanforth, 1995), financial transactions (Wong & Carducci, 1991) and investment in e-commerce firms (Hunter & Kemp, 2004).

Although it has been widely used, Zuckerman's SSS-V is not without its critics. The main criticism has been that it contains questions that are too specific (e.g. I often like to get high, drinking alcohol or smoking marijuana). Arnett (1994) suggested that the scale's questions have been too similar to certain studied constructs, hence more likely producing significant correlations between the construct and measure. For example, the outcome of the scale having specific questions addressing drug use behaviours and administering these items to drug users is that it is more likely that users will be labelled sensation seekers. This increased chance may inflate the apparent validity of Zuckerman's sensation seeking scales (Arnett, 1994; Roth, 2003).

Arnett (1994) developed an alternative tool to Zuckerman's SS scale in the form of the Arnett Inventory of Sensation Seeking (AISS). The AISS is like Zuckerman's scale in that it was constructed to measure sensation seeking. However, one difference between the two scales appears in how the researchers conceptualised sensation seeking. Arnett (1994) conceptualised sensation seeking as "the need for novelty and intensity of stimulation." (p 290). Hence Arnett intended the AISS to tap into the broader underlying need that might make up sensation seeking and placed greater emphasis on intensity of stimulation; whereas Zuckerman, as we have seen, now distances his measure from acknowledging sensation seeking as a need. Another difference between the two measures is that their questions are constructed differently. Zuckerman SSS-V scale includes items that explicitly ask respondents to choose between concrete behaviours, whereas the AISS favours descriptions of more general behaviours ("If it were possible to visit another planet or the moon for free, I would be the first to join up"). Items are rated on four point scales (A,B,C or D) from "describes me very well" (A) to "does not

describe me at all (D)”. (p 296). Arnett (1994) thought that concrete behaviours were better conceptualised as being contained within the broader and less specific sensory quality of need for sensation.

While such alternatives to Zuckerman SSS-V exist, Zuckerman is perhaps the best recognised researcher into sensation seeking, and his scale the most widely used in psychological research. The measure he developed, which has undergone a series of refinements over five versions, has been used to measure sensation seeking propensities in people and to predict whether they are likely to engage in risk seeking behaviours. Thus I chose to use this instrument to test for the presence of a domain general, risk seeking personality type and to determine if it correlates with investing in risky pyramid schemes.

Variables influencing risk

It may seem obvious to the reader that people will vary in their willingness to engage in risky behaviours. And, in fact, the general risk propensity of people to engage in risky behaviours ranges from risk seeking to risk avoidance (Harrå, 2000; MacCrimmon et al., 1986; Stone, Yates, & Caruthers, 2002; Zeelenberg, Beattie, van der Plicht, & de Vries, 1996). When exploring risk taking, a complicating factor to be aware of is that a single person may express high risk behaviours in some situations but in other situations express low risk behaviours (Grable et al., 2004). A person who is willing to parachute jump would not necessarily be willing to gamble at a casino. As Slovic (1987) suggests, this variance makes it difficult to reliably predict an investor’s behaviour from their involvement in other risky behaviours. However Zuckerman’s SSS-V subscales include specific targeted behaviours that have been linked to investment decisions (Hunter &

Kemp, 2004; Zuckerman, 1994). Therefore, to be thorough it seemed appropriate for me to include tests for correlations between subscale scores and investing in pyramid schemes.

Age

As age increases, risk seeking typically declines (Butkovic & Bratko, 2003; Otani, Leonard, Ashford, Bushroe, & al., 1992; Slovic, 2000). After administering Zuckerman's SSS-V to a sample of Australians, Ball Farnill and Wangeman (1984) analysed the resulting data to determine if differences in people's total sensation seeking scores bore significant relationships with their age and gender. As in previous research (Ball et al., 1984; Zuckerman & Neeb, 1980) males on average expressed greater propensities for sensation seeking than females. However it was also found that sensation seeking declined as age increased; which is a commonly found main effect when these variables are studied together.

Gender

Amongst researchers, there is a general consensus that, when making decisions to engage in risky behaviours, differences exist between men and women (Eckel & Grossman, 2002; Larkin & Pines, 2003; Zaleskiewicz, 2001). Males are typically more willing to engage in risky behaviours than females and concurrently perceive these risks as less serious. Examples of studies that have shown this gender difference include those into alcohol and drug use (Spigner, Hawkins, & Loren, 1993); environmental hazards (Flynn et al., 1994), and violence (Wilson & Daly, 1993).

Gender and Economic Risk

Zaleskiewicz (1999, cited in Zaleskiewicz, 2001) found that men and women also differ in making economic decisions. The financial options in this study included “gambling, horse races, investing in the stock market and one’s own education” (Zaleskiewicz, 2001, p. 106). People’s propensities for risk as measured by Zuckerman’s SSS-V were also found to be influenced by their sensation seeking motives. Importantly this study revealed men were more likely to choose to invest in riskier options than were women. Other studies in economic decision making have shown that men have more favourable perceptions of risks associated with gambling (Johnson & Powell, 1994; Levin, Snyder, & Chapman, 1988), more frequently engage in gambling (Wolfgang, 1988), have riskier asset portfolios (Olsen & Cox, 2001), and in general are more willing to take financial risks (Barsky, Juster, Kimball, & Shapiro, 1997; Powell & Ansic, 1997). Given these numerous findings that point to the significance of gender, it seems logical to test for possible differences between men and women in deciding to invest in pyramid schemes.

Savings

People often save money in banks so that they have a buffer against unexpected economic expenditures (Dahlbäck, 1991). However as Dahlbäck (1991) also demonstrated, when studying peoples’ savings behaviours, it is important to consider their aversion to taking risks. Data from this study showed that the amount of risk people are willing to take affects their saving choices. Propensity to take risks produced significant negative correlations with money invested in banks. It seems that when saving money in bank accounts, people choose this saving option because it is perceived as a low risk type of investment. However, risk taking was not found to relate to the amount

of readily available money for unexpected expenses; and had little associated variance with amounts of total net capital.

Stock market investments

Conversely, people's propensities to engage in risky behaviour correlates with investing in the stock market. McInish and Srivastava (1984) demonstrated that the nature of investment portfolios differed according to how risky people perceived stock options were, and this perception was more important as a predictor than other demographic variables (e.g. gender, age, income & education). Risk in this study was measured by the beta obtained from regressing stock expectations against specific stock performance. As the perceived risk of investing in stock increased, people's attraction to investing in them decreased. Hunter and Kemp (2004) found the same relationship when they researched the relationship between people's risk taking propensities and investment decisions in e-commerce shares. Wood and Zaichkowsky (2004) further showed that, as a group, risk intolerant traders purchase different varieties of stock and these stocks are primarily those they considered to be less risky.

Whereas Dahlbäck (1991) correlated propensities for risk with saving money and Wood and Zaichkowsky (2004) with stock market investments, my intention was to broaden this area of research by including the option of investing in a pyramid scheme. By simultaneously presenting a number of investment options, I hoped that the variety would present a more realistic platter of choices to the investor, than by simply focusing on one. My intention here was to determine if perceptions of risk and risk propensity were correlated with investing in pyramid schemes and to compare this with other investment choices.

White male effect

Although a gender difference exists between men and women's attitudes towards risk, this difference is itself variable (Johnson, 2002). For instance, Flynn et al. (1994) showed that, when perceptions of potential environmental health risk were surveyed, gender differences were more marked in white populations than non-white. These results revealed that the greatest amount of perceived risk was reported by white women, followed by non-whites and lastly by white men. There was no significant difference between males as a group and non-white females; however, white males did report the least amount of perceived risk of any group; a finding commonly referred to as the 'white male' effect (Palmer, 2003). Flynn et al. (1994) proposed that when predicting men and women's perceptions of potential risks, additional sociodemographic factors to gender differences should also be considered, especially status, power & alienation.

The white male effect appears to be a reasonable robust finding. Knight and Warland (2004) tested for significant differences amongst three different populations in their levels of concern they had for the effects of environmental poisons, and fat in foods. The three different American populations that were tested were African American, white Americans and women. Once again, support was found for the white male effect. The results showed that white males were the least concerned, followed by blacks and then women. However, criticism has been laid against using the term "white male effect" because it is too specific and inaccurately describes what is actually a general phenomenon. In fact, the "white male" effect is also found across different populations (Johnson, 2002; Palmer, 2003), and is not restricted to the low risk perceptions of health

(e.g. Eckel, 2002) or environmental hazards (Flynn et al., 1994; Knight & Warland, 2004). When (Palmer, 2003) surveyed the perceived risks of technological hazards, the results from this study showed the same effect in Taiwanese males. Hence the term “white male” does not adequately encompass the true nature of this effect and as Palmer (2003) suggested should be renamed.

Explaining gender differences

Evolution

Larkin and Pines (2003) outline how evolutionary principles explain why men and women differ in how they perceive risky behaviours, their attitudes toward risk and whether they are likely to engage in it. The basic premise of evolutionary theory is that successful gene replication hinges on people adopting adaptive behaviours that will benefit their reproductive success. Hence it is argued that behavioural differences between men and women have resulted from the different returns they have faced from alternative investment strategies and their subsequent reproductive success. It is this relationship, over the course of human and perhaps all animal history, that is responsible for many of the observed differences between the genders.

For females, successful gene replication (parenting) depends on adopting a low risk long-term gain approach, as measured by offspring survival. Because offspring survival is more dependent on the survival of the mother, avoiding personal risks is a better strategy for females to adopt. According to the evolutionary argument, it is this basic relationship between mother and offspring that has resulted in women being less likely to engage in risky behaviours. Conversely, because males have less parental investment in offspring, it

is better for them (in terms of gene replication) to reproduce as many times as possible with the most desirable female partners. Although males' reproductive status/desirability increases with their amount of resources, the catch is that they are in competition for resources with other males. Therefore successfully acquiring resources often depends on engaging in risky behaviours to gain advantages over competitors. The outcome of these benefits, as proposed by this theory, is that men are more willing to take risks.

As Larkin and Pines (2003) point out, before wholeheartedly accepting a biological explanation for the differences in risk taking between men and women, certain criteria must first be met. A significant problem with biological explanations of these gender differences is that the effect seems to vary with other variables which are independent of gender. If indeed men and women's attitudes towards risk are determined by biological mechanisms, patterns of risk taking should be similar across different cultures and socioeconomic groups. However as Finucane (2000) and Flynn (1994) suggested, gender is not always the best determinant of how risky people will perceive behaviours. Across cultures, other variables are often more effective at predicting peoples' perceptions of risk. Examples of these variables include a person's income and education, if the risky situation is private or public (Larkin & Pines, 2003), and the control they have over the possible outcomes (Eckel & Grossman, 2002; Krinsky & Golding, 1992).

Sociological

From a sociological perspective, differences in risk seeking behaviours between men and women are due to inequalities in their decision making power and control (Gustafson, 1998; Larkin & Pines, 2003). How risky something is perceived reduces in accordance to one's increased control of the outcome of the event (Larkin & Pines, 2003). Compared to

men, women have historically had less power and autonomous decision making (Larkin & Pines, 2003); hence from a sociological perspective “women may have internalized some of the consequences of powerlessness, perceived risks in others' negative evaluations of their behaviour, and sought protection through gendered behaviour consistent with stereotypes.” (Larkin & Pines, 2003, p. 206). It is these restrictions that have resulted in women adopting the expected behaviour of risk aversion as a means of protecting themselves from negative outcomes (Gustafson, 1998; Larkin & Pines, 2003). In terms of investing, men and women may have different societal expectations and pressures of what are acceptable behaviours. If men are expected to be better at handling risky options than women, then it is possible that investment options presented to women and the advice they receive may differ and be a significant factor in explaining the different gender choices (Larkin & Pines, 2003). Hence this bias in what is presented to women and men may unfairly enhance stereotypical expectations of men and women. At the simplest level, men and women may differ in their attitudes towards risk and may also have different societal expectations of what is acceptable behaviour.

CHAPTER 3

Sunk Costs and Intelligence

Sunk costs

The 'sunk cost effect' is a term used to describe another behaviour that demonstrates how people deviate from making rational decisions (Karlsson, Gärling, & Bonini, 2005). The sunk cost effect, which falls within the construct of escalation of commitment (see Earl & Kemp, 1999), is "the tendency to continue to invest money, time or effort following unsuccessful investments" (Karlsson, Ásgeir, Grankvist, & Gärling, 2002, p. 309). This effort may continue even when subsequent investments can not be recovered and therefore it is a maladaptive economic behaviour. Instead, a rational decision maker would choose the paths they expect to produce the best future returns, rather than continuing with current investments because of previous investment decisions (Arkes & Ayton, 1999; Arkes & Blumer, 1985).

Clearly prior investments should not affect current investment decisions. Instead the changes in how well investments are meeting expected returns should be paramount in determining continued investment (Arkes & Ayton, 1999). However, numerous researchers (e.g. Arkes & Blumer, 1985; Garland, 1990; Karlsson et al., 2002; Staw & Ross, 1989) have shown that prior investments are significant factors in determining future courses of action. For example, Arkes (1985) studied the effect of sunk costs on people's decisions to attend theatre performances. Depending on the price people paid for season theatre tickets (\$8, \$13 or \$15), which was randomly determined, participants were categorised into one of three groups. Over the following six month period, theatre attendance was recorded for all groups. The results showed that the group which had paid

fifteen dollars attended the greatest number of shows. This result indicated that patrons who had sunk the largest sums of money in the season tickets (\$15) were more motivated to use them (Arkes & Blumer, 1985). Therefore, because the only difference amongst the groups was in the ticket prices, the sunk cost effect was clearly demonstrated.

Simonson and Staw (1992) conducted a study that identified procedures that could be taken to avoid escalation of commitment. Participants were presented with a fictitious company that had introduced two new brands of beer to the market. Participants had to make funding decisions as to which brand should receive extra funding. Amounts of money invested (sunk costs) and returns on investment were varied. Simonson and Staw (1992) discovered escalation of commitment could be significantly reduced “by setting minimum targets for performance and having decision makers compare their performance with these target levels.” (p 424). Hence while continued investment in projects after substantial losses is irrational (Ross & Staw, 1993), it is not unavoidable.

The sunk cost effect is explained by the prospect theory and how people perceive gains and losses. According to this theory, a loss will have greater weight than the same sized gains (see Chapter 2). Hence, withdrawing from an investment option may mean perceiving the investment as a loss, which is undesirable for the investor. An alternative interpretation would be to perceive the loss as an expense towards achieving the end goal (Brockner, 1992; Garland, Sandefur, & Rogers, 1990; Karlsson et al., 2005); thus making the loss palatable to the investor and encouraging additional investment. It is this perception of loss that is suggested to be at the root of the sunk cost effect.

Karlsson (2005) summarises criticisms of the research into sunk costs and how these may limit its real world applicability. Karlsson acknowledges that it is difficult to argue that the sunk cost effect is irrational without explicitly stating “estimates of future or expected returns.” (p. 67). Researchers claim (Heath, 1995; Parks & Conlon, 1990; Tan & Yates, 1995) that such explicit statements have more ecological validity and may in fact de-escalate commitment. However, Karlsson has countered these assertions by demonstrating that continued commitment occurs even when outcomes are transparent. These effects were evident when alternative options offered the same outcomes, but did reduce as the outcomes offered by other options increased.

It seems impossible to ignore sunk costs when investigating investing in pyramid schemes. Once a person has made the initial investment in a pyramid scheme the sunk cost effect predicts that they will continue with the scheme even in the face of adversity. I also suggest that people will try to recruit investors even when past efforts of this kind have proven to be fruitless. I test this prediction in Studies 3 and 4 below by allowing participants the choice of doing: nothing to encourage new investors, actively encouraging other people to invest; or actively discouraging new investors. Additionally, to further test if the sunk cost effect is apparent when outcomes are transparent, participants will be explicitly told about the outcomes from investing in a pyramid scheme.

Intelligence

Intelligence has been conceptualised as being made up of a number of skills. Weschler conceptualised intelligence as “the aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with this environment” (Weschler

1958, cited in Sternberg, Grigorenko, & Bundy, 2001, p399). Traditional intelligence tests, for example, the Weschler Adult Intelligence Scale (WAIS) and the Stanford Binet, like many other tests, focus on scoring performance on cognitive tasks in a timed conditions (Kline, 1993). Academic success, job performance (Cascio, 1991), and feeling of overall well being (Sternberg et al., 2001), all positively correlate with intelligence scores.

Intelligence tests can report intelligence as a single unitary capacity, most commonly Spearman's g, or as a construct including relatively distinct domains. For example, Gardner (1983) lists separate but interrelated types of intelligence in the domains of language, music, logic, spatial, bodily-kinaesthetic, and interpersonal. Most intelligence tests measure both a general factor (g) and separate but correlated group factors (Sternberg, 2000; Sternberg et al., 2001). General factor g is perhaps the most widely used factor to represent intelligence (Sternberg et al., 2001). Although intelligence is a widely researched construct, a literature search revealed little about how it relates to investment, thus it was included when I conducted my research (Study 6).

Summary of Predictions

Throughout the introduction several predictions have been made as to what was researched and tested as part of this thesis. To assist the reader, some of these predictions are listed below.

Hypothesis 1. *Significant positive relationships would exist between the amounts of money allocated to investment options and people's perceptions of them.*

Hypothesis 2. *Significant differences would exist between people's perceptions of the investment options and whether or not they invested in the pyramid scheme.*

Hypothesis 3. *Significant differences would exist between the amounts allocated to the investment options and whether or not they invested in the pyramid scheme.*

Hypothesis 4. *People will be less confident in investing larger amounts of money.*

Hypothesis 5. *A significant difference would exist between the amount of money men and women allocated to the investment options.*

Hypothesis 6. *Perceived risk will be significant in predicting how people allocated money to investment options.*

Hypothesis 7. *Depending on the likelihood of financial loss, people in an existing pyramid scheme, will differ in who they choose to be pyramid scheme investors.*

Hypothesis 8. *Propensity for sensation seeking will relate to investment choices.*

Hypothesis 9. *A significantly greater proportion of men than women would invest money in riskier investment options.*

Hypothesis 10. *Pyramid scheme investors will have a higher propensity for sensation seeking than will non-pyramid investors.*

Hypothesis 11. *Intelligence will be negatively related to the amount of money allocated to a pyramid scheme.*

CHAPTER 4

Study 1: Using People's Perceptions of Investment Options as Explanations of Their Investing Behaviours.

Introduction

The first study aimed to determine the relationships between people's perceptions of different investment options and their investment decisions. The investment options included descriptions of three legitimate options (bank, stock market, & safe) and a pyramid scheme, which would be illegal in most western countries (Commerce Commission, 1997; 1999). Given previous research (see Kahneman & Tversky, 1988) it seemed likely that people's investment choices would vary with their perceptions of the options. The current experiment is the first I know of to include pyramid schemes in a range of investment choices.

Broadly, I explored three groups of variables within this study: Those associated with what the investment options offered; the money allocated by participants to hypothetical investments (allocation task); and responses to questionnaire items.

In the allocation task, participants were instructed to imagine themselves in each of four scenarios that outlined a different investment opportunity and to allocate money as they saw fit. These scenarios were constructed to reflect characteristics of investment opportunities offered by pyramid schemes as well as legitimate investment schemes. To remain manageable, the manipulated variables within each option (the bank, pyramid scheme, stock market & safe) were restricted to monetary returns within time periods, and how each option generated its revenue. The questionnaire contained scales that

measured the person's perceptions of each option and how much money they would allocate to it.

Method

Participants

Participants were 40 male ($M_{\text{age}} = 22.43$, $SD = 8.54$) and 52 female ($M_{\text{age}} = 21.70$, $SD = 6.17$) students from the University of Canterbury, New Zealand who volunteered for a study entitled "Exploring the psychology of people's economic behaviour within the context of different investment options". Once recruited and as an expression of gratitude for their participation, they were each offered one dollar instant scratch-and-win lottery tickets that presented chances to win up to \$10,000.

Procedure

Experimental sessions were run at convenient times for each participant. All sessions were run in the same laboratory with a maximum of 4 participants run at any one time. Each person was greeted and then seated in individual cubicles, which ensured they could complete the experiment in privacy; not see other participants' responses; and not be distracted by other participants or the experimenter.

Consent

A standardised information sheet detailing the study and explaining the participants' rights was presented to each participant. This clearly expressed that participation was anonymous, strictly voluntary and could be withdrawn at any time. Furthermore, it was clearly communicated that to ensure anonymity participants would not be identified with their data.

After being seated, participants were asked to read the instructions and begin the experiment. The first step consisted of an allocation task among the four investment options. The scenarios were written to ensure the wording was as balanced as possible. Care was taken to ensure that the different options varied only in terms of financial returns on offer and the associated steps required to receive them. This consistency was considered important to avoid unwanted framing effects that could have biased peoples responses (see Chapter 2). Description 1 represented the option of investing in a bank, Description 2 represented the pyramid scheme, Description 3 the stock market and Description 4 the option of placing money in a safe. Randomised orderings of the investment options were used to control for order effects. The allocation task began with brief instructions and descriptions of the options as follows:

This study is interested in how people invest money. To help us explore this behaviour, we would like you to complete a number of simple tasks. Your first task is to read the following descriptions of different investment options.

Description 1

You can invest your money in a bank that offers a 2% per annum return upon your money at the end of a 30-day period. For you to receive financial returns from this option, you have to leave your money in the bank and not 'touch' it for this agreed amount of time. In order for this option to deliver your financial returns, it will lend your money to people at a higher rate (8%) and give part of the profit to you. The bank will keep the other part of the profit as a payment for its investment services.

Description 2

You can invest your money in a proposal that offers to keep doubling your money in short terms of time. For you to receive the financial returns from this option, you have to get other people to invest in this option. The greater the number and the quicker you get people to invest, the less time it takes to double your money. As more and more people invest, the number of times you might double your money increases and potentially you could receive extremely large amounts of money. This option relies on the revenue of new investors to generate its funds.

Description 3

You can invest your money with a stockbroker who offers a 4% per annum return upon your money at the end of a 30-day period. For you to receive financial returns from this option, you allow the stockbroker to invest your money in the stock market. In order to receive financial returns, the stockbroker invests in the stocks he or she expects to increase in value. The stockbroker will keep the other part of any profit, as payment for his or her investment services.

Description 4

You can place your money in a safe where you live.

After they had read these four options, participants were instructed:

Now imagine you have \$1000 that you can invest in any of the above investment descriptions/options. Simply allocate as much of the \$1000 as you want to any number of the options. The amount of money and which option(s) you choose to invest in are entirely up to you, but the total must equal \$1000.

Once you have decided on the amount of money you wish to allocate, write this amount in dollars on the line next to the chosen description(s). If you make a mistake, simply cross it out and write in the new amount.

*Remember that you have a total of \$1000 to allocate to any number of the descriptions. Once you have finished this task, please proceed to the questionnaire on the following page. If you have any questions please ask the experimenter.

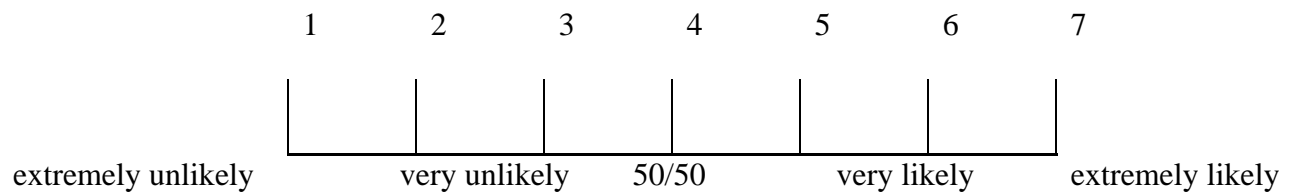
After the allocation task was completed, participants completed the questionnaire. The questionnaire began:

Simply read the following descriptions/options and answer the questions by indicating the number that best reflects your opinion. There are no right or wrong answers; we are only interested in what you think. If you have any questions, please ask the experimenter.

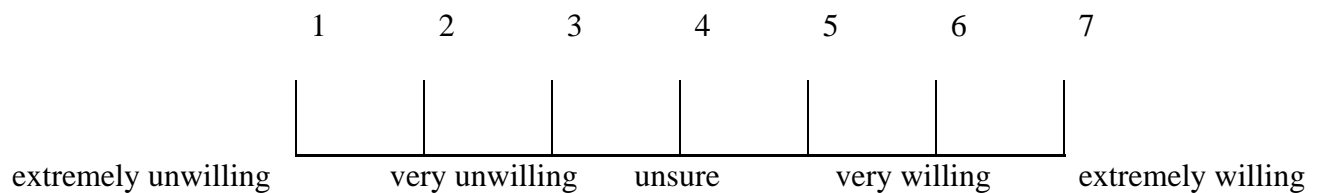
Subsequently the participants had to make judgments indicating how they perceived each of the four investment options from the preceding allocation task. The four options were each presented again, followed each time by their batch of questions. Exact questions and scales that followed each option are presented as Figure 1. Participants were asked to rate the options in terms of: How likely they would receive the financial returns on offer (Q.1), how willing they would be to invest in it (Q. 2 & Q.4), how confident they would be to recommend it someone else (Q. 3), how confident they would be to invest different amounts of money (Q. 5) and, in terms of delivering returns, how deceptive or truthful they considered the option was (Q. 6). Questions 1, 2, 3, 4, & 6 were rated on 1-7 anchored Likert scales that measured the degree each construct was considered to be present. For example, how likely they would receive the financial returns on offer was measured on scales ranging from *extremely unlikely* (1) to *extremely likely* (7) with a mid point of 50/50; willingness to invest was measured on scales ranging from *extremely unwilling* (1) to *extremely willing* (7) with a mid-point *unsure*. Question 4 differed from Question 2 in that it measured how willing participants were to invest different amounts of income over time periods: income for a day, a week and a year. Question 5 required participants to indicate on a scale ranging from *extremely unconfident* (1) to *extremely confident* (100), how confident they would be to invest different amounts of money. The dollar amounts to be rated were \$1, \$10, \$50, \$100, \$500, \$1,000, \$5,000, \$10,000, \$50,000, \$100,000, \$500,000 and \$1,000,000. Once all tasks were completed, participants were again thanked, debriefed and paid for their participation. Participants were also invited to take part in later studies.

Figure 1: Questions and scales used in Experiment 1.

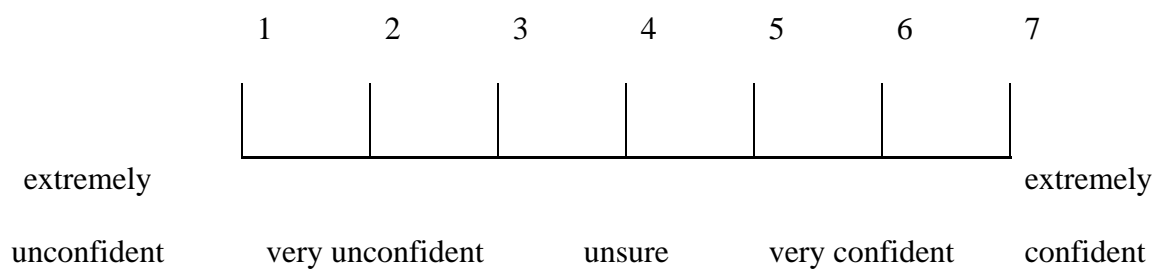
1. How likely do you think it is that you would receive the financial returns this option offers?



2. How willing would you be to invest in this option?

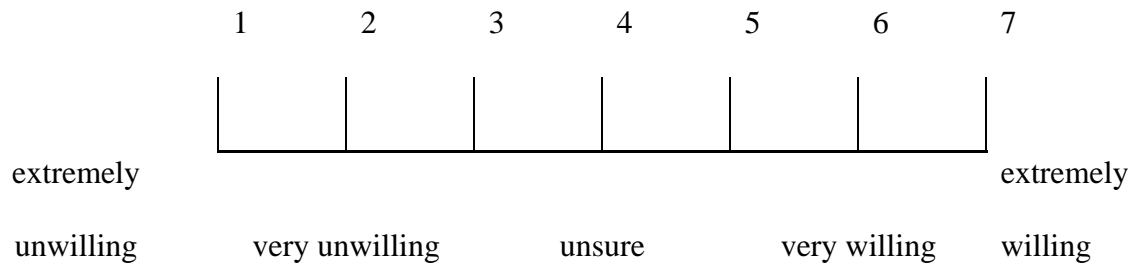


3. How confident would you be in recommending this option to someone else?

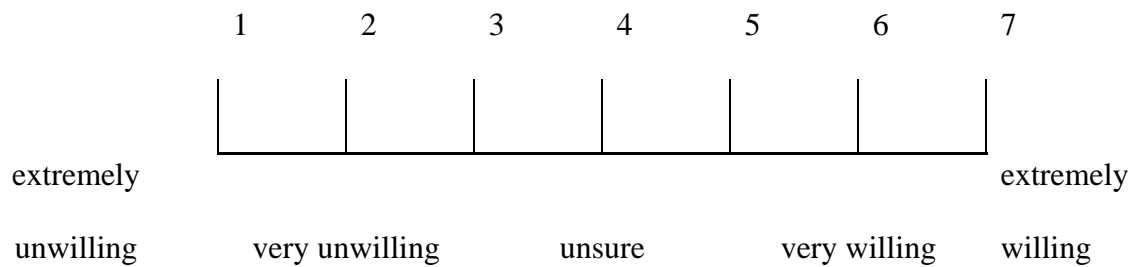


4. How willing would you be to invest the following general amounts of money in this option?

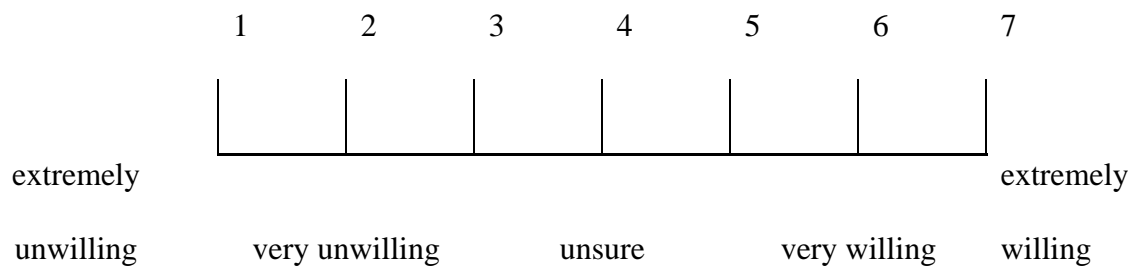
Your income for a day



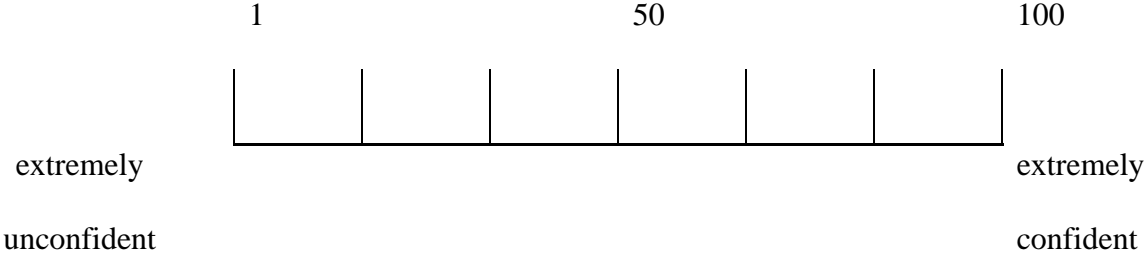
Your income for a week



Your income for a year

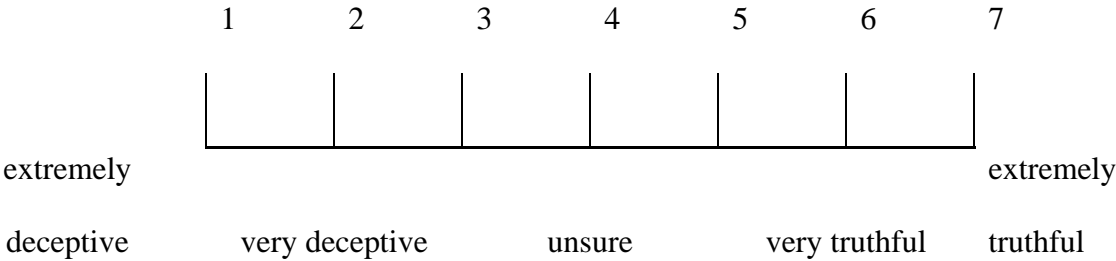


5. How confident would you be in investing the following amounts of money into this option? In the grey cells next to each dollar amount, write a number from 1-100, which best reflects how confident you feel about investing. Remember that for each dollar amount you can use any number from 1-100.



\$1:00		\$10:00		\$50:00	
\$100:00		\$500:00		\$1,000:00	
\$5,000:00		\$10,000:00		\$50,000:00	
\$100,000:00		\$500,000:00		\$1,000,000:00	

6. In terms of delivering its financial returns, how deceptive/truthful do you think the description of this option was?



Piloting

Two PhD students from the University of Canterbury read relevant material (Blaylock, 1998; Commerce Commission, 1997, 1999; Entombed Albania's Pyramids, 1997) and came to an agreement on the fundamental aspects of pyramid schemes and how to word the description of the scenarios above. To assure face validity, scenarios were presented to 10 participants in a pilot study and they were asked to comment on ease of comprehension and understanding of what was required of participants. Appropriate corrections were made.

Results

Descriptive statistics

Descriptive statistics were calculated on the amounts of money participants invested in the options (the bank, pyramid scheme, stock market & safe) from the \$1000 they were assigned. Ranging from greatest to least, the mean dollar amounts of money allocated to the options were the bank ($M = 444.02$, $SD = 306.78$), the stock market ($M = 250.54$, $SD = 235.98$), the pyramid scheme ($M = 165.21$, $SD = 242.78$) and the safe ($M = 140.23$, $SD = 202.22$). When a repeated measures ANOVA was performed on these amounts of money, a significant difference was evident, $F(3, 273) = 20.96$, $p < .001$. Post hoc testing using Tukey's Honestly Significant Difference Test revealed that the mean amount of money invested in the bank ($M = 444.02$, $SD = 306.78$) was significantly greater than all other options. The only other significant difference was that more money was allocated to stock market ($M = 250.54$, $SD = 235.98$) than the safe ($M = 140.23$, $SD = 202.23$).

Of the 92 participants (investors) who completed the investment task and questionnaire, 43 (46.73%) of them were Pyramid Investors, whereas 49 (53.26%) were Non Pyramid

Investors (NPI). The Pyramid Investors allocated at least some money to the pyramid scheme; the Non- Pyramid Investors allocated no money to the pyramid scheme.

Seventeen participants invested no money in the bank (18.48%), 26 (28.26%) invested no money in the stock market and 45 (48.91%) invested nothing in the safe. A total of six people invested all their \$1,000 in the bank, two chose the pyramid scheme, two invested all in the stock market and one put it all in the safe.

In order to reveal if Pyramid Investors and Non-Pyramid Investors differed in the amounts of money they allocated to the other three options (the bank, stock market & safe), a repeated measures analysis of variance was conducted. When a 2 (pyramid investor vs. non-pyramid investors) X 3 (investment options) *ANOVA* with repeated measures on the last factor was performed, the interaction effect was statistically significant, $F(2, 180) = 6.10, p < .01$. As reported in Table 1, and supported by Tukey post-hoc testing, non-pyramid investors allocated significantly more money to the bank ($M_{NPI} = 575.51, SD = 310.26$) than did pyramid investors ($M_{PI} = 294.17, SD = 225.25$). However, there were no significant differences between Pyramid Investors and Non-Pyramid Investors in how much money they allocated to the stock market or safe. In terms of within-group differences, the only significant difference was for the non-pyramid investors in that they allocated significantly more money to the bank ($M_{NPI} = 575.51, SD = 310.26$) than the stock market ($M_{NPI} = 285.71, SD = 280.07$) and the safe ($M_{NPI} = 138.76, SD = 235.90$).

Table 1:
Different dollar amounts of money allocated to investment options between types of investors.

	Pyramid Investors		Non-Pyramid Investors	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Bank	294.17 _{a*}	310.26	575.51 ^{c*} _{b*}	225.25
Stock market	210.47	167.10	285.71 ^{d*}	280.07
Safe	141.86	158.08	138.76 ^{e*}	235.90

Notes: Post-hoc testing used Tukey's Honestly Significant Difference Test: This test was performed to identify significant differences between investors (pyramid investor and non-pyramid investors) in the three options. Means across rows with different subscripts indicate significant difference; means with different superscripts in columns indicate significant difference. (*) Significant ($p < .01$).

Attitudes towards investment options

Correlations were calculated for a more detailed insight into how the participants perceived each of the four investment options (the bank, pyramid scheme, stock market & safe). Recall that each item was rated on a 1-7 Likert scale where 7 denoted more of the variable and participants' rated options in terms of: *How likely they would receive the financial returns on offer* (LTR); *how willing they were to invest in it* (WTI); *How confident they would be to recommend the option to someone else* (CTR); and *how truthful they thought the description of the option was* (TRT). From examination of Table 2, it can be seen that there were statistically significant positive relationships (mostly moderate to high) between the four measures for all investment options.

Table 2 also presents the relationships between the participants' ratings of the four investment options (the bank, pyramid scheme, stock market & safe). Statistically significant positive relationships were seen between how likely they would receive (LTR) the financial returns on offer from the bank with the stock market ($r = .32, p < .001$) and the safe ($r = .21, p < .05$); how confident they would be to recommend (CTR) the bank and stock market to someone else ($r = .21, p < .05$); and how truthful they thought the description (TRT) of the bank and stock market were ($r = .32, p < .001$). Of the remaining associations of the stock market and safe, only one negative correlation was seen-between how willing they were to invest in the stock market and the safe ($r = -.22, p < .05$). Negative relationships were seen in how willing they were to invest in the bank and how confident they would be to recommend (CTR) the pyramid scheme to someone else ($r = -.25, p < .01$); and how truthful they thought the description of the bank was with how likely they would receive the financial returns on offer from the pyramid scheme ($r = -.22, p < .05$). Overall, it seems that the bank and stock market were perceived as rather similar, but the pyramid scheme was different to these and the safe different again.

Table 2:

Intercorrelations Between Ratings of Each Investment Option

Questions	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Bank LTR	.37***	.48***	.59***	-0.19	-0.17	-0.20	-0.11	0.32**	0.28**	0.22*	0.26*	0.21*	-0.08	0.07	0.19	
2. Bank WTI		.69***	.37***	-12	-0.19	-0.25*	-0.13	0.03	0.09	0.090	-0.010	0.100	0.04	0.04	-0.01	
3. Bank CTR			.53***	-0.03	-0.08	-0.17	-0.06	0.21*	0.24*	0.21*	0.21*	0.130	-0.09	-0.01	0.01	
4. Bank TRT				-0.22*	-0.1	-0.11	-0.11	0.37***	0.27**	0.30**	0.32**	0.074	0.02	0.07	0.10	
5. Pyramid LTR					0.68***	0.63***	0.55***	0.03	-0.11	0.030	-0.080	0.080	0.05	-0.01	-0.06	
6. Pyramid WTI						0.86***	0.59***	-0.08	-0.13	0.090	-0.010	0.080	0.10	0.08	0.02	
7. Pyramid CTR							0.63***	-0.09	-.21*	0.020	-0.120	0.020	0.06	0.09	0.07	
8. Pyramid TRT								-0.09	-0.14	-0.010	-0.010	0.010	0.09	0.03	-0.06	
9. Stock LTR									0.72***	0.68***	0.70***	-0.110	-0.17	-0.15	0.08	
10. Stock WTI										0.74***	0.65***	-0.190	-0.22*'	-0.19	0.05	
11. Stock CTR											0.65***	-0.128	-0.18	-0.130	0.05	
12. Stock TRT												-0.120	-0.06	-0.10	0.10	
13. Safe LTR														0.28*	0.40***	0.38***
14. Safe WTI															0.69***	0.25***
15. Safe CTR																0.29**
16. Safe TRT																

Notes: LTR = Likelihood to receive financial returns on offer. WTI = Willingness to invest. CTR = Confidence to recommend option to someone else. TRT = Truthfulness of what description offered.. * $p < .05$. ** $p < .01$. *** $p < 0.001$. Bold text indicates the correlations within the four measures for each investment option.

Hypothesis 1 predicted that significant positive relationships would exist between the amounts of money allocated to investment options and people's perceptions of them. A correlation matrix was calculated to show the relationship between the dollar amounts of money participants allocated to each of the options and how they rated each in terms of: How likely they would receive the financial returns on offer; how willing they were to invest in it; how confident they would be to recommend the option to someone else; and how truthful they thought the description of the option was in what it offered. There were several significant positive relationships between the amounts of money participants invested in the bank and how it was perceived. Statistical significance was reached with how willing they were to invest in it ($r = .55, p < .001$); how confident they would be to recommend the option to someone else ($r = .29, p < .005$) and how truthful they thought the description of the option was ($r = .21, p < .05$). There was no significant relationship between the amount of money invested in the bank and how likely they would receive the financial returns on offer ($r = .18$).

There were several significant positive correlations between the amounts of money participants invested in the pyramid scheme and how they perceived it. Statistical significance was reached with how likely they would receive the financial returns on offer ($r = .51, p < .001$); how willing they were to invest in it ($r = .71, p < .001$); how confident they would be to recommend the option to someone else ($r = .72, p < .001$) and how truthful they thought the description of the option was ($r = .60, p < .001$).

Also, there were several significant positive correlations between the amounts of money participants invested in the stock market and how it was perceived.

Statistical significance was reached with how likely they would receive the financial returns on offer ($r = .42, p < .001$); how willing they were to invest in it ($r = .54, p < .001$); how confident they would be to recommend the option to someone else ($r = .45, p < .001$) and how truthful they thought the description of the option was ($r = .41, p < .001$).

Finally, there was one significant positive correlation between the amounts of money participants invested in the safe and how it was perceived. Statistical significance was reached with how willing they were to invest in it ($r = .37, p < .001$). How likely they would receive the financial returns on offer ($r = .12$); how confident they would be to recommend the option to someone else ($r = .20$) and how truthful they thought the description of the option was ($r = .11$) did not reach statistical significance.

An interesting finding to note concerns the size of the correlations associated with the pyramid scheme. Consistently large positive correlations existed between the amount of money invested in it and favorable perceptions. On the other hand, the significant positive findings for the bank, stock market and safe were moderately correlated, except for the large positive relationship between willingness to invest and how much money was allocated to the bank. On the surface, investing in pyramid schemes can be distinguished by larger correlations between perceptions and the amounts of money invested.

Further Analysis

The ratings on the four measures (LTR, WTI, CTR, TRT) correlated with each other (see Table 2). Means, standard deviations and Cronbach Alphas were calculated for the items in each scenario. Table 3 shows items were sufficiently similar to allow for further analysis (Aron & Aron, 1994). When a 2 (gender) X 4 (options) X 4 (ratings) ANOVA with repeated measure on the last two factors was performed, the effect of participant sex was non-significant, $F(1, 90) = 1.46, ns$. However the interaction effect between options and ratings was statistically significant $F(9, 810) = 14.21, p < 0.01$. The main effect of the options was also statistically significant, $F(3, 270) = 36.94, p < 0.01$. Post hoc analysis (Tukey Honestly Significance Test) indicated that the participants' combined average ratings of the pyramid scheme ($M = 2.89, SD = 1.56$) were significantly lower than those of the bank ($M = 4.71, SD 1.34$), the stock market ($M = 4.25, SD = 1.17$) and the safe ($M = 4.25, SD = 1.35$). As presented in Figure 2, the average ratings of the pyramid scheme were lower than those ratings of the remaining three investment options (the bank, stock market & safe) and indicating it was a generally less desirable investment option.

Table 3:
Average item ratings and Cronbach Alpha for each option.

<i>Item</i>	Items				Average <i>M (SD)</i>	<i>Alpha</i>
	LTR <i>M (SD)</i>	WTI <i>M (SD)</i>	CTR <i>M (SD)</i>	TRT <i>M (SD)</i>		
Bank	5.16 (1.35)	4.60 (1.30)	4.29 (1.50)	4.74 (1.47)	4.71 (1.34)	.80
Pyramid scheme	3.28 (1.18)	2.82 (1.56)	2.73 (1.68)	2.74 (1.42)	2.89 (1.56)	.88
Stock market	4.52 (1.10)	4.21 (1.35)	3.95 (1.27)	3.36 (1.29)	4.25 (1.17)	.89
Safe	3.46 (2.60)	4.07 (1.85)	3.99 (1.85)	5.50 (1.73)	4.25 (1.35)	.70

Notes: LTR = Likelihood to receive financial returns on offer. WTI = Willingness to invest. CTR = Confidence to recommend option to someone else. TRT = Truthfulness of what description offered. Items were rated on a 1-7 Likert scale where 7 denoted more of the construct.

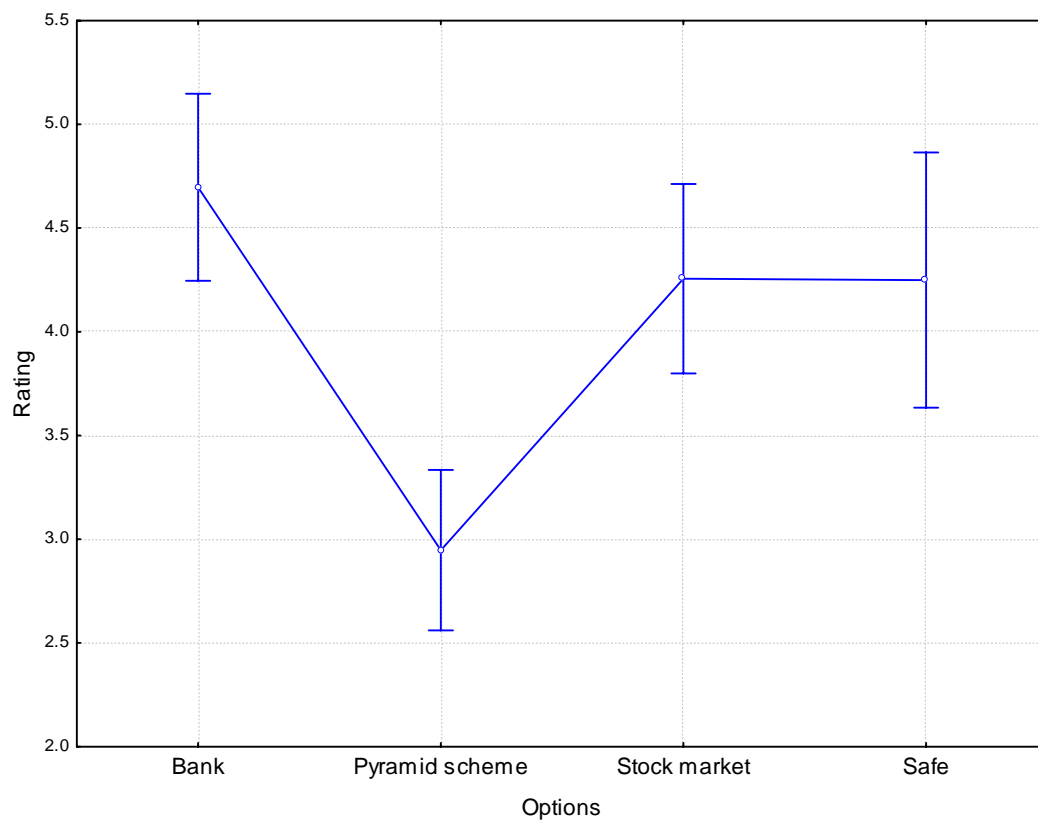


Figure 2: Average ratings for each investment option as rated on scales ranging from 1 to 7, where 7 indicates more of the construct.

Given that a main effect existed between how pyramid investors and non-pyramid investors allocated money to the bank, stock market and safe it was considered appropriate to explore if they differed in their ratings of the four measures (LTR, WTI, CTR, TRT). A series of 2 (pyramid investor vs. non-pyramid investors) X 4 (ratings) ANOVAs with repeated measures on the last factor was performed for each option.

Bank

When the bank was analysed no statistically significant interaction effect was evident, $F(3, 270) = 0.35, ns$. However a main effect of investor type was statistically significant $F(1, 90) = 4.38, p < .05$. Tukey post-hoc testing revealed that non-pyramid investors perceived the bank as a more favorable investment option ($M_{NPI} = 4.93, SD = 1.16$) than did the pyramid investors ($M_{PI} = 4.45, SD = 1.17$). The individual means and standard deviations for how pyramid investors and non-pyramid investors rated the bank (see Table 4) on all four items were not significantly different to each other.

Table 4:
Average ratings of the bank between types of investors

<i>Question</i>	Pyramid Investor		Non-Pyramid Investor	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1. LTR	4.95	1.52	5.34	1.14
2. WTI	4.30	1.24	4.95	1.27
3. CTR	4.06	1.45	4.48	1.45
6. TRT	4.51	1.59	4.94	1.34

Notes: LTR = Likelihood to receive financial returns on offer; WTI = Willingness to invest; CTR = Confidence to recommend option to someone else; TRD = Truthfulness of what description offered. Items were rated on a 1-7 Likert scale where 7 denoted more of the construct.

Pyramid scheme

When a 2 (pyramid investors vs. non-pyramid investors) X 4 (ratings) repeated measures ANOVA was calculated for the pyramid scheme, the interaction effect was statically significant, $F(3, 270) = 8.73, p < .001$. The main effect of investor type was statistically significant. Pyramid investors perceived the pyramid scheme ($M_{PI} = 3.80, SD = 1.35$) as a more favorable investment option than did the non-pyramid investors ($M_{NPI} = 2.08, SD = 0.94$), $F(1, 90) = 78.26, p < .001$. Post hoc analysis (Tukey Honestly Significance Test) indicated that pyramid investors' mean ratings of the pyramid scheme (see Table 5) were significantly more positive than the non-pyramid investors ratings for: How likely they would receive the financial returns on offer ($M_{PI} = 3.88, SD = 1.00; M_{NPI} = 2.76, SD = 1.07$); how willing they were to invest in it ($M_{PI} = 3.95, SD = 1.43; M_{NPI} = 1.82, SD = 0.81$); how confident they would be to recommend the option to someone else ($M_{PI} = 3.88, SD = 1.60; M_{NPI} = 1.71, SD = 0.96$); and how truthful they thought the description of the option was

($M_{PI} = 3.51, SD = 1.48; M_{NPI} = 2.06, SD = 0.94$). As one would expect, the results consistently show that for all four measures the pyramid scheme investors perceive it as a more favorable investment option than did the non-pyramid investors.

Table 5:
Average ratings of the pyramid scheme between types of investors

<i>Question</i>	Investor		Non-Investor	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1. LTR	3.88	1.00	2.75 _{a*}	1.07
2. WTI	3.95	1.43	1.81 _{a*}	0.80
3. CTR	3.88	1.60	1.71 _{a*}	0.93
6. TRT	3.51	1.47	2.06 _{a*}	0.94

Notes: Post-hoc testing used Tukey's Honestly Significant Difference Test: This test was performed to identify significant differences between investors (pyramid investor and non-pyramid investors) in the pyramid scheme. LTR = Likelihood to receive financial returns on offer; WTI = Willingness to invest; CTR = Confidence to recommend option to someone else; TRD = Truthfulness of what description offered. Items were rated on a 1-7 Likert scale where 7 denoted more of the construct. Note Between group difference indicated by (a); * $p < .01$.

Stock market

When a 2 (pyramid investors vs. non-pyramid investors) X 4 (ratings) repeated measures ANOVA was calculated for the stock market it did not reveal a statistically significant interaction effect $F(3, 270) = 0.70, ns$. The effect of investor type was not statistically significant and the pyramid investors ($M_{PI} = 4.22, SD = 1.30$) and non-pyramid investors ($M_{NPI} = 4.29, SD = 1.22$), perceived the stock market more or less equally favorably $F(1, 90) = 0.09, ns$. The individual means and standard

deviations for how pyramid investors and non-pyramid investors rated the stock market (see Table 6) on the four items were not significantly different to each other.

Table 6
Average ratings of the stock market between types of investors

<i>Question</i>	Pyramid Investor		Non-Pyramid Investor	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1. LTR	4.48	1.09	4.55	1.10
2. WTI	4.12	1.43	4.29	1.27
3. CTR	4.00	1.31	3.90	1.25
6. TRT	4.28	1.33	4.43	1.26

Notes: LTR = Likelihood to receive financial returns on offer; WTI = Willingness to invest; CTR = Confidence to recommend option to someone else; TRD = Truthfulness of what description offered. Items were rated on a 1-7 Likert scale where 7 denoted more of the construct.

When a 2 (pyramid investors vs. non-pyramid investors) X 4 (ratings) repeated measure *ANOVA* was calculated for the safe, again it did not reveal a statistically significant interaction effect, $F(3, 270) = 0.25, ns$. The main effect of investor type was not statistically significant in that the pyramid investors ($M_{PI} = 4.26, SD = 1.22$) and non-pyramid investors ($M_{NPI} = 4.20, SD = 1.29$) did not perceive the safe as being a more or less favorable investment option $F(1, 90) = 0.11, ns$. The individual means and standard deviations for how pyramid investors and non-pyramid investors rated the stock market (see Table 7) on the four items were not significantly different to each other.

Table 7
Average ratings of the safe between types of investors

<i>Question</i>	Pyramid Investor		Non-Pyramid Investor	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1. LTR	4.45	1.10	4.48	1.09
2. WTI	4.28	1.27	4.11	1.43
3. CTR	3.89	1.25	4.00	1.31
6. TRT	4.43	1.26	4.28	1.33

Notes: LTR = Likelihood to receive financial returns on offer; WTI = Willingness to invest; CTR = Confidence to recommend option to someone else; TRD = Truthfulness of what description offered. Items were rated on a 1-7 Likert scale where 7 denoted more of the construct.

Income analysis

The willingness of people to invest different amounts of income (a day's, week's & year's) into the bank, pyramid scheme, stock market and safe was explored by way of a 3 (income) X 4 (options) repeated measures ANOVA. A statistically significant interaction effect was present, $F(6, 546) = 3.64, p < .01$. When tested, a main effect for options was statistically significant $F(3, 273) = 22.49, p < .001$. The effect of income periods was also statistically significant $F(2, 180) = 24.02, p < .001$. Post hoc analysis (Tukey Honestly test) revealed that the participants willingness to invest income in the pyramid scheme ($M = 2.99, SD = 1.80$) was significantly less than that for the bank ($M = 4.22, SD = 1.60$), the stock market ($M = 4.17, SD = 1.52$) and the safe ($M = 4.61, SD = 1.91$). As depicted in Figure 3, participants were less willing to invest income into the pyramid scheme than any of the other three investment options.

I had predicted that people would be less willing to invest larger periods of income. Post hoc analysis (Tukey Honestly test) showed significant differences to lie between people's willingness to invest income for a year ($M = 3.21$, $SD = 1.28$) and a week ($M = 4.22$, $SD = 1.09$), which were both significantly greater than that for a day ($M = 4.84$, $SD = 1.26$). As expected, and evident in Figure 3, even when not specified in precise dollar amounts, people were less willing to invest increasingly greater amounts of money.

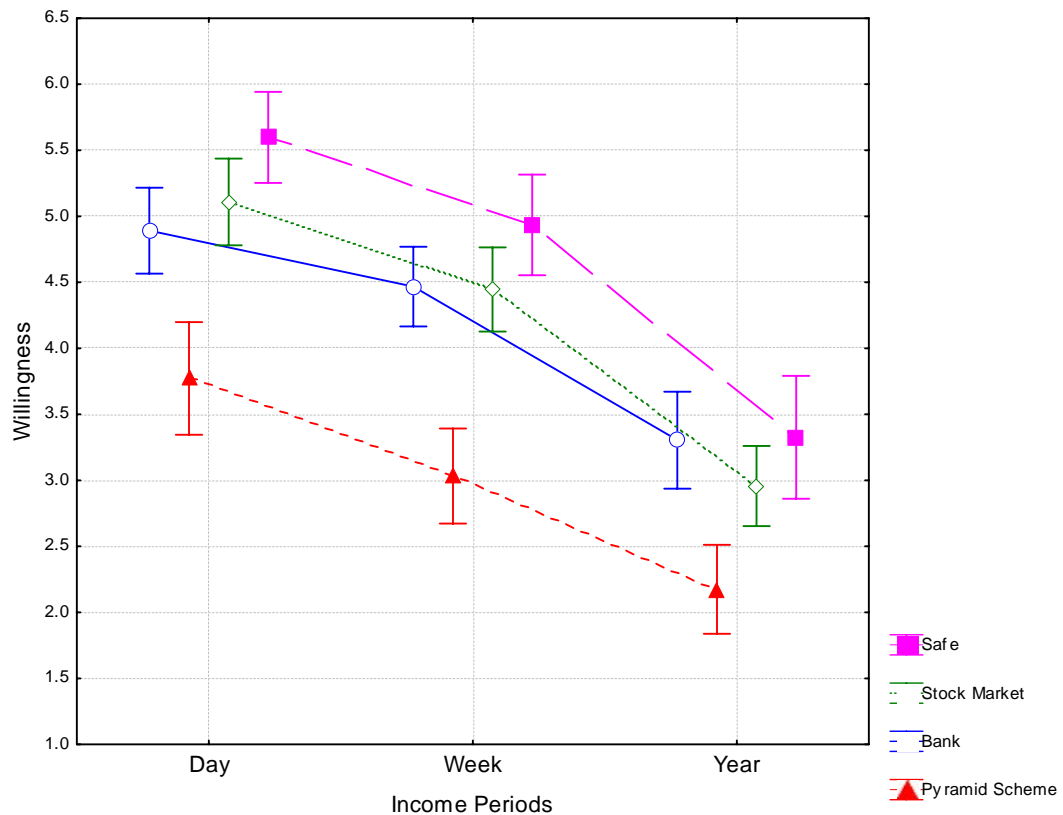


Figure 3: Willingness to invest different amounts of income in different investment options.

Confidence

Participants were required to indicate how confident they were in investing different dollar amounts of money (\$1, \$10, \$50, \$100, \$500, \$1,000, \$5,000, \$10,000, \$50,000, \$100,000, \$500,000 & \$1,000,000.) in each of the four options. Confidence was measured on a scale ranging from 1 (extremely unconfident) to 100 (extremely confident) and average scores calculated for pyramid investors and non-pyramid investors. A 2 (pyramid investors vs. non-pyramid investors) X 4 (options) repeated measures *ANOVA* demonstrated a significant interaction effect $F(3, 267) = 12.79, p < 0.001$. A main effect was also found in that pyramid investors were overall more confident ($M_{PI} = 51.81, SD = 12.10$) than non-pyramid investors ($M_{NPI} = 44.80, SD = 11.99$), $F(3, 267) = 12.79, p < .001$. There was no statistically significant difference between men and women in confidence in investing the different amounts of money in the four options $F(33, 2937) = 1.36, ns$. As shown in Figure 4 and confirmed by Tukey post-hoc tests, significant differences were only evident for pyramid investors ($M_{PI} = 48.66, SD = 12.91$) and non-pyramid investors ($M_{NPI} = 20.69, SD = 9.75$) in regards to the pyramid scheme. There were no differences in how the groups discerned the bank, stock market, or safe. The only difference identified was that non-pyramid investors expressed less confidence in investing different amounts of money in the pyramid scheme while a similar lack of confidence was not expressed towards any of the other options by the pyramid investors. Participants who opted to invest in the pyramid option did not perceive any of the options as being significantly different to each other.

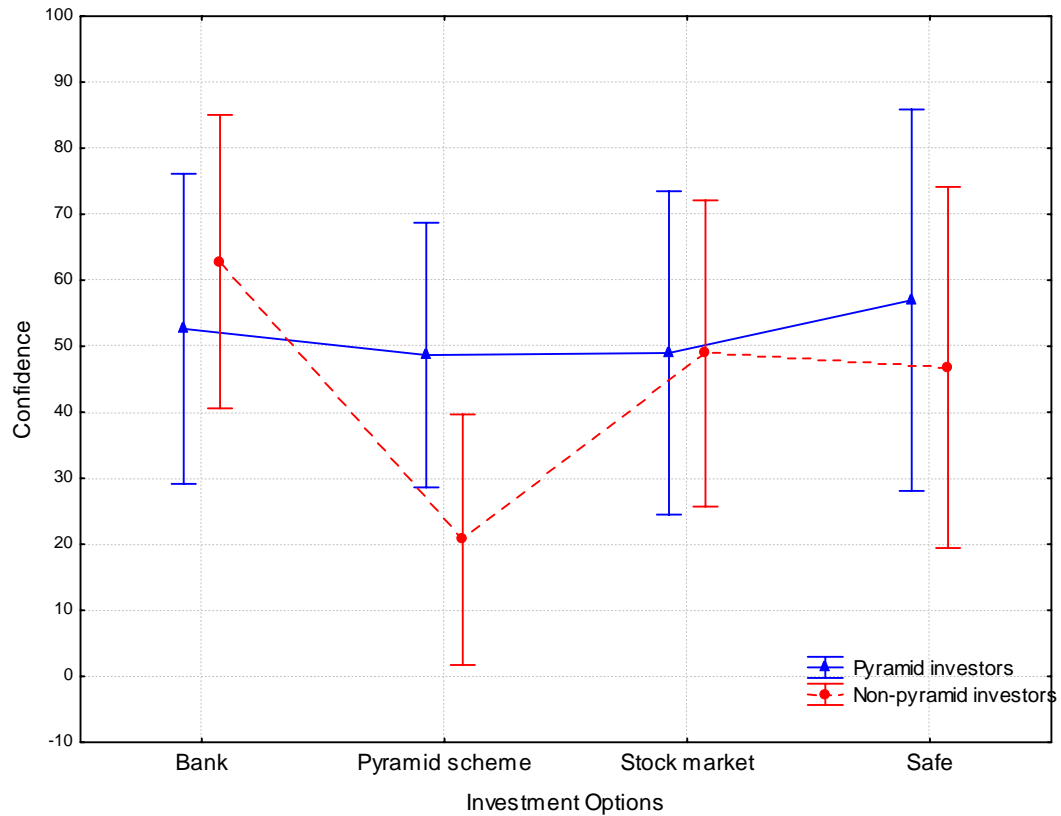


Figure 4. Confidence in investing money in different options.

Hypothesis 4 stated that people would be less confident to invest larger amounts of money, even when the chances of receiving returns were unaltered. The dollar amounts (\$1, \$10, \$50, \$100, \$500, \$1,000, \$5,000, \$10,000, \$50,000, \$100,000, \$500,000 & \$1,000,000) were logged and regressed against the mean confidence ratings of investing each of them in the bank, pyramid scheme, stock market and safe. As Figures 5-8 clearly depict, these reductions in confidence greatly reduced as amounts of money increased and was shown (see Table 8) to be significant for all four options.

Table 8
Summary of Regression Analysis for Variables Predicting Investor Confidence in Investing Money

<i>Option</i>	<i>B</i>	<i>SE B</i>	<i>R</i> ²	<i>B</i>	<i>t</i>
Bank	-0.13	.001	.96	-.98	-16.84***
Pyramid scheme	-.07	.001	.96	-.96	-11.24***
Stock market	-.01	.001	.97	-.97	-14.23***
Safe	.08	.001	.94	-.97	-13.59***

Note: *** $p < .001$.

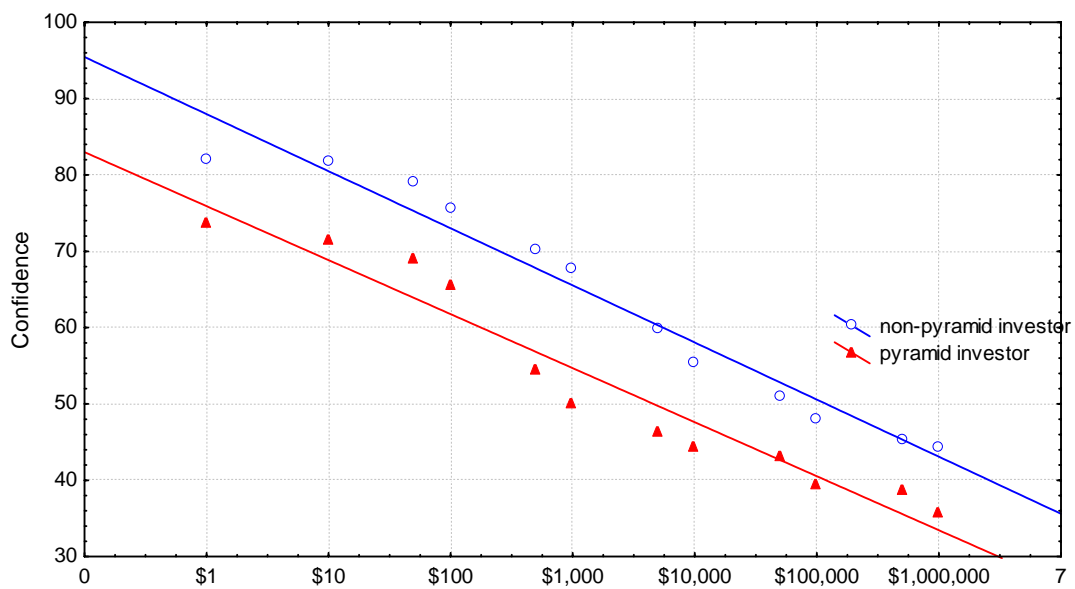


Figure 5: Average confidence in investing in the bank as a function of logarithmically scaled amounts of money to invest for pyramid and non-pyramid investors separately. Best fitting regression lines are shown.

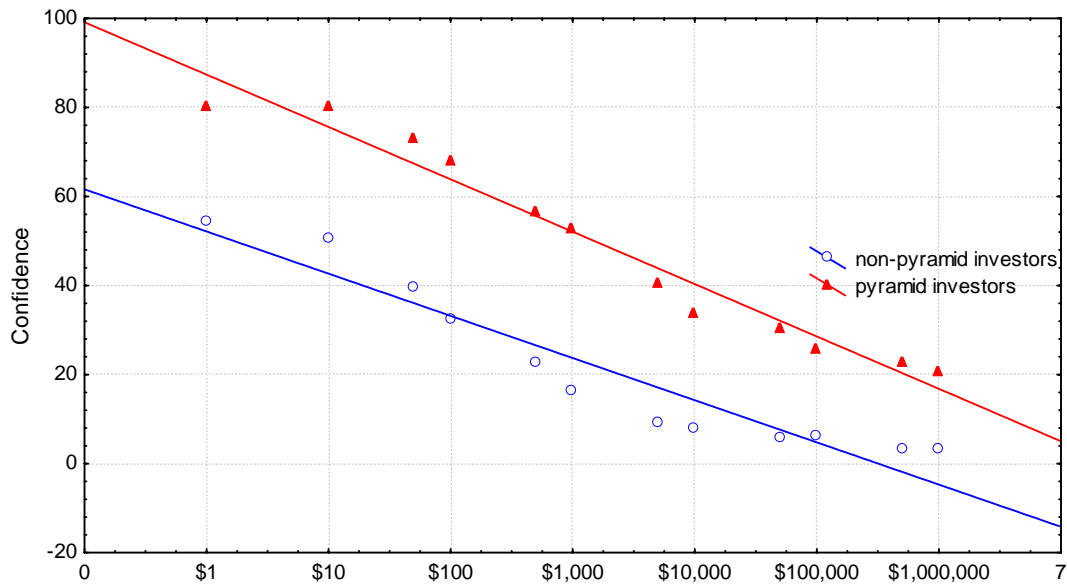


Figure 6: Average confidence in investing in the pyramid scheme as a function of logarithmically scaled amounts of money to invest for pyramid and non-pyramid investors separately. Best fitting regression lines are shown.

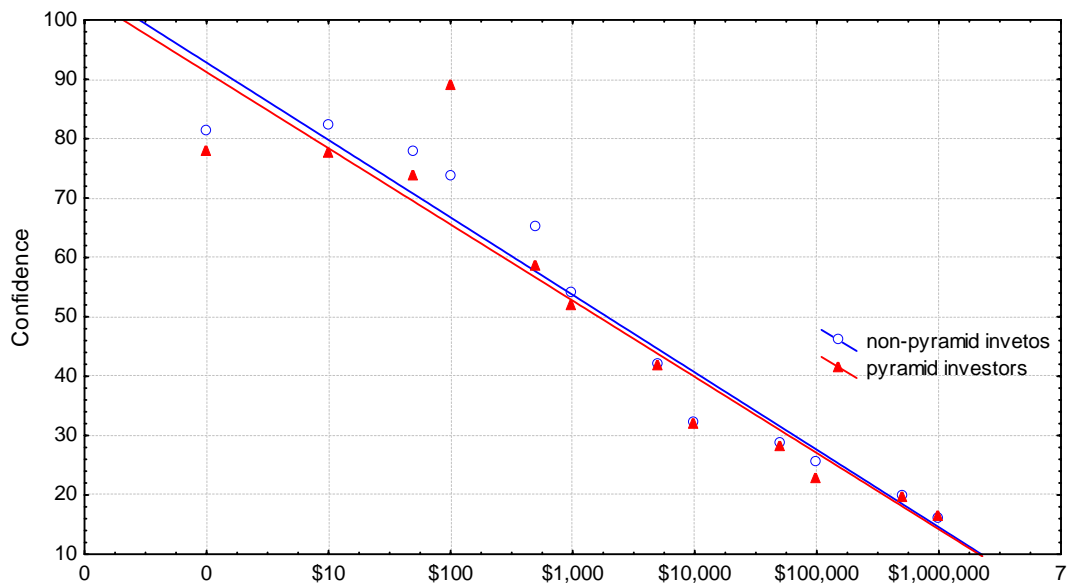


Figure 7: Average confidence in investing in the stock market as a function of logarithmically scaled amounts of money to invest for pyramid and non-pyramid investors separately. Best fitting regression lines are shown.

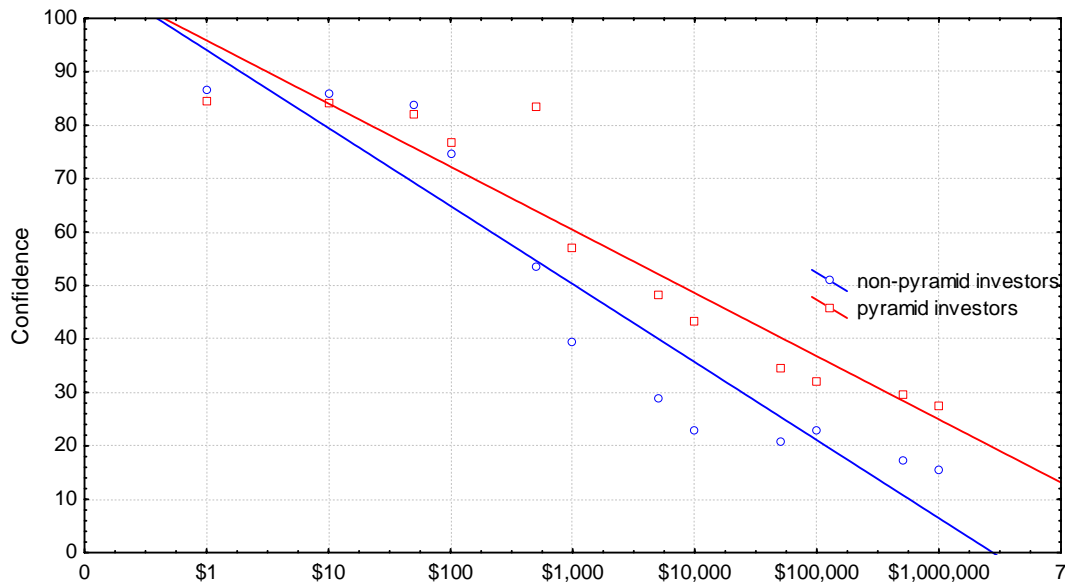


Figure 8: Average confidence in investing in the safe as a function of logarithmically scaled amounts of money to invest for pyramid and non-pyramid investors separately. Best fitting regression lines are shown.

Summary

Almost half of all the participants, who were all university students, were willing invest money into the pyramid scheme. Between pyramid scheme and non-pyramid scheme investors there were no differences in the amount of money they invested in the stock market or safe. People's perceptions generally correlated with their investment choices. Generally people rated the pyramid scheme less highly. People who invested in pyramid schemes were more confident when investing money in it and, there were large correlations between positive perceptions of the scheme and the amount of money invested in it. People were less confident and willing to invest larger sums of money.

Study 2

An additional study seemed appropriate to explore the relationship between risk and investment decisions. The previous Study 1 showed that significant positive relationships exist between a person's attitudes towards an investment option with how much money they would invest in it. Study 2 was undertaken to determine if people's risk assessment of the potential investment options was also related to how they chose to allocate money to them.

Method

Twenty males and 46 female students from the University of Canterbury were recruited and paid five dollars to participate in the study.

Materials

The allocation task was similar to that used in Study 1. Participants imagined themselves in each of four scenarios (bank, pyramid scheme, stock market & bank) and allocated money as they saw fit. In addition subjects rated each investment in terms of how risky they were perceived to be. Risk was assessed by way of a 10 point Likert scale that ranged from 1 (not at all risky) to 10 (extremely risky) with a mid point of 50/50. Participants were asked to "Please rate each option in terms of: How risky you consider it is to invest money in it".

Procedure

The same experimental room was used as in Study 1 and once seated subjects completed the money allocation tasks and rated each in terms of how risky the

option was considered. Stimuli orderings were randomised; payment and expressions of gratitude were similar to those in Study 1.

Results

General descriptive statistics

Descriptive statistics were calculated for the amounts of money invested in each option (the bank, pyramid scheme, stock market & safe). Ranging from greatest to least, the mean amounts of money allocated to the options were the bank ($M = 462.88$, $SD = 281.66$), the stock market ($M = 265.15$, $SD = 228.87$), the pyramid scheme ($M = 171.97$, $SD = 281.65$) and the safe ($M = 77.25$, $SD = 145.23$). When a repeated measures *ANOVA* was performed on these amounts of money, a statistically significant difference was evident, $F(3, 195) = 26.22$, $p < .001$. Post hoc analysis (Tukey Honestly Significant Difference Test) revealed that the mean dollar amount of money invested in the bank ($M = 435.34$, $SD = 301.02$) was significantly greater than that invested in the pyramid scheme ($M = 171.97$, $SD = 281.65$), the stock market ($M = 265.15$, $SD = 228.87$), or the safe ($M = 77.25$, $SD = 145.23$). The only other significant effect was that more money was allocated to stock market ($M = 265.15$, $SD = 228.87$) than the safe ($M = 77.25$, $SD = 145.23$). The pattern of results was thus the same as that in Study 1.

Simple descriptive statistics revealed that of the 66 participants (investors), 34 (51.51%) of them chose to be pyramid investors (PI), while 32 (48.49%) to be non-pyramid investors (NPI) and allocated no money at all to the pyramid scheme. In regards to investing all the \$1000 into only one option, three allocated it to the

bank, two to the pyramid scheme, one to the stock market; no one chose to leave it all in the safe.

A repeated measures *ANOVA* was performed to test the perceived riskiness of the bank, pyramid scheme, stock market and safe. Participants ratings on ten point Likert scales were analysed for each option and were found to vary significantly, $F(3, 192) = 114.56, p < 0.001$. No gender differences were found between how males ($M = 4.80, SD = 1.90$) and females ($M = 4.77, SD = 1.95$), rated the overall risk of investing in the options, $F(1,63) = 0.01, ns$. Post hoc analysis (Tukey Honestly Significant Difference Test) revealed that the perceived risk associated with investing in the bank ($M = 2.69, SD = 1.88$) and the safe ($M = 2.35, SD = 1.84$) were significantly lower than that for the pyramid scheme ($M = 7.20, SD = 2.99$) and the stock market ($M = 6.87, SD = 1.81$).

When correlation matrices were calculated between perceived risk and the amounts of money invested in each option, significant relationships were seen. Significant negative relationships existed between the amount of money participants allocated and how much risk was associated with investing in the bank ($r = -.25, p < .05$), the pyramid scheme ($r = -.36, p < .01$) and the stock market ($r = -.34, p < .01$). Results also suggested that the people who considered the pyramid scheme to be riskier were more likely to invest in the stock market ($r = .49, p < .001$), whereas those who considered the bank as riskier opted for the safe ($r = .38, .01$). Clearly when people invested money in the options the associated risk of the respective option was a significant consideration. The greater the perceived risk associated with investing in these options the less money was allocated to them.

Summary

Study 2 demonstrated people's perceptions of the riskiness of investment options correlated with the amount of money they invested, as had been predicted (Hypothesis 6). Other results virtually replicated those found in Study 1. For example, there was almost a 50/50 split between who invested in the pyramid scheme and who did not invest in the pyramid scheme.

CHAPTER 5

Study 3: Exploring Behaviours and Types of Decisions People Make When Involved in Pyramid Schemes.

Introduction

Study 1 revealed links between peoples' perceptions of investment options and how they allocated money to them. In brief, the amount of money invested in the pyramid scheme received consistently large positive correlations with optimistic perceptions of it in terms of: their likelihood to receive funds, their willingness to invest in it, their confidence in recommending it to someone else, and the perceived level of truthfulness in its description of what the returns would be. The amount of money invested in the legitimate investment options (the bank, stock market & safe) moderately correlated with perceptions of them. One high correlation existed between the amount invested in the bank and willingness to invest in it.

The present study extended the investigation into pyramid schemes by analyzing how people might behave when they have already become involved in pyramid schemes. Participants (agents) were placed in the role of investors looking for new people (targets) to invest in the schemes. The study consisted of three parts: a diadic word choice experiment; assigning explanations to targets that could affect investment decisions; and rating and ranking how close they perceived targets to be to themselves.

Pyramid schemes are based on impossible promises, and when this is realized by agents, the recruitment of others must be based on deceit (see Chapter 1). I attempted to construct an experimental task that would investigate this behaviour.

Participants read short scenarios and completed a series of tasks. The manipulated variables included: the relationship between targets and participants, and the participants' and targets' expected chances of receiving investment returns from the pyramid schemes. Measures included how closely participants rated and ranked targets, and types of explanations assigned to targets. Targets were presented to participants within a framework of their relationship with the participant and ranged from being not at all close to extremely close. This subjective rating allowed for more accurate measurements of the closeness of the targets than the experimenter could have managed (DePaulo & Kashy, 1998). Subjective rating was used because objective relationships of the same degree may actually be more or less close. For example, one man may be very close to his sister, while another man only has a distant relationship with his sister. Agents were able to give targets explanations that varied in their likelihood of influencing them to become pyramid investors. Eventual financial returns for targets and agents were limited to the parameters of pyramid schemes, which most frequently result in financial loss (Commerce Commission, 1997).

The published statistics describing people affected by pyramid schemes show their relationship with the target investors to fall within three main categories: family members, friends and work colleagues (Commerce Commission, 1997). These associations contrast with the typical professional relationships maintained between legitimate investment houses, and stock markets and their investors (although there are a number of family firms).

As mentioned above, the principle of altruistic behaviour towards others shows that people are more likely to act altruistically to the people most closely related to them, or to whom they generally feel close to (Ridley, 1996; Sigmund, 1993). However, the generalisability of this principle to people involved in pyramid schemes and their subsequent behavior is unknown. As people involved in these schemes are typically friends, family members or work colleagues (Commerce Commission, 1997), basic principles of evolutionary psychology were expected to be predictive of the participant's economic behaviour. More precisely, it was expected that, in the short term, when the perceived chance of receiving financial returns is greater, people would be more likely to approach those close to them and deceive them less. As the chance of financial loss increases, the incidence of deception would increase and targets that were considered closer would be approached less often than more distant ones.

Method

Participants

Participants were 22 male ($M_{\text{age}} = 20$, $SD = 1.36$) and 22 female ($M_{\text{age}} = 24$, $SD = 8.39$) students from the University of Canterbury, New Zealand who volunteered for a study entitled "Exploring peoples investment decisions and behaviours within a framework of psychology". Participants were recruited by advertisement that asked for people willing to take part in an experiment exploring people's investment choices and behaviours. They were informed that they would be given five dollar vouchers for participation and that the experiment would take approximately forty minutes to complete.

Materials

Word stimuli generation

Words used to represent target investors were generated by 10 male & 10 female introductory psychology students from the University of Canterbury, New Zealand. They were asked to write down as many individual words as they could that represented people they considered ranged from *not at all close* to *extremely close* to themselves. The example of “mother” was given as a possible word that denoted someone who could be considered very or extremely close. The experimenter accepted words (target people) for which there was agreement as to closeness from eighty five percent of the students. At the end of the session a list of seventeen target words was formed that represented people who ranged in terms of closeness. Ranging from most to least close, the words were mother, father, brother, sister, aunt, uncle, cousin, friend, man, woman, student, enemy, stranger, nurse, builder, butcher and chemist.

Rating scales

Rating scales allowed participants (agents) to give target investors different possible explanations that would influence the target’s investment behaviour (see Figure 9). The *explanation* scales were anchored analog vertical lines that were one hundred millimeters in length. These were printed on sheets of A4 paper with the target identified in the upper left corner. The mid point of the scales had a *neutral/no effect* area while the anchors at the ends were worded: “An explanation that would almost certainly result in investing” and “An explanation that would almost certainly result in not investing”. Thus participants did not actually have to generate or choose a persuasive explanation but only the strength and direction of it.

Target

An explanation that would
almost certainly result in
investing

Neutral/no effect

An explanation that would
almost certainly result in not
investing



Figure 9: The explanation measure. In the scale depicted, a vertical line is drawn through the horizontal line to indicate effect of chosen explanation.

When rating targets closeness, participants used Likert scales that ranged from not at all close (1) to extremely close (7) with a mid point of moderately close.

Ranking task

Ranking lists were made up of randomised orderings of the seventeen target investors. Participants were required to rank targets in terms of how close they considered each was to themselves, 1 being the closest and 17 the least close (see Figure 10).

Simply rank the following people in terms of how close each is to you. 1 being the closest, 2 the next closest and so on until you get to 17, which would be the least close. Simply write the number that reflects your ranking in the cell next to the name. If you make a mistake or change your mind, cross it out and write the correct number beside the mistake. Please ask the experimenter if you have any questions. Please begin.

student	
brother	
man	
nurse	
builder	
chemist	
butcher	
woman	
enemy	
uncle	
stranger	
aunt	
friend	
father	
mother	
sister	
cousin	

Figure 10: The ranking measure.

Software

Superlab software (Hisham & Sugar, 2001) was used to run the experiment via a 14 inch monitor connected to a COMPAQ PC. Full details of Superlab can be accessed via www.cedrus.com.

Procedure

Experimental sessions were blocked into forty minute intervals; and to minimize any disturbance all the subjects to be tested in a session were present before the experiment commenced. Sessions were run in the same lab as in Study 1, with a maximum of four participants run at any one time. Each person was greeted and seated in a cubicle, which ensured they could complete the experiment in privacy and without being distracted by other participants or the experimenter. Once seated, the participants were told that there were three main tasks to complete and to follow the instructions on the computer screen.

Task one, diadic target choice

The target choice experiment required participants to choose between stimuli displays of two possible target investors. The stimuli were made up of all possible paired combinations of the target investors and selection was made by participants pressing one of two keys on a keyboard. Presentations of the pairs were balanced and displays randomised in all experimental conditions to counter order effects. Word pairs were horizontally positioned and centered when displayed on the computer screens. Participants were exposed to two experimental conditions: Condition 1 outlined what pyramid schemes offer in terms of high financial gain, whereas Condition 2 reflected how unlikely it was to achieve what was on offer. To reflect the most common experience of pyramid investors, Condition 1 always preceded Condition 2. Participants began the experiment by reading a description of experimental Condition 1 and following the instructions on the computer screen which read:

Imagine you have invested a \$1,000 in a proposal that offers to keep doubling your money in short terms of time. For you to receive these financial returns, you have to get other people to invest \$1000. The greater the number and the quicker you get people to invest, the less time it takes to double your money. As more and more people invest, the number of times you double your money increases and potentially you and the new investors could earn extremely large amounts of money. This option relies on the revenue of new investors to generate its funds.

Your task is to choose between one of two people to be a new investor. In other words, who would you like to tell about the above investment proposal and want to become a new investor. A simple example may help explain what you are to do.

Two words will be presented on the screen, e.g.:

baker mechanic

If you were to choose *baker*, press the left white dot on the key board; if you choose *mechanic*, press the right dot. It is that simple, there are no right or wrong answers, we are only interested in your choices. Work as fast and accurately as you can. Please ask the experimenter if you have any questions. Press any key to begin (e.g. the letter B).”

The second stage of the experiment began with participants being presented with the following screen of information:

Now imagine you are still looking for investors to get your \$1000 back or make a profit. You now realise that each person who invests also has to get other new investors to get their money back or make a profit, but the chances of them ever doing this is extremely unlikely or near impossible.

Your task is to once again choose between one of two people to know about the investment proposal and want to become a new investor. Work as accurately and as quickly as you can.

Press any key to begin (e.g. the letter B).

Again all the pairs were balanced and presented randomly. Once these two decision tasks were completed participants were instructed on the computer screen to proceed to the analog rating task. Participants were presented with the following instructions:

Now imagine you can give the people explanations about the previous proposal. When approaching the people, you can tell them different types of explanations that will influence their likelihood of investing. In fact, depending on what you tell a person, their possibility of investing can range from *almost certainly will result in investing* to *almost certainly will result in not investing*; with a mid point that will have *no effect*.

Imagine it has been some time and you are still looking for investors to get your \$1000 back, or make a profit. You realise that each person who invests also has to get other new investors to get their money back or make a profit, but the chances of them ever doing this is extremely unlikely or near impossible.

On the following pages, draw a line through the vertical scale to indicate what type of explanation you would give each person.

Subjects were then presented with the seventeen randomly ordered explanation scales (one for each target person) that they could use to affect the target investors likelihood to invest in the pyramid scheme. When they had completed the task, the participants moved on to the final parts of this experiment that required them to rate and rank the targets in terms of how close they felt each target was to themselves. When rating targets closeness, Likert scales were used that ranged from not at all close (1) to extremely close (10) with a mid point of moderately close. Agents also ranked targets from 1, the most close, to 17, the least close to themselves. Again the order of these stimuli were randomised and once completed, participants were thanked, debriefed and paid for taking part in the experiment. The total time to complete the experiment did not exceed 40 minutes.

Results

Manipulation check

The experimenter rankings for the 17 targets were compared with the ranked ratings from participants (see Table 9) using Kendall's Tau correlation. This revealed a significant correlation between the two measures ($T = .64, p < .01$), which indicated that the participants perceived the closeness of targets in the predicted direction (Aron & Aron, 1994).

Table: 9

Average closeness ratings for each of the 17 target investors as rated on scales that ranged from 1 (not at all close) to 7 (extremely close). Targets are presented in descending order of closeness to participants.

Target	Mean	SD
mother	6.31	1.16
father	5.89	1.23
friend	5.89	1.17
sister	5.64	1.51
brother	5.36	1.79
aunt	4.60	1.05
uncle	4.31	0.97
cousin	4.11	1.13
student	3.76	1.19
builder	3.07	1.16
nurse	3.04	1.17
woman	3.02	1.34
man	2.47	1.25
chemist	2.24	1.07
butcher	1.71	1.06
stranger	1.56	0.87
enemy	1.53	1.29

Main results

Simple statistics for the two experimental conditions were calculated to describe the participants' choices of investors from the possible 17 targets. Condition 1 (no monetary loss) placed participants in the position of having invested \$1,000 into a pyramid scheme that offered high financial returns for investors (agents & targets). Condition 2 (monetary loss) presented the participants with the near impossible but realistic experiences investors (agents & targets) have of not achieving any financial returns and losing their money. Targets were rated on scales from 1-7 of how close they were to each target (greater numbers indicated more closeness), and ranked from 1-17 in descending order of closeness to themselves.

Hypothesis 7 had predicted that a significant difference would exist between the targets chosen in the two experimental conditions. When participants were engaged in a pyramid scheme and informed about the certain monetary loss for them and new investors (Condition 2), they would choose targets less close to themselves than those targets chosen in Condition 1 (no loss). When the closeness ratings of the targets who were chosen in each experimental condition were compared the difference was statistically significant, $t(43) = 5.42, p < 0.001$. The targets who were chosen as pyramid investors in the monetary loss Condition 2 ($M = 3.48, SD = 0.85$) were rated by agents as being significantly less close to themselves than those chosen in the no monetary loss Condition 1 ($M = 4.22, SD = 0.85$). As the almost certain financial loss from investing in a pyramid scheme became apparent, participants selected targets who were less close.

Relationships between the participants' choice of targets in the second loss condition and how closely they ranked the targets were explored. Rank order correlations were calculated between the explanations given to the selected targets and how closely they were ranked. The prediction had been made that participants' explanations would vary with how close targets were ranked to themselves. The closer a target was ranked the less likely the explanation was expected to result in investing in the loss condition. Analysis in the form of Spearman rank order correlation was performed on participants' ranked orders of the 17 target investors with the explanations each was given. When the correlations were calculated it revealed that as explanations not to invest became stronger these were significantly related to how close the participants ranked the targets ($r_s = -.87, p < 0.01$). This very high correlation showed that when having to make a choice of who to persuade in a situation that offered almost certain monetary loss, people who were ranked as being less close to the agent were chosen.

Summary

Several statistically significant correlations have emerged from the data. When placed in the position of having invested money into a pyramid scheme, people's choice of who they selected to become a pyramid investor changed with the likelihood of them losing money from their investment. People selected the targets who they considered were close to themselves when there was no monetary loss associated with the pyramid scheme. Conversely, when it was made clear that monetary loss was almost certain for all pyramid investors, participants selected targets that were less close to themselves. As the conditions associated with

pyramid schemes changed so did the reported economic behaviours of the participants.

Study 4

A limitation of Study 3 concerns the time of presentation of the explanation task. Here it was given after completion of the diatic word task exercise. Participants select the types of explanations they could assign targets only in experimental Condition 2 (monetary loss). A more effective and perhaps simpler experimental design would have had the explanation task presented after each experimental condition, thus making it easier to measure differences in explanations given in the loss condition (Condition 1) versus non-loss condition (Condition 2). In Study 4, participants also selected explanations given to the targets in Condition 1 (no monetary loss). The question to be addressed here was: Would the explanations given to targets in the Condition 1 (no loss) be significantly different to those explanations given in Condition 2 (loss)? Hence, the current study was performed to extend and enhance the findings of Study 3.

Method

Participants

Participants were ten male and 15 female students from the University of Canterbury who were each paid five dollars to complete a study entitled “Exploring people’s investment decisions and behaviours within a framework of psychology”.

Materials

Materials were the investment tasks, rating and explanation scales outlined in the previous Study 3.

Procedure

The procedure was adapted from Study 3 in that participants did not perform the diadic word task and ranking exercise. However the participants, as in the previous study completed the same rating and explanation tasks with the latter done after each experimental condition. The 1-10 rating scales measured how close agents perceived a target to be to them and the explanation scales (ranging from -ve 100 to +ve 100) could be used to affect the target investors' likelihood to invest in the pyramid scheme. Subjects were first required to complete the explanation task, which required them to assign an explanation to each and every target in Condition 1, and then in Condition 2. When they had completed the explanation task participants moved on to the final parts of this experiment that required them to rate the targets in terms of how close they felt each target was to themselves. Again the order of the target stimuli was randomized. Once they had completed the experiment, participants were thanked, debriefed and paid for taking part in the experiment. The total time to complete the experiment did not exceed 25 minutes.

Results

The types of explanations that people assigned to targets in experimental Condition 1 and 2 were compared. Condition 1 had participants (agents) in the early stages of a pyramid scheme where no monetary loss was stated, whereas Condition 2 made clear the almost certain loss of money invested in a pyramid scheme. When rated on a scale from -ve 100 to +ve 100, where higher scores indicated more likelihood of investing, the mean explanation rating given to the targets in Condition 1 was greater than that for Condition 2. Average ratings were calculated for each of the 17 targets in each experimental condition (see Table 10). A dependant measures t-test was performed and showed that explanations given in Condition 1 ($M_{\text{no loss}} = 29.35$, $SD = 34.59$), were significantly more likely to cause targets to invest in the pyramid scheme than those given to investors in Condition 2 ($M_{\text{loss}} = -10.67$, $SD = 43.56$), $t(25) = 3.34$, $p < .01$; as in Study 3.

As in Study 3, participants (agents) in Study 4 rated target investors on scales from 1-7 where 7 indicated greater closeness to themselves. Ratings of how close they considered target pyramid investors to be to and the explanations they gave them, were expected to be correlated to each other. The prediction was made that when participants were in Condition 1 (no loss), they would give explanations that would more likely result in investing to targets who were close to them; whereas in Condition 2 (loss) the targets who were considered close would receive explanations that would more likely result in not investing. Pearson's correlations were calculated between how close each target was rated with the explanations they received. When calculated for Condition 1, the large positive relationship between

how close targets were and the respective explanations was statistically significant, ($r = .87, p < .001$). The large negative relationship between the variables in Condition 2 was also statistically significant ($r = -.92, p < .001$). When no monetary loss was stated participants offered explanations that would more likely result in investing to the target investors they rated as being close to themselves. However, when a monetary loss became evident they offered explanations that would more likely not result in investing. People's choices of explanations given to target pyramid investors varied both with how close they were to the respondent and whether or not a monetary loss was anticipated.

Table 10:
Average ratings for each of the 17 targets in each experimental condition. Targets are presented in order of average ranked closeness.

Target	Closeness	Explanations	
		Condition 1	Condition 2
Mother	1	38.05	-37.02
Father	2	52.00	-19.84
Friend	3	52.48	-32.04
Brother	4	43.14	-25.24
Sister	5	65.4	-31.74
Cousin	6	46.12	-35.89
Aunt	7	44.96	-26.22
Uncle	8	37.26	-32.12
Student	9	22.54	-14.85
Woman	10	20.76	-0.46
Nurse	11	11.78	-6.10
Man	12	23.44	7.30
Chemist	13	4.14	13.64
Stranger	14	2.87	6.94
Butcher	15	19.16	6.36
Builder	16	27.06	12.56
Enemy	17	12.21	33.13

Summary

Once again, several statistically significant correlations have emerged from the data that both replicate and extend the findings of Study 3. The closeness of a target was highly correlated with the type of explanation they were given and varied according to the possibility of monetary loss. If people were less close they were more likely to be encouraged to invest in a pyramid scheme when agents realized the target was likely to lose money.

CHAPTER 6

Studies 5 & 6: Identifying Relationships between People's Risk Seeking Behaviour, Numerical Ability and Investment Decisions.

Introduction

Studies 1 and 2 showed that nearly half of all the student participants were prepared to invest money in the pyramid. What individual differences exist between these people that predict who will or will not become a pyramid scheme investor? Given previous research has shown intelligence to predict a person's behaviour (Cascio, 1991) and a person's risk propensity can predict investment their decisions (Hunter & Kemp, 2004) these constructs were the focus of Studies 5 and 6..

It was thought important to determine if an individual's propensity to engage in risk seeking activities and reasoning ability would relate to how much money they allocated to different investment options. Sensation seeking scores, as measured by Zuckerman's Sensation Seeking Scale V (SSS-V), were used to ascertain individuals' propensities for risk; the Australian Council for Educational Research BQ (ACER BQ) was used to measure individual numerical reasoning ability because it has been shown to be a valid tool (ACER, 1982). As intelligence has never been tested as a possible factor in pyramid scheme investment, it will be included here.

It is almost impossible to address investment decisions in the broader discipline of economic psychology without mentioning or encountering the concept of risk. As

reviewed earlier, economic psychology is replete with studies on investors' investment decisions and their relationships to risk (see Chapter 2). Similarly, psychology has a fundamental interest in the measurement of people's attitudes and abilities to be used to predict and explain future behaviours (Gray, 2002). It was considered likely that sensation seekers would be identified as having a greater attraction to different investment options than people less willing to engage in sensation-seeking behaviours.

Method

Participants

Students from the University of Canterbury took part in a study entitled "Exploring factors that contribute to investing money". Twenty-nine males and 29 females were recruited by advertisement; two males and six females were participants from Study 1 who had expressed an interest in follow-up experiments. Participants were informed the experiment would take approximately 40-45 minutes and they would each be given a five dollar gift voucher as payment and a token of appreciation.

Materials

The Australian Council for Educational Research (ACER) BQ numerical test was administered. Items included in this paper and pencil test included number sequences, arithmetic reasoning and number matrices. Investment and allocation tasks from Study 1 and Zuckerman's online Sensation Seeking Scale Form IV (SSS-V) (see Appendix A) were also used. Participants were informed that the

questionnaire was designed to explore people's tendency towards varied, novel and intense sensations. Pencils were supplied.

Australian Council for Educational Research (ACER) BQ Test Overview

The ACER BQ consists of twenty nine items which have a twenty minute time limit to complete. Used in conjunction with ACER BL (verbal reasoning), the tests can be used as a measure of the general ability factor (g). Kuder-Richardson reliability has been reported as .89 for a sample of Australian tertiary students (ACER, 1982).

Zuckerman's SSS-V Test Overview

Zuckerman's online Sensation Seeking Scale Form V (SSS-V) is made up of forty forced choice items related to thrill and adventure seeking (SS 1), experience seeking (SS 2), disinhibition (SS 3) and boredom susceptibility (SS 4). An overall sensations seeking score (SS-total) was obtained by the addition of the 4 subscales. High sensation seeking scores have been found to correlate with engaging in risky behaviours (see Chapter 2).

Procedure

Subjects were seated in cubicles where they had access to Zuckerman's online sensation seeking scale, the ACER BQ numerical reasoning test and investment and allocation tasks. First the investment and allocation tasks were completed. The allocation task was the same as that used in Studies 1 and 2, where participants were asked to imagine themselves as having the opportunity to invest in each of four scenarios (bank, pyramid scheme, stock market & bank) and allocating proportions of one thousand dollars as they saw fit. The order of administration of

the two psychological tests was counter balanced. The ACER BQ numerical reasoning tests began with 10-minute practice exercises to familiarise participants with what was required of them. Once completed, and after any inquiries were answered, the twenty nine item test began. Exact instructions and scoring procedures were read and followed as outlined in the test manual (ACER, 1982). Zuckerman's sensation seeking scale was administered via an online link. Participants read instructions on how to proceed and a brief history of the test. The forty forced-choice questions took no longer than ten minutes to complete. Participants were assured confidentiality and informed they could withdraw from the experiment at any time. Participants' grade point averages (GPA) for university exams and bursary marks (if applicable) were also collected as measures of intellectual performance that could be analysed in respect to investment decisions. Finally, participants were given feedback on their scores, thanked and paid for their cooperation.

Results

General descriptive statistics

Descriptive statistics were calculated for the amounts of money allocated to each of the four options (the bank, pyramid scheme, stock market & safe). Ranging from greatest to least, the mean dollar amounts of money allocated to the options were the bank ($M = 435.34$, $SD = 301.02$), the stock market ($M = 332.76$, $SD = 259.48$), the pyramid scheme ($M = 123.28$, $SD = 165.23$) and the safe ($M = 110.35$, $SD = 137.89$). When a repeated measures ANOVA was performed on these amounts of money, a significant difference was evident, $F(3, 171) = 21.80$, $p < .001$. Post hoc analysis (Tukey Honestly Significant Difference Test) revealed that the mean dollar

amount of money invested in the bank ($M = 435.34$, $SD = 301.02$) was significantly greater than the pyramid scheme ($M = 123.28$, $SD = 165.23$) and the safe ($M = 110.35$, $SD = 137.89$). The only other significant differences were that more money was allocated to stock market ($M = 332.76$, $SD = 259.48$), than the pyramid scheme ($M = 123.28$, $SD = 165.23$) and the safe ($M = 110.35$, $SD = 137.89$).

Simple descriptive statistics revealed that, of the 58 participants (investors), 30 (51.71%) of them chose to be pyramid investors while 28 (48.29%) were non-pyramid investors who allocated no money at all to the pyramid scheme. Of those who invested the whole \$1000 in only one option, three participants allocated it all to the bank, two to the stock market; no one chose the pyramid scheme or the safe. These results were comparable to those obtained from Studies 1 and 2.

Testing for main effects

Given the possible presence of main effects for gender (Eckel & Grossman, 2002; Larkin & Pines, 2003; Zaleskiewicz, 2001), these were first tested for to determine the appropriate analyses for the current study. When comparing numerical reasoning ability, males ($M_{\text{males}} = 13.38$, $SD = 4.71$) were not significantly different to females ($M_{\text{females}} = 11.48$, $SD = 3.86$), $t(56) = 1.68$, *ns*. When exploring the four subscales of Zuckerman's Sensation Seeking Scale V (thrill & adventure seeking; experience seeking; disinhibition; and boredom susceptibility), a 2 (gender) X 4 (subscales) ANOVA with repeated measures on the last factor revealed that males reported higher propensities for sensation seeking ($M_{\text{males}} = 5.65$, $SD = 0.23$) than females ($M_{\text{females}} = 4.55$, $SD = 0.23$), $F(1, 56) = 9.36$, $p < .01$. When analysed further, independent measures t-tests revealed significant differences in that males

had higher scores than females for: thrill and adventure seeking ($M_{\text{males}} = 7.38, SD = 1.59; M_{\text{females}} = 5.86, SD = 1.57$), $t(56) = 3.20, p < .01$; and disinhibition ($M_{\text{males}} = 6.03, SD = 1.82; M_{\text{females}} = 4.62, SD = 2.21$), $t(56) = 2.65, p < .01$. When the four subscales were combined, the mean total sensation seeking score (SS-total) for males ($M_{\text{males}} = 22.62, SD = 5.10$) was significantly greater than that for females ($M_{\text{females}} = 18.207, SD = 4.58$), $t(56) = 3.09, p < .01$.

Main results

Hypothesis 8 proposed that the participants' propensity to engage in sensation seeking activities would significantly relate to how they invested money. Given that the male participants had reported a greater propensity for sensation seeking than females, separate data analyses were conducted for each gender. Individual correlation matrices were calculated for participants' scores on Zuckerman's SSS-V (4 subsets & 1 total score) with the amounts of money invested in each option (the bank, pyramid scheme, stock market & safe). When first looking at the results for women (see Table 11), a number of significant relationships were found. Higher propensities for thrill and adventure were seen to negatively relate to the amount of money invested in the bank ($r_{\text{females}} = -.43, p < .05$), but positively to the amount invested in the stock market ($r_{\text{females}} = .61, p < .001$). The females' total sensation seeking scores showed a similar relationship in that higher sensation seekers allocated less money to the bank ($r_{\text{females}} = -.45, p < .05$) and more money to the stock market ($r_{\text{females}} = .49, p < .01$). There were no statistically significant correlations for the pyramid scheme or safe allocations.

Table 11
Correlation between females' sensation seeking scores and how much money was allocated to the investment options.

Sensation	Bank	Pyramid	Stock market	Safe
1. Thrill & adventure	-.19	-.20	.22	.19
2. Experience	-.26	.23	.12	.01
3. Disinhibition	-.30	.01	.32	.01
4. Boredom	-.43*	-.22	.61***	.04
5. Total	-.45*	-.05	.49**	.04

* $p < .05$. ** $p < .01$. *** $p < .001$.

When a correlation matrix was calculated for the males data a number of statistically significant correlations were found between their propensity to engage in sensation seeking activities and how they invested money. Table 12 shows that experience seeking ($r_{\text{males}} = -.40, p < .05$), boredom ($r_{\text{males}} = -.50, p < .01$) and total sensation seeking ($r_{\text{males}} = -.43, p < .01$) all possessed significant negative relationships with how much money was allocated to the bank. Conversely, the amount of money they allocated to the stock market was positively related to experience seeking ($r_{\text{males}} = .61, p < .001$) boredom ($r_{\text{males}} = .46, p < .01$) and total sensation seeking ($r_{\text{males}} = .55, p < .01$). Again, there were no statistically significant correlations for pyramid scheme or safe allocations.

Table 12
Correlation between males' sensation seeking scores and how much money was allocated to the investment options.

Sensation	Bank	Pyramid	Stock market	Safe
1. Thrill & adventure	-.17	-.15	.21	.20
2. Experience	-.40*	-.06	.61***	-.20
3. Disinhibition	-.21	-.17	.36	.02
4. Boredom	-.50**	.08	.46**	.23
5. Total	-.43**	-.10	.55**	.09

* $p < .02$. ** $p < .01$. *** $p < .001$.

Male and female data were pooled to increase power of the analysis. Table 13 shows that Thrill & adventure ($r_{\text{pooled}} = -.40, p < .001$) experience seeking ($r_{\text{pooled}} = -.37, p < .001$), boredom ($r_{\text{pooled}} = -.40, p < .001$) and total sensation seeking ($r_{\text{males}} = -.40, p < .001$) all possessed significant negative relationships with how much money was allocated to the bank. Conversely, the amount of money they allocated to the stock market was positively related to thrill & adventure ($r_{\text{pooled}} = .39, p < .01$), experience seeking ($r_{\text{pooled}} = .51, p < .001$), boredom ($r_{\text{pooled}} = .35, p < .01$), and total sensation seeking ($r_{\text{pooled}} = .48, p < .001$). Once again, there were no statistically significant correlations for pyramid scheme or safe allocations.

Table 13
Correlation between pooled (over male & female) sensation seeking scores and how much money was allocated to the investment options

Sensation	Bank	Pyramid	Stock market	Safe
1. Thrill & adventure	-.21*	-.14	.39*	.04
2. Experience	-.37*	.01	.51***	-.14
3. Disinhibition	-.17	-.01	.19	.01
4. Boredom	-.40**	.01	.35**	.18
5. Total	-.40**	-.05	.48**	.04

* $p < .02$. ** $p < .01$. *** $p < .001$.

A series of independent t-tests were performed to test whether a difference was present between pyramid scheme investors and non-pyramid scheme investors in their sensation seeking scores. When calculated, the means and standard deviations for how the two types of investors responded were not statistically different (see Table 14). Thus, the results indicate that propensity to invest in a pyramid scheme is not related to individual differences in sensation seeking.

Table 14
Average sensation seeking for type of investor

	Pyramid investor		Non-pyramid investor		<i>t</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	
1. Thrill & adventure	6.48	1.89	6.78	2.02	-0.57
2. Experience	5.90	1.40	5.78	1.63	0.31
3. Disinhibition	5.35	2.13	5.30	2.16	0.10
4. Boredom	3.06	1.82	2.66	1.59	0.89
5. Total	20.81	5.29	20.52	5.17	0.21

Hypothesis 11 stated that numerical reasoning would be a significant predictor of people's investment. When faced with the decision to invest money, it was predicted that a significant relationship would exist between people's numerical reasoning ability and how much money they invested in each of the options. As can be seen in Table 15, simple regression analyses showed that numerical reasoning significantly predicted how much money participants invested in the bank ($r = .43$, $p < .001$), the stock market ($r = -.27$, $p < .05$) and the safe ($r = -.38$, $p < .001$). It appears people who had higher numerical reasoning abilities invested greater amounts of money in the bank while lower numerical reasoning ability resulted in investing in the stock market and safe, which lent support for the hypothesis. Numerical reasoning did not significantly predict how much money was allocated to the pyramid scheme.

Table 15
 Summary of simple r -correlations for numerical reasoning predicting amounts of money invested in options.

Option	r
Bank	0.43**
Pyramid scheme	-0.06
Stock market	-0.27*
Safe	-0.38**

Note: * $p < .05$; ** $p < .001$.

A correlation matrix was calculated for the participants' GPA scores , bursary marks and how they invested money. As Table 16 shows, GPAs and Bursary marks did not significantly relate to how they invested in any of the four investment options. Thus they were excluded from future analyses.

Table 16
 Summary of simple linear regression for grade point averages and bursary scores predicting amounts of money invested in options.

Options	Measure	
	GPA <i>r</i>	Bursary <i>r</i>
Bank	.15	.13
Pyramid Scheme	-.13	-.09
Stock Market	-.06	.07
Safe	.01	-.17

Additional Analysis

Additional analysis by way of an independent measures t-test was performed to compare the numerical reasoning ability of those participants who invested in the pyramid scheme and those who did not invest. When tested, the numerical reasoning ability of pyramid investors ($M = 11.90$, $SD = 4.77$) and non-pyramid investors ($M = 13.03$, $SD = 4.00$) was not statistically different $t(56) = .98$, *ns*. When compared to appropriate norms, students scores were within accepted levels.

Summary

Support was evident for the prediction that numerical reasoning ability, and sensation seeking would predict how people would invest money into the bank, stock market and safe. However, no significant relationship was seen between investing money in the pyramid scheme and the propensity for sensation seeking. Rather than predicting who would invest in a pyramid scheme, this was the only

option that did not correlate with numerical reasoning, although sensation seeking did predict investment in the bank and stock market.

Similarly there was no relationship between pyramid scheme investment and numerical reasoning or academic performance, although numerical reasoning ability did predict investment in the other 3 options.

Study 6

Study 5 showed that investment in three of the options (bank, stock market & safe) related to the individual's numerical reasoning ability. In Study 6, the possible influence of general intelligence on the different investment decisions was investigated. Although numerical reasoning contributes to the wider construct of general intelligence (Sternberg, 2000), it was possible that general intelligence would also correlate with peoples investment decisions. In particular one might anticipate that higher general intelligence might serve to protect one from the allure of a pyramid scheme.

Raven, Court, and Raven (1988) developed the Raven's Progressive Matrices to differentiate between people according to a person's level of intellect. The test can be used to assess intellectual efficiency and indicate general intelligence (Sternberg, 2000). The test requires testees to find a missing element from a three by three group of figures. These figures vary according to logical patterns and it is the task of the testee to work out the pattern in order to find the missing element (Raven et

al., 1988; Sternberg, 2000). Raven's Progressive Matrices are considered to be an important and effective measure of intelligence (Sternberg, 2000).

Method

Participants

Thirty-seven males and 52 female Stage One psychology students were recruited from the University of Canterbury to complete the study and each paid five dollars for their participation.

Materials & procedure

Participants completed the investment tasks (as in Studies 1, 2 & 5) and then completed the Raven's Advanced Progressive Matrices (Sets I & II) that tests Spearman's g . The test proper contained 36 items, and 40 minutes were allowed for participants to complete it. Precise instructions were followed as outlined in the test manual (Raven, Court, Raven, 1988).

Results

General descriptive statistics

Descriptive statistics were calculated for the amounts of money invested in each option (the bank, pyramid scheme, stock market & safe). Ranging from greatest to least, the mean amounts of money allocated to the options were the bank ($M = 471.35$, $SD = 277.25$), the stock market ($M = 262.92$, $SD = 237.74$), the pyramid scheme ($M = 156.74$, $SD = 266.03$) and the safe ($M = 85.39$, $SD = 156.66$). When a repeated measures *ANOVA* was performed on these amounts of money, a significant

difference was evident, $F(3, 264) = 37.77, p < 0.001$. Post hoc analysis (Tukey *Honestly Significance Test*) revealed that the mean amount of money invested in the bank ($M = 471.35, SD = 277.25$) and the stock market ($M = 262.92, SD = 237.74$) were significantly different to each other as well as to the amounts invested in the pyramid scheme ($M = 156.74, SD = 266.03$) and safe ($M = 85.39, SD = 156.66$).

Simple descriptive statistics revealed that, of the 89 participants (investors), 41 (46.06%) chose to be pyramid investors and 48 (53.94%) chose not to be pyramid investors who allocated no money at all to the pyramid scheme. In regards to investing all the \$1000 in only one option, no one chose the safe, five participants chose the bank, two the pyramid scheme and one the stock market.

An independent t-test was performed to test if there was a significant difference between males and females in how they answered the Progressive Matrices. No statistically significant difference was evident between the number of items that were correctly answered by males ($M = 26.38, SD = 4.55$) and females ($M = 25.46, SD = 5.59$), $t(87) = -0.82, ns$. Table 5 shows that when correlations were calculated between the participants' scores on the Raven's Advanced Progressive Matrices and the amounts of money they allocated to the different options no significant relationships were evident. The absence of significance demonstrated that general intelligence was not able to predict how people invest money, as was the case with numerical reasoning ability (see Study 5).

I also examined the possibility of a difference in scores between pyramid investors and non-pyramid investors. When tested by way of an independent t-test the mean

number of correctly answered items by pyramid investors ($M = 25.44$, $SD = 6.30$) and non-pyramid investors ($M = 26.32$, $SD = 3.42$) was not statistically different, $t(87) = 0.80$, *ns*.

Table 17

Summary of simple linear regression for general intelligence predicting amounts of money invested in options.

Variable	<i>r</i>
Bank	.11
Pyramid	.12
Stock market	.06
Safe	.04

Summary

General intelligence did not relate to how people invested money. The general intelligence of pyramid scheme investors was no different to other investors. The absence of significance in the current study adds weight to the findings of Study 5 that showed that neither academic performance nor numerical reasoning corresponded with how people allocated money to a pyramid scheme.

CHAPTER 7

Discussion

The concluding chapter will begin by summarising why this thesis was undertaken. The six studies which were conducted as part of this thesis will be outlined and findings that describe pyramid scheme investment covered. The first two studies were intended to identify and measure pyramid scheme investors' attitudes and perceptions of a range of investments, including pyramid schemes. The next two studies focused on the hypothetical behaviour of people after they had invested money in a pyramid scheme and become a member of it. These two studies successfully isolated the effects of target closeness and deception in predicting how people might go about choosing others to invest in pyramid schemes. The effect of target closeness (the personal closeness between the respondent and another possible investor) was found to be very highly correlated with target choice. The final two studies tested for these individual differences between pyramid scheme investors and other investors in measures of intelligence and desire for sensation seeking. Interestingly, pyramid scheme investment was not predicted by either intelligence or sensation seeking, whereas the other investment choices were.

Investment in pyramid and other schemes and the perception of risk

The primary goal of the research conducted for this dissertation was to investigate investment in pyramid schemes. Published statistics had previously shown that pyramid schemes constituted a significant financial loss for New Zealand's national economy, as well as for that of several other countries. However, before I undertook this thesis, no previously published psychological study seems to have been devoted

to investigating this form of investment behaviour. This absence determined the nature of Study 1. Also, Study 1 was an important preliminary step to the success of subsequent studies because it showed that many people, at least in a laboratory setting, would be willing to invest in a pyramid scheme.

To better reflect a variety of investment options that someone in the real world might have, it was considered important that in Studies 1, 2 and 5 participants be given several investment possibilities that they could invest in. Hence participants had a choice of investing in a bank, pyramid scheme, stock market and safe. Also, as a large body of research has shown that framing scenarios in terms of gains or losses affects people's decisions (Ingersoll, 1987; Kahneman & Tversky, 1988; Tversky & Kahneman, 1981), care was taken to eliminate framing effects in these studies. Therefore, when scenarios were used in Studies 1, 2 and 5, they only described how funds were generated, the time taken to generate them and the returns offered on investments. Labels were avoided.

In Study 1, ninety-two participants were given a hypothetical allocation task where they could invest in a bank, pyramid scheme, stock market and safe. Once this task was completed, attitudes and perceptions towards their investment choices were measured to find whether they varied with the hypothetical amounts of money invested in each option. The attitudes and perceptions that were measured were the perceived likelihood they would receive the financial returns on offer, willingness to invest in the option, confidence in recommending the investment option to someone else, confidence in investing different amounts of income in the option (a day, week or year's), and how deceptive or truthful they considered the option's

claims of what the actual return would be. Confidence in investing was further tested by measuring how confident participants were to invest different dollar amounts of money (\$1, \$10, \$50, \$100, \$500, \$1,000, \$5,000, \$10,000, \$50,000, \$100,000, \$500,000 & \$1,000,000).

Interestingly, Study 1 established these ratings to be more highly correlated with the amount of money invested in the pyramid scheme than was the case for any of the other investors. The more money people chose to invest in the pyramid scheme the higher they perceived the likelihood they would receive the financial returns on offer, the higher their willingness to invest in the option, the higher their confidence in recommending the investment option to someone else and the more truthful they thought the description of the description of the option was. Thus pyramid scheme investors had more positive attitudes towards their investments than the other investors. This possibly explains the longevity of such schemes. It is tentatively suggested that these stronger relationships between attitudes and amount of money invested are important in understanding why people are drawn into the scam.

Additional relationships were found between willingness to invest in the pyramid scheme and perceptions of the other investment options. People who reported they were willing to make bank investments had less confidence in recommending the pyramid scheme to others as an investment option; those people who believed the description of what the bank offered were less likely to expect the pyramid scheme would meet its returns; people who perceived the bank as a favorable option rated the description of the pyramid scheme as a less desirable option. The pyramid scheme was similar to the stock market in the amounts of money invested and

investors did not differ in their attitudes towards the pyramid scheme and the stock market.

The decision on how to invest one's money is largely restricted to legal enterprises. These can include banks, stock markets and the like. Other legal enterprises one can opt for include lottery tickets and other forms of gambling. Occasionally, the chance of investing in a seemingly legal and profitable money making scheme may arise, and this scheme later turns out to be illegal. An enduring example of such an illegal scheme scam is the pyramid scheme which attracts seemingly ordinary people into almost certain financial loss.

Study 1 showed about half of the sample would invest in a pyramid scheme. Unlike the non-pyramid scheme investors, pyramid scheme investors showed no differentiation between it and the other options in overall confidence in investing money. Non-pyramid scheme investors, however, identified the pyramid scheme as somehow different and expressed less confidence in investing in it. In comparison, pyramid scheme investors were about equally confident in all four investment options. However, like the other investors the confidence of pyramid scheme investors decreased as the amounts of money available for investment increased. The relationship between these two variables was very strong. Increasing the potential sums of money did not alter the likelihood of receiving returns so in a purely rational model confidence should not have varied. For example, the returns from investing \$1000 dollars are no more or less likely than those from investing \$10, 000. Such changes in perception are challenging to economic models and reaffirm that subjectivity is often a feature of people's investment decisions

(Ingersoll, 1987; Zaleskiewicz, 2001). Perhaps this decline in confidence relates to people's loss aversion as explained by the prospect theory (Kahneman & Tversky, 1979). People are more averse to loss, be it real or imagined, and an aversion to increased loss might have reduced their confidence.

One line of research into economic behaviour that has implications for pyramid schemes is that into risk. As previously discussed in Chapter 2, there has been a great deal of research concerning the importance of risk as a central component in whether people choose one course of action or another. For the purposes of this dissertation, research in risk was broadly divided into risk associated with economic activities and risk associated with non-economic activities. Investment of money in a pyramid scheme clearly belongs to the former category. Decisions to invest money frequently depend on how risky the different investment options are perceived (Finucane et al., 2000; Flynn et al., 1994; Slovic, 1987). Risky decisions are made when the decision maker accepts a high probability that negative outcomes are likely and still continues in his or her chosen course of action (MacCrimmon et al., 1986; Sitkin & Pablo, 1992; Yates, 1992). Study 2 was intended as a measure of how perceived risk is related to the amount of money people might invest in a pyramid scheme.

Building on Study 1, Study 2 extended our understanding of the characteristics that relate to investment in pyramid schemes. In Study 2, the money invested in a pyramid scheme, or in a bank, stock market or safe, reduced when the perceptions of the associated risk increased. Study 2 also revealed that participants perceived the pyramid scheme to be significantly more risky to invest in than the bank or the

safe. Investment in the pyramid scheme was, however, perceived to be no more or less risky than the stock market. Considering the differences in how money is generated between the stock market and pyramid scheme, this similarity is surprising, if not disturbing.

To some degree or another, economic risk is present for all investment options (Tversky & Fox, 1995). The results of Study 2 demonstrated risk aversion was clearly associated with how much money was invested in the pyramid scheme (or indeed any other investment). Such an aversion is a fundamental characteristic of economic models devised to explain peoples investment behaviors (Warneryd, 1996). However, as research in prospect theory has demonstrated (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992), economic models are unable to explain how people make seemingly irrational decisions. The key new finding from Study 2 is that people were not able to correctly identify the pyramid scheme as the most risky option. Clearly, if they could, this knowledge would protect them from investing in the scam. The data gathered in Study 2 suggests people were capable of making rational decisions not to invest money in risky options, but were poor at accurately assessing economic risk.

Even though pyramid schemes are all based on an impossible tenet, there seems to be an underlying attraction to pyramid schemes for people. This tenet is that each investor earns money by having additional investors give them money. The result of such a system is that an exponential growth in the numbers of investors for an infinite period of time is necessary for this scheme to meet all its financial promises. It is therefore illogical to think a pyramid scheme can be a viable investment

structure, and thus the risk for an individual of investing in a pyramid scheme is very high. One might expect a sample of tertiary students to be able to determine the illogical nature of the pyramid scheme. Indeed, some might argue they should have been better at this assessment because of their advanced education. However, the student participants generally did not perceive the scheme to be different to the stock market, even though the latter is not based on an impossible tenet and offers real actual returns on investments with less associated risk (Earl & Kemp, 1999).

Deception and recruiting others

Deception occurs in a wide variety of situations and there has been a considerable amount of research devoted to understanding it (DePaulo & Rosenthal, 1979; Ekman & O'Sullivan, 1991; Fiedler & Walka, 1993; Kalbfleisch, 1994; Turner et al., 1975; Vrij, 2000). Deception goes against generally accepted social norms of behaviour (Sigmund, 1993). Also, it is possibly more prevalent in economic transactions because of the anticipation of the monetary gains it might produce (Lewicki, 1993; Lewicki & Litterer, 1985; O'Connor & Carnevale, 1997). What is unarguable is that deception is a central and defining characteristic of pyramid schemes (Caroll, 1998; Commerce Commission, 1997). However, as previously stated by Steinel & De Dreu, (2004), few studies have addressed the conditions “that foster or inhibit people’s tendency to be truthful and accurate or dishonest and inaccurate”. (p. 419). Study 3 and Study 4 were designed to meet this challenge for the special case of pyramid schemes. The results of these studies revealed that people change their deceptive behaviour depending on the economic conditions in the pyramid scheme. This section will endeavor to explain why people invest in a pyramid scheme and how they behave after they have invested in it.

Theories that explain people's deceptive behaviour share a common feature. This is that people vary in the degree of deception they engage in, according to the closeness of the recipient target. Hence, the acceptability of deception is a malleable construct (Backbier et al., 1997), which depends on the relationship between agent and target. Deception is perceived as less acceptable when perpetrated against those people closer to oneself. It is more acceptable to deceive a complete stranger in financial matters than your mother. Reasons for this variation include the increased chance someone close to you may be able to detect your deception, not wanting to cause negative outcomes for the people who you are closer to, and fear of being the recipient of undesirable paybacks. These principles are encompassed by evolutionary theory and explain how participants behaved in Studies 3 and 4. The relevant principle is altruism. At its simplest, this principle states that people act altruistically to those they are closer to and are themselves more likely to reciprocate at some later time (Ridley, 1997; Sigmund, 1993). Often this relationship effect is expressed in the answers to the question "if you were in a life boat and only could save one person from your brother, father or cousin, who would it be?" This theory correctly predicted how people behaved when in Studies 3 and 4 they imagined they had invested in a pyramid scheme.

In Studies 3 and 4 participants were given the option, for each target, to choose whether to persuade them to invest in the scheme, to persuade them not to invest, or to do nothing at all. The kind of explanation that participants gave each target investor was the measure and was also presumed to determine the target's investment decision. This measure therefore revealed how investors behaved when they were involved in a pyramid scheme. Condition 1 in both Studies 3 and 4

offered possible good fortune from investing in a pyramid scheme. In this condition it was not explicitly stated that financial loss was likely. The principles of evolutionary psychology predicted that people would more likely share the good fortune of Condition 1 with those closest to themselves. In this initial stage, there is no need to deceive targeted investors because participants were not intentionally misinforming them about the pyramid scheme. It could even be argued that sharing the possibility of good fortune with those closest to you is admirable. However, sharing such good fortune with those not considered close must be weighed up against the financial benefits you would receive (money from their investment). It seems that people were less willing to benefit those targets less close to themselves, even if it resulted in their own economic benefit. The initial stage of a pyramid scheme thus seems to place those closest to the investor at the greatest risk of recruitment.

However, in Condition 2 of Studies 3 and 4, participants were presented with a different economic environment. In Condition 2 the potential for financial loss was explicit. Participants were informed they were having difficulty in recruiting new investors and that these investors would find it almost impossible to recruit other investors. Again, participants could decide on what explanation to give targeted investors. They could also persuade targets not to invest and risk losing their investment, to persuade others to invest and make money for themselves, or do nothing at all that would affect the target investor's behavior. The results revealed that people were both willing and able to alter their deceptive behaviour towards targets depending on the pyramid scheme conditions. When Condition 2 clearly stated that target investors had little chance of receiving money, participants were

more inclined to offer explanations that would result in investing to the people they were less close to.

Across most cultures, cheating is disliked and largely considered an unfavourable behaviour (Sigmund, 1993). The degree to which this form of deception is considered serious varies with several factors. As shown above, people judge the act of cheating others out of their money as worse if the intent to cheat is present (DePaulo & Kashy, 1998; DePaulo & Rosenthal, 1979), if people cheat others who are close to themselves (DePaulo & Kashy, 1998) and if the cheating is done for one's own benefit (Backbier et al., 1997). In Condition 2 (loss) of Studies 3 & 4, people were more willing to accept a possible financial loss than cheat someone close to themselves. However, even though cheating for one's own benefit is undesirable, it did not, in the loss condition, prevent participants cheating those who were presumably less close to themselves. In this instance, the financial benefits from cheating were more important than how such cheating might be judged by others or oneself.

Because approximately half the subjects invested in the pyramid scheme, it seems that they were ineffective in identifying the erroneous nature of pyramid schemes. This proportion is initially surprising, but might have been predicted from previous research. In fact, when determining the veracity of others, most people perform below or close to levels of chance (DePaulo & Rosenthal, 1979). Studies 1 and 2 thus extended the research into deception detection by testing people's abilities to determine the veracity of written descriptions of investment options. Non-pyramid investors, but not pyramid scheme investors, were able to identify the pyramid

scheme as being more deceptive in its claims of potential financial returns. Given previous research (Porter et al., 2000) has shown that training may improve one's ability to detect deception, training people in identifying pyramid schemes might reduce the chances of them becoming investors.

Prospect theory and the sunk cost effect help explain why people continue to be members of a pyramid scheme even when it is clear they are likely to lose their money. Central to these theories is that people perceive loss as greater than they would a gain of equal size (Arkes & Blumer, 1985; Earl & Kemp, 1999; Garland, 1990; Karlsson et al., 2002; MacFadyen & MacFadyen, 1986; Staw & Ross, 1989; Tversky & Kahneman, 1992). According to economic models, such distinctions would not be made by a rational interpretation of value and utility (Arkes & Ayton, 1999; Warneryd, 1996). It is argued that the sunk cost effect, as explained by the prospect theory, contributes to our understanding of the behaviour of people in Studies 3 and 4. After participants had invested in the pyramid scheme, Condition 2 presented them with the possibility of losing their investment. Withdrawing from the pyramid scheme would mean a halt on recruiting new investors and accepting their investment as a loss. However, the sunk cost effect predicts that investors would make a continued effort to recover their losses (Arkes & Blumer, 1985; Garland, 1990; Karlsson et al., 2002; Staw & Ross, 1989). This prediction was heavily supported as the participants in both Study 3 and 4 chose to continue recruiting new investors. It is entirely possible that the loss was perceived as an expense towards achieving the end goal (Brockner, 1992; Garland et al., 1990; Karlsson et al., 2005); thus making continued recruitment more acceptable. Thus

the sunk cost effect contributes to our understanding of peoples' continued involvement in pyramid schemes after they have experienced monetary loss.

Individual differences in propensity to invest in pyramid schemes

The remaining Studies, 5 and 6, explored individual differences between pyramid scheme investors and non-pyramid scheme investors. Intelligence and sensation seeking were measured and explored as predictors of investment. The earlier studies provided much of the impetus for these investigations. In Study 1, 49.73% of participants (n = 92) invested in the pyramid scheme, in Study 2 (n = 44) it was 51.51%. The proportions were similar in the later studies: Study 5 (n = 58) 51.71%, and finally in Study 6 (n = 89) 46.06%. Nearly half of all the participants were prepared to invest money in a pyramid scheme. This was a surprisingly large proportion. One might expect that, given the sample was taken from a tertiary institution, where reasonable intelligence is assumed, intelligence might have somehow enabled the respondents to determine the flawed nature of the pyramid scheme. However, the actual findings were that a significant proportion of these educated tertiary students considered the investment option viable enough to invest money in it.

When general intelligence and numerical reasoning ability were measured they were not correlated to pyramid scheme investment. This lack of effect of intelligence in deciding to invest in a pyramid scheme is worthy of note. One might expect that intelligence would relate to making rational decisions. In fact rational thought is an important component of how Weschler defined intelligence: "the aggregate or global capacity of the individual to act purposefully, to think

rationally, and to deal effectively with this environment.” (Weschler 1958, cited in Sternberg et al., 2001, p. 399). General intelligence tests, like numerical reasoning tests, typically have a component or sub-test that comprises items that draw on people’s numerical reasoning ability (Sternberg et al., 2001). These items frequently require the participant to calculate patterns in a series of numbers and mathematical problems. Higher scores on these tasks contribute to higher intelligence scores. Those people who are more proficient at these tasks are presumed to have the capacity for more rational thought. Given this, it seems clear that intellect has little to do with the decision to invest in a pyramid scheme.

Before writing this thesis there had been few published studies into intelligence as a predictor of investment choices and none for pyramid scheme investment. Scores on numerical reasoning ability were found to correlate with amounts of money invested in the bank, the stock market and safe, however it did not relate to pyramid schemes in any identifiable way. This shows that some other factor besides intelligence is preventing nearly half of the participants from investing in the pyramid scheme. However intelligence does help people chooses the bank over the stock market or safe. This finding is important for two reasons. First as a methodological check, it shows that the studies were powerful enough to pick up moderately sized interesting effects. Second it shows that some of the expected relationships with intelligence do emerge.

People’s propensity for sensation seeking was expected to predict how much or whether they would invest in pyramid schemes. This propensity is typically gauged by measuring a person’s desire for sensation seeking (Hammelstein, 2004;

Zuckerman, 1994). The measure used, Zuckerman's SSS-V, has been shown to be accurate at measuring sensation seeking and therefore had the potential to isolate any risk seeking propensity that could characterise pyramid scheme investors.

Zuckerman's SSS-V measure was made up of four subscales (Thrill and Adventure Seeking, Experience Seeking, Disinhibition, & Boredom Susceptibility), that, when summed, produced a score that reflected a general risk seeking propensity (Zuckerman, 1994). Higher scores on the Disinhibition subscale have been linked to greater propensities to gamble. Furthermore, Hunter and Kemp (2004) found that this sub-scale as well as those for Experience Seeking and Boredom Susceptibility correlated with people's decisions to invest in a risky type of share (dotcoms).

Also, given Study 2 had found that the pyramid scheme and stock market were considered similarly risky, and the bank and safe less risky again, there was a reasonable expectation that a propensity for risk seeking would predict pyramid scheme investment. Oddly, investment in the pyramid scheme was the only investment option that a propensity for sensation seeking did not predict. Thus people do not invest in pyramid schemes because they desire risk or sensation seeking. Pyramid schemes are therefore appealing to people who range from risk seekers to risk avoiders.

Other studies (Olsen & Cox, 2001 Barsky, Juster, Kimball, & Shapiro, 1997; Powell & Ansic, 1997) have reported differences between men and women's investment decisions. However, in Studies 1-6, no significant gender differences existed between the amounts of money invested in the pyramid scheme, in their recruiting behaviour or in how the pyramid scheme was perceived. Given this

absence of gender differences, pyramid schemes are no more or less an attractive investment option to men and women. In fact the two genders were equally vulnerable to the call of the pyramid scheme. As Flynn (1994) stated, it appears that gender alone is insufficient in explaining people's investment decisions.

Thus a propensity to invest in a pyramid scheme is not predicted very well by people's intelligence, gender, numerical reasoning ability or tendency to seek sensation. There is, in fact, something rather odd about it that calls for future research. In the meantime, however, the apparent vulnerability of some or many to the appeal of such schemes indicates it is probably worthwhile for society to keep them illegal.

Limitations of the Research and Possibilities for Future Research

The obvious limitation to the thesis was that an actual pyramid scheme was not instigated. Arguably it could have been run under laboratory conditions and would have added to the ecological validity of the research conducted as part of this thesis. However, while this idea was considered, it was quickly rejected on legal and ethical restrictions. Performing such a study would have challenged the laws in New Zealand where pyramid selling schemes are prohibited under the Fair Trading Act. The law recognises the vulnerability of people to pyramid schemes - amply demonstrated in the proceeding studies and makes it a criminal offence to run one. An ethical dilemma would also have arisen if a pyramid scheme had been run. Deliberately misleading people to invest money for the good of research would be difficult to justify to oneself and to the board of ethics at the University of Canterbury.

In looking at directions for future research a number of possibilities arise. The most obvious would be to identify pyramid scheme investors and then at a later time find if they were any more or less likely to invest in another after having already experienced a pyramid scheme. Also, developing a computer simulation of a pyramid scheme may enable this type of scheme to be further explored. The added benefit of such a method is that people's investment behaviours could be more easily tracked over a longer periods of time and outside the confines of a laboratory setting using the internet. For instance, having such a mobile system would enable other populations to be tested for their vulnerability to pyramid schemes.

Before beginning the research reported here, I carried out a search of the literature to determine whether any studies existed on pyramid schemes. No such psychological studies were found and it has, therefore, been interesting to examine this previously unexplained type of economic behaviour. The present work contributed our understanding of what type of individuals and conditions give rise to pyramid scheme investment. This line of research is of particular importance for many reasons. Arguably the most important are that pyramid schemes cause financial loss for most of its investors and there is no sign of their appeal abating. At present, there is no foolproof way to tell whether a person will invest in a pyramid scheme, or not. Instead we must rely on the legal system to protect people from pyramid schemes and penalise those people who run them.

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Appendix A: Zuckerman's Sensation Seeking Scale Version five (SSS-V)

Sensation Seeking

For each question, please clearly tick which of the choices most describes your likes or the way you feel. When it is hard to choose, select the option that describes you best or that you dislike the least.

1. A. I like "wild" uninhibited parties
 B. I prefer quiet parties with good conversation

2. A. There are some movies I enjoy seeing a second or even third time
 B. I can't stand watching a movie that I've seen before

3. A. I often wish I could be a mountain climber
 B. I can't understand people who risk their necks climbing mountains

4. A. I dislike all body odours
 B. I like some of the earthy body smells

5. A. I get bored seeing the same old faces
 B. I like the comfortable familiarity of everyday friends

6. A. I like to explore a strange city or section of town by myself, even if it means getting lost
 B. I prefer a guide when I am in a place I don't know well

7. A. I dislike people who do or say things just to shock or upset others
 B. When you can predict almost everything a person will do and say he or she must be a bore

8. A. I usually don't enjoy a movie or play where I can predict what will happen in advance
 B. I don't mind watching a movie or play where I can predict what will happen in advance

9. A. I have tried cannabis or would like to
B. I would never smoke cannabis
10. A. I would not like to try any drug which might produce strange and dangerous effects on me
B. I would like to try some of the drugs that produce hallucinations
11. A. A sensible person avoids activities that are dangerous
B. I sometimes like to do things that are a little frightening
12. A. I dislike "swingers" (people who are uninhibited and free about sex)
B. I enjoy the company of real "swingers"
13. A. I find that stimulants make me uncomfortable
B. I often like to get high (drinking alcohol or smoking marijuana)
14. A. I like to try new foods that I have never tasted before
B. I order the dishes with which I am familiar so as to avoid disappointment and unpleasantness
15. A. I enjoy looking at home movies, videos or travel slides
B. Looking at someone's home movies, videos, or travel slides bores me tremendously
16. A. I would like to take up the sport of water skiing
B. I would not like to take up water skiing
17. A. I would like to try surfboard riding
B. I would not like to try surfboard riding

18. A. I would like to take off on a trip with no preplanned or definite routes or timetable
B. When I go on a trip I like to plan my route and timetable fairly carefully
19. A. I prefer the “down to earth” kinds of people as friends
B. I would like to make friends in some of the “far-out” groups like artists or anarchists
20. A. I would not like to learn to fly an airplane
B. I would like to learn to fly an airplane
21. A. I prefer the surface of the water to the depths
B. I would like to go scuba diving
22. A. I would like to meet some people who are homosexual (men or women)
B. I stay away from anyone I suspect of being gay or lesbian
23. A. I would like to try parachute jumping
B. I would never want to try jumping out of a plane, with or without a parachute
24. A. I prefer friends who are excitingly unpredictable
B. I prefer friends who are reliable and predictable
25. A. I am not interested in experience for its own sake
B. I like to have new and exciting experiences and sensations even if they are a little frightening, unconventional, or illegal

26. A. The essence of good art is in its clarity, symmetry of form, and harmony of colours
B. I often find the beauty in the clashing colours and irregular forms of modern paintings
27. A. I enjoy spending time in the familiar surroundings of home
B. I get very restless if I have to stay around home for any length of time
28. A. I like to dive off the high board
B. I don't like the feeling I get standing on the high board (or I don't go near it at all)
29. A. I like to date people who are physically exciting
B. I like to date people who share my values
30. A. Heavy drinking usually ruins a party because some people get loud and boisterous
B. Keeping the drinks full is the key to a good party
31. A. The worst social sin is to be rude
B. The worst social sin is to be a bore
32. A. A person should have considerable sexual experience before marriage
B. It's better if two married people begin their sexual experience with each other
33. A. Even if I had the money, I would not care to associate with flighty rich people in the jet set
B. I could conceive of myself seeking pleasures around the world with the jet set

34. A. I like people who are sharp and witty even if they do sometimes insult others
B. I dislike people who have their fun at the expense of hurting the feelings of others
35. A. There is altogether too much portrayal of sex in the movies
B. I enjoy watching many of the sexy scenes in movies
36. A. I feel best after taking a couple of drinks
B. Something is wrong with people who need alcohol to feel good
37. A. People should dress according to some standard of taste, neatness and style
B. People should dress in individual ways even if the effects are sometimes strange
38. A. Sailing long distances in small sailing crafts is foolhardy
B. I would like to sail a long distance in a small but seaworthy sailing craft
39. A. I have no patience with dull or boring people
B. I find something interesting in almost every person I talk to
40. A. Skiing down a high mountain slope is a good way to end up on crutches
B. I think I would enjoy the sensations of skiing very fast down a high mountain slope