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Incidental Emotions and Trust Decisions: Visceral Influences on Economic Behavior

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Incidental Emotions and Trust Decisions:
Visceral Influences on Economic Behavior

Senior Project submitted to
The Division of Social Studies
of Bard College

By
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Annandale-on-Hudson, NY

April 2014

INCIDENTAL EMOTIONS AND TRUST DECISIONS

Dedication and Acknowledgements

I'd like to dedicate this thesis to my family. To my grandparents, Clement and Naomi, for the words of wisdom, the delicious food, and for sharing their life experiences with me. To my father, Yuval, for all the long talks, for motivating me, and for being the best role model a son could ask for. To my mother, Beate, for giving me her love and always supporting me, no matter what. To my brother, Liad, for always bringing a smile to my face, and for showing sensitivity and thoughtfulness beyond his years. Finally, to my uncles and aunts, Gili, Orit, and Batia, and my cousins, Omer, Roey, Noah, and Adi, for being there for me even when I'm 5,600 miles away.

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Abstract

In recent years, trust has emerged as a key concept in the understanding of cooperation between individuals and organizations. It has been implicated as an important variable in topics ranging from individual decision-making in finance, to macroeconomic growth and stability in developing countries. This thesis employs an experimental design to investigate the impact of emotions on trust behavior. In the experiment, emotion was induced in participants who then played a basic trust game originally proposed by Berg, Dickhaut, & McCabe (1995). Results indicate that emotions do impact trust, with anger decreasing trust behavior. However, the data also reveal that individual propensity for risk as well as attachment to a community play a role in the effect of emotions on trust. This finding contributes to the current literature in that it provides empirical evidence not only for the impact of emotions on trust but also for the relationship between emotions, risk, and trust behavior. The implications of these findings are discussed in light of recent literature in behavioral economics.

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Chapter 1

Introduction: Why Behavioral Economics?

A physicist, a chemist and an economist are stranded on an island with nothing to eat. A can of soup washes ashore. The physicist says, "Let's smash the can open with a rock." The chemist says, "Let's build a fire and heat the can first." The economist says, "Let's assume that we have a can-opener..."

Behavioral economics

Modern conceptions of behavioral economics first appeared during the mid 1900's with the development of cognitive and behavioral psychology. According to Camerer, Loewenstein, and Rabin (2004), "behavioral economics increases the explanatory power of economics by providing it with more realistic psychological foundations," (p. 3).

This movement towards psychological realism in economics reflected increasing discontent with neoclassical assumptions of rational choice, expected utility, and discounted utility models. Essentially, the development of behavioral economics was facilitated by increasing dissatisfaction with economic models that assumed the existence of a 'can opener,' rational human behavior. Concurrently, a shift in psychology resulted in a rise in research on behavior, decision-making, judgments, and information processing which allowed a framework against which to compare neoclassical assumptions regarding human behavior. As a result, behavioral economics has emerged from the union of these simultaneous trends in psychology and economics.

Despite the relatively recent development of modern behavioral economics, the ideas expounded by behavioral economists date back to the founding of economics as a field of study. For example, Adam Smith, often referred to as the founder of modern economics, wrote "we suffer more... when we fall from a better to a worse situation, than

we ever enjoy when we rise from a worse to a better,” (Smith, 1759, p. 311). Smith effectively described loss aversion in an economic setting over 200 years before Kahneman and Tversky investigated the phenomenon for the first time using psychological experiments (Kahneman & Tversky, 1984).

Writers from Adam Smith to John Stuart Mill and David Ricardo addressed this notion of the psychology of economics in one way or another. The turn away from psychological underpinnings to economic theory came with the rise of neoclassical economics in the 1870’s. As a result, behavioral economists have recently argued that modern behavioral economics represents a return to the basic ideas of classical economics, as opposed to the creation of a new field of study (Camerer, Loewenstein & Rabin, 2004). I believe that this return to the roots of economics holds invaluable promise in terms improving current economic models and theory.

Introduction

Drawing on theories and empirical evidence from economics and psychology, this senior thesis investigates the effect of emotions on trust decisions. This area of study piqued my interest because, while largely overlooked in mainstream economics, emotions and trust decisions are key to an understanding of economic behavior. The empirical component of this study is based on an experiment that looks at the relationship between these two variables at the microeconomic level. Within my experimental design, trust behavior is measured within the framework of economic decision-making. This is done using a modified version of a trust game originally proposed by Berg, Dickhaut, and McCabe (1995), which has become a staple of behavioral game theory. In addition to measuring the effect of emotions on trust behavior, I utilize self-report measures to

include other variables, such as risk and empathy, in the analysis and to provide a unique perspective on micro-level trust behavior.

The key research question that this study investigates is, to what extent do emotions, specifically incidental emotions, impact trust behavior? In order to provide a basis for addressing this question, the next four chapters will review literature from both economics and social psychology. Chapter two will review literature on trust in economics. This chapter will compare neoclassical conceptions of trust to recent studies of trust in behavioral economics. It will then demonstrate the importance of trust in economic interactions on both a micro and macroeconomic level. Chapter three will review the relevant literature on emotions theory in order to develop a working definition for emotions in this study. The chapter will analyze different theories on the structure and elicitation mechanisms of emotions as well as the relationship between emotions and observed behaviors.

The fourth chapter will cover emotions in judgment and decision-making. It will begin by reviewing several emotion theories that apply to decision making in order to provide a theoretical framework for the current research. Once this framework has been established, the chapter will investigate the role of emotions in economics and how emotions have been perceived within the framework of economic decision-making. Finally, chapter five will begin by reviewing the literature on emotions and trust and then introduce the experimental design, utilizing the theoretical framework in chapter four as a basis.

After this literature review, chapters six and seven will describe the methodology and report the results of the experiment. Chapter eight will then discuss the findings and

key implications of this study, evaluate how this study is contextualized in current literature, and offer suggestions for future research.

Chapter 2

Trust in Economics

“Trust is the expectation that arises within a community of regular, honest, and cooperative behavior, based on commonly shared norms, on the part of other members of that community” (Fukuyama, 1995:26)

What is trust and why is it important?

The idea of social capital was first formally introduced by Loury (1977) in an attempt to explain socioeconomic stratification among racial groups in the U.S (Akcomak, 2011). This notion has subsequently come into widespread use in many of the social sciences since the 1990’s. In the last two decades it has been instrumental in the analysis of economic development on both a macroeconomic and microeconomic level.

Social capital is defined as the information, trust, and norms of reciprocity inherent in a social network (Woolcock, 1998). While both are viewed as important determinants of economic position, social capital differs from the traditional neoclassical concept of human capital. At the basic level, human capital is evaluated according to individual differences in education and work experience (Hanushek, 2013; Becker, 1975). In contrast, social capital provides a broader explanation for differences in economic development by addressing societal mechanisms that impact growth. Another way to think about it is that human capital might provide an individual-level explanation for economic mobility by evaluating personal differences in education and work experience (Loury, 1977). In contrast, the unit of analysis in research on social capital is not the individual but the interactions between individuals; social capital is the foundation for interactions and economic exchanges in the market (Woolcock, 1998). Whereas

human capital refers to ability and the “quality” of individuals, social capital refers to opportunity and is a quality created between people (Burt 1997; Coleman 1994).

Several important studies over the past two decades have indicated that social capital is critical to economic growth (Knack and Keefer 1997, Putnam 1993; La Porta, Lopez-de-Salanes, Shleifer & Vishny, 1997; Golding & Katz, 1999). If this is the case, we must ask ourselves, what are the components and preconditions of social capital formation?

According to the definition of social capital given by Woolcock (1998), trust is one component of social capital. Several researchers have gone a step further and argued that trust is not only a component of social capital, but is also a necessary precondition of social capital formation in a society (Fukuyama, 1995; Coleman, 1988; Putnam 1993). Fukuyama states that social capital is in fact “a capability that arises from the prevalence of trust in a society or in certain parts of it” (Fukuyama, 1995; p. 26).

This observation has led scholars to conclude that trust plays an integral role in social capital formation and economic development because it fosters cooperation. Furthermore, they assert that the most effective organizations and economic ventures are those that are grounded in shared ethical values, which foster cooperation (Fukuyama, 1995). Thus, trust, in an economic context, is imperative to cooperation between individuals and organizations, which forms the basis of economic function.

To better explain the role of trust in economic behavior, the following sections will first provide an analysis of different viewpoints on trust within economics and then attempt to reach a conclusion in regard to what the role of trust is in economic

transactions and how this might influence macro-level economic growth and development.

Trust in mainstream economics

Rational choice theory has long been foundational to conceptions of human behavior in neoclassical economics. The most basic and critical assumption held by rational choice theory is that people aim to maximize their utility (Grafstein, 1995). In other words, the theory predicts that the market will function with each individual acting in pure, unbridled, self-interest.

In economic terms, utility maximization means that an individual will take the course of action that will yield the highest possible expected monetary return. If we accept that monetary reward is the defining measure of utility for an economic entity, this assumption of self-interest yields at least one interesting conclusion: It excludes the possibility of behaviors such as altruism, reciprocity, fairness, and trust in an economic interaction.

This conclusion is best demonstrated with a simple example of a strategic interaction between two players. Assuming that player 1 is a sophisticated player, and assumes player 2's rationality, he will know that any monetary sum entrusted to player 2 (for the purpose of investment or otherwise) will not be returned if player 2 is given an option of how much of a return to give. In other words, player 2 will maximize his or her utility by not reciprocating and player 1 will be aware of this. Thus, player 1 will not trust player 2 to give her/him any monetary gains because reciprocity and fairness do not exist in a model with perfectly rational players. If both players maximize their utility, and

each player knows that the other player is maximizing his/her utility, there can be no trust between players without exogenous assurances.

How then, does the neoclassical framework explain cooperation within economic exchanges? One explanation is that self-interest will naturally cause people to cooperate. This applies to situations such as direct trades in which one party exchanges goods or services with another at a single point in time and both parties come off better due to comparative advantage. However, situations such as labor agreements in which goods or services are provided for future payment (instead of payment at the time of the transaction) abound in the real world. Rational choice theory would indicate that economic agents would fail to cooperate in any such situation. For these situations, neoclassical economists have posited that exogenous assurances would provide incentives for cooperation.

Exogenous assurances encompass institutions such as legal contracts, government backed property rights, and contract enforcement. Therefore, neoclassical economists argue that trust is not necessary for real-world interactions involving cooperation. Instead, economic agents, operating rationally on the principle of self-interest, will cooperate under the assurance of contracts, incentives, and legal mechanisms (Fukuyama, 1995; Knack & Keefer, 1997).

This view of trust and cooperation is the prevalent view in mainstream economics. However, we must ask, do real world data reflect this conception of the nonexistent and unnecessary nature of trust? Does trust behavior actually exist in an economic sense or do individuals act in accordance with rational choice theory and rely purely on self-interest and exogenous assurances for cooperative behavior?

Conceptions of trust in behavioral economics

Several studies have investigated whether economic agents behave in a rational way when faced with decisions of trust. For example, Berg, Dickhaut, and McCabe (1995) proposed an experimental trust game based on strategic interaction. In this game, an Investor is given an endowment X which they can choose to keep or invest. If the Investor decides to invest X , he or she will earn a return of $(1+r)$, with r being a constant. The total amount of money post-investment $(1+r)T$, with T being the portion of the endowment invested, is given to an anonymous Trustee who must decide how to allocate this new sum of money between themselves and the Investor.

According to rational choice theory, the Trustee would maximize his or her utility by keeping the entirety of this new sum and the Investor, knowing this, would not invest any money to begin with. This study has been carried out numerous times and the results show that, among adult populations in industrialized countries, most Investors choose to invest a significant part of the endowment, indicating trusting in an anonymous player. In addition, due to principles of fairness and reciprocity¹, the Trustee generally repays the Investor with a significant sum, with repayments averaging 110% of the original invested amount in many studies (Ortmann, Fitzgerald & Boeing, 2000). Therefore, counter to rational choice theory, the Investors in this strategic interaction on average maximize their utility through trust behavior. They rely on 'honest and cooperative behavior, based on commonly shared norms' to induce the other player to reciprocate their trust.

Another interesting study similarly investigated trust, but did so outside of the limited laboratory construct (Resnick, Zeckhauser, Swanson & Lockwood, 2006).

¹ Fairness and reciprocity also contribute to the concept of social capital. They can be defined as social norms that induce people to reciprocate risky moves on the part of others despite a reduction in utility as a

Researchers conducted a field experiment in which they utilized an eBay auction with two vendors selling identical products at different times (Resnick et al., 2006). One seller was established and had a good reputation whereas the other seller was new and had no buyer feedback and therefore no reputation². The researchers found that trust, generated from a strong reputation and positive buyer feedback, resulted in a price premium for the established seller (Resnick et al., 2006).

These results indicate that, in an environment with limited information on the seller such as Internet retail, the ability to trust a seller in their honesty and fulfillment of a purchase seems to be a factor for which buyers are willing to pay an additional cost. This behavior runs counter to normative predictions of rational choice theory. In neoclassical models, markets are assumed to have no information asymmetries and rational actors are presumed to be able to analyze and incorporate all information into their decision-making. Contrary to this assertion, buyers seem to rely almost solely on sale volume in determining how trustworthy a seller is (Resnick et al., 2006). Furthermore, instead of maximizing their utility by paying the lowest possible price and analyzing the greatest amount of data (product quality, geographic location, written comments, seller website quality), buyers seemed to be willing to pay a price premium to buy from a more trustworthy, established, seller. This indicates that trust plays a role in real world sales interactions and is important enough to garner a price premium, especially in information-ambiguous situations.

Trust has also been shown to play a key role in employer-employee relationships. The ‘paradox of organizational trust’ for example, relates to the debate over whether

² The researchers created the vendors’ merchant accounts and buyer accounts in order to supply feedback and ratings to the vendor account with the ‘good reputation.’

incentive plans in the workplace improve employee performance (Rigdon, 2006).

According to mainstream economic theory, incentives are a motivating factor for better performance on the part of the employee. In a desire to maximize their utility by getting a bonus, employees will be willing to work harder and worker efficiency will increase. However, it has been argued that the use of incentives decreases trust within an organization because it signals to employees that managers do not believe them to be adequately self-motivated (Rigdon, 2006). As a result, this lack of trust decreases worker productivity, yielding the opposite effect from the one predicted by the standard neoclassical model. Specifically, several studies have found that the introduction of incentives decreases performance in a variety of contexts (Gneezy and Rustichini, 2000a; Lepper and Greene, 1978; Deci and Ryan, 1999). These findings have also been extended to situations involving punishments as incentives in social contracts (Gneezy and Rustichini, 2000b). These studies consist of both field and laboratory experiments and indicate that workers' trust in their employer might be a greater motivator for efficiency and productivity than monetary incentives.

The results of these studies indicate that neoclassical models of rational choice theory and expected utility might not be accurate predictors of people's economic behavior in circumstances involving trust. Instead of acting according to the predictions of rational choice theory, economic agents in a variety of contexts seem to trust others, be willing to pay for trust, and be willing to sacrifice monetary and other forms of utility in favor of trust. This indicates that trust does play a role in economic interactions and a strong one at that. However, the studies discussed so far have focused exclusively on microeconomic behavioral decision-making. This prompts the question of whether these

findings aggregate and whether trust impacts economic interactions on a broader, macroeconomic scale?

Impact of trust

Several studies have indicated that trust translates from individual behavioral decision making to macroeconomic changes through several mechanisms (Glaiser, Laibson & Sacerdote, 2002; Putnam 1993; La Porta, Lopez-de-Salanes, Shleifer & Vishny, 1997; Golding & Katz, 1999, Knack & Keefer, 1997). One landmark study employed a cross sectional regression analysis to investigate the effect of societal trust levels on economic development (Knack & Keefer, 1997). This study found that trust levels, as measured by the World Values Survey, are positively correlated with aggregate economic performance (Knack & Keefer, 1997). In addition, the researchers found that this effect is stronger in poorer countries. They attributed this finding to national variation in trust levels, arguing that the effect is stronger in poorer countries because trust plays a larger role in facilitating economic interactions in economies that lack formal institutions and contract enforcement. This stands in contrast to developed economies with more stable formal institutions in which contracts are more widely used in business interactions (Knack & Keefer, 1997). The authors go on to discuss several mechanisms by which trust might impact macroeconomic performance. One explanation they discuss for the connection between higher trust levels and higher growth rates involves protection and contract enforcement in economic transactions:

Individuals in higher-trust societies spend less to protect themselves from being exploited in economic transactions [and]... are also likely to divert fewer resources to protecting themselves-through tax payments, bribes, or private security services and equipment-from unlawful (criminal) violations of their property rights. (p. 1252)

This explanation for the link between trust and economic growth implies that trust reduces costs of conducting business. In this sense, at the macro level, trust between economic agents and institutions can be seen as an economic lubricant. If individuals and firms devote fewer resources to protecting themselves from unforeseen negative outcomes, they will be able to divert more resources to productive endeavors. As a result, the country will be able to accumulate more physical capital and increase production. In the Solow growth model, a staple of neoclassical growth theory, physical capital accumulation is a key component of growth (Solow, 1956). The aggregate production function for the model is shown below in which Y represents total output, K represents capital, L represents labor, A represents labor augmenting technology³, and α is the elasticity of output with respect to capital.

$$Y = K^{\alpha}(AL)^{1-\alpha}$$

In addition, a country with higher trust levels and lower costs for protection will have a more attractive investment environment. In poorer countries with low labor costs, a stable and secure investment environment might attract foreign investment, which would further increase capital accumulation. Foreign investment has been implicated as a factor that has helped drive growth in some developing countries (DeMello, 1999). In summation, trust levels might reduce costs and therefore increase growth by creating an environment more conducive to macro level investment and capital accumulation.

Another mechanism by which trust might increase growth is the development of informal markets. Institutions and infrastructure that support market systems in more

³ A includes human, and in some interpretations social, capital because they effectively increase output per worker.

developed countries are often lacking in developing countries. This absence stunts economic growth by disallowing access to credit from formal institutions. However, in societies with adequate levels of trust, informal credit sources can develop and become an important source of liquidity. For example, informal credit sources play a big role in rural lending in many developing countries because of their relatively low transaction costs and fewer barriers to entry than formal institutions (Meier & Rauch, 2005). Studies have also shown the presence of rotating credit associations, in which money is pooled and lent to a different family each time, in countries and cultures on every continent (Miracle, Miracle & Cohen, 1980; Putnam, 1993). Similar to the lower protection costs associated with trust, access to liquidity through informal credit sources allows rural farmers to accumulate capital and increase productivity.

A third way in which micro trust levels could impact macroeconomic development has to do with investment horizons⁴. Knack and Keefer (1997) argue that if government officials and policy makers are deemed trustworthy by economic agents then an investment environment conducive to long term planning will be more likely to develop. In other words, policies pursued by central bankers and financial policy makers will be more stable and preplanned and will thus allow for long-term investment horizons. Long-term investment horizons will once again encourage foreign direct investment and reduce transaction costs because businesses will not have to protect themselves from adverse and unforeseen fiscal and monetary policies. As a result, physical capital accumulation will increase and spur economic growth.

⁴ Investment horizons refer to the length of time over which investors intend to hold on to, and plan for, an investment strategy.

While these mechanisms have direct implications for physical capital accumulation, which drives short-term growth, societal trust levels may also have strong implications for returns to human capital. According to the Solow Growth Model, long run growth is exogenously determined by technological progress (Solow, 1956). This ‘technological progress’ is comprised of many components, one of which is human capital (Solow, 1956). If we operationalize human capital as the extent and quality of education, which is a widely used measure of human capital, there is a clear, albeit indirect, link between trust and human capital development. Trust and civic norms such as fairness, reciprocity, and civic duty, have been positively correlated with better government institutions including the provision of public education (Putnam, 1997; Coleman 1988). Additionally, in high trust societies, (compared to low trust societies) hiring will be based to a larger degree on credentials and education as opposed to ethnic, tribal, or family membership (Knack & Keefer, 1997). This will increase the quality of hiring practices and result in a more productive labor force. Higher payoffs to education will also create greater incentives to educational attainment and further drive long run growth.

In addition to these mechanisms of growth, a recent paper also found that higher trust levels are associated with lower economic volatility (Sangnier, 2013). This can be linked to the attractive investment environment created in high trust societies. Lower economic volatility will once again increase propensity to invest and adopt long-term investment horizons on the part of both domestic businesses and foreign firms.

The evidence presented here indicates that trust does in fact translate from microeconomic decision-making to macroeconomic growth in both the short and long

term. This leads us to the next section, which discusses how societal trust should be evaluated in light of these findings.

Implications of trust

Interpersonal trust seems to significantly affect growth by reducing transaction costs, providing a stable investment environment, and increasing returns to human capital investment. The importance of trust is underscored by research indicating the existence of a low-trust poverty trap, in which sufficiently low trust levels result in such low investment levels that growth is impossible (Zak & Knack, 2001). In addition, trust levels do seem to vary significantly across nations and cultures on both a micro and macro level⁵. For example, when the Berg, Dickhaut and McCabe (1995) trust study was carried out in different cultures, the experiment yielded different results in terms of both trust and reciprocity (Camerer, 2003). For example, when the experiment was carried out in Kenya with Orma herders, average trust was around 40% of the endowment and average return was only around 55% of the amount invested (Ensminger, 2000). In contrast, when the trust game was replicated with German subjects, the average amount invested was around 60% of the endowment and the average return was 110% (Jacobson & Sadrieh, 1996; Willinger, Lohman & Usunier, 1999). Additionally, in their cross-sectional analysis, Knack and Keefer (1997) found significant differences in macro-level trust between countries.

With evidence indicating that trust is a strong determinant of growth and that trust varies significantly among countries, how do we evaluate the real effects of trust on economic performance within a given nation? In order to answer this question we can

⁵ Micro level trust behavior is measured through experiments such as the Berg, Dickhaut & McCabe (1995) study. Macro level trust is generally measured through surveys that have much larger, and more representative, samples, such as the World Values Survey data used by Knack and Keefer (1997).

turn to a basic model of aggregate supply and demand. Assuming a situation where trust levels decline, transaction costs should increase in the short run, impacting aggregate demand by making both producers and consumers less likely to engage in transactions due to increased cost. Thus, lower levels of trust could be seen as a tax on transactions in the short run, resulting in a downward shift of the aggregate demand curve.

Alternatively, an increase in societal trust levels could be seen as a subsidy to transactions resulting in an upward shift of the aggregate demand curve and greater output.

In the long run, a decrease in trust levels, which translate to a decrease in social capital, will reduce returns to human capital. As a result, educational attainment will decline and the country will experience a brain drain as educated individuals immigrate to countries where they receive higher returns to their existing education.

In conclusion, this chapter posits that trust plays an integral role in economic growth. In contrast to neoclassical conceptions of rationality, people do seem to trust others in micro-level economic transactions. This trust behavior in turn translates into significant positive benefits for economic growth and stability. Specifically, societal trust levels have been implicated in stimulating both short run and long run growth by reducing transaction costs, providing a stable investment environment, and increasing returns to human capital investment. Low levels of interpersonal trust must therefore be evaluated as a tax on economic transactions and policies should be put in place to facilitate the development of trust. The policy implications of trust studies and motivating factors that generate trust on a macro level will be discussed in the conclusion of this thesis.

Chapter 3

Emotions Theory

Psychological definitions of the term ‘emotion’ vary and no single definition has been agreed upon across the literature. Research has indicated that psychologists differ in their definitions of emotion along several key dimensions (Izard, 2010). These dimensions include the activators, structure, and functions of emotion as well as the connections between emotion and observed responses (Izard, 2010). As a result, researchers tend to define emotions based on their individual analyses of the above emotion components and the specific emotions/types of emotions they are investigating (Izard, 2010; Gendron, 2010).

The current research deals with emotions in the framework of economic decision-making, which naturally narrows down the context in which we may operationalize emotions. This chapter will review current literature on emotions in order to identify what an emotion is, how emotions are activated, how emotions are structured, and how emotions and observed reactions relate to one another. The next chapter, which will deal with emotions in decision-making, will investigate the function of emotions in the context of the current research.

Essentially, this chapter aims to give an overview of the basic components of emotion and argue for certain emotion theories which apply most directly to the current study in order to come up with a working definition for emotions.

What are emotions?

At the basic level, an emotion is an affective experience. There has been much debate in emotion psychology on how affective experiences, which in their simplest terms are classified in terms of positive and negative feelings, can be categorized. The

current consensus among emotions researchers seems to be that affective traits can be separated into three distinct categories, emotional traits, moods, and emotions (Kahneman, 1999; Ekkekakis, 2013; Rosenberg, 1998; McCullough, Emmons & Tsang, 2004; Ekman, 1994). In order to understand what an emotion is we must first understand how psychologists differentiate emotions from other affective experiences.

The most basic affective category is that of emotional traits. These traits consist of general emotional states of being that persist across time and in different situations (Athota & O'Connor, 2014; Larsen & Ketelaar, 1989). These traits are expressed as recurring tendencies in an individual's life. In other words a person with a certain emotional trait will display this trait consistently in a variety of situations. In addition, possessing such a trait would lower one's threshold for experiencing an emotional state with similar valence and arousal characteristics (Edmondson, Shaffer, Chaplin, Burg, Stone & Schwartz, 2013; Rosenberg, 1998). For example, a hostile emotional trait would predispose an individual to experience anger and this person's psychological profile would closely resemble that of an angry individual, even in the absence of an anger-inducing stimulus (Edmondson, et al., 2013).

The second category of affective experiences is mood. In contrast to emotional traits, moods do not persist across large portions of a person's life. Instead they are affective experiences that last for a set period of time but are not focused on a particular cause and are not context-dependent (Ekkekakis, 2013; Watson & Tellegen, 1985). In addition, they generally appear and dissipate slowly and without defining circumstances (Ekkekakis, 2013). Moods are stronger affective experiences than emotional traits but still lack a distinct causal focus.

The third category of affective experience is emotion. Emotions are generally shorter than moods, usually have a direct causal factor and have a defined starting and ending point (Ekkekakis, 2013, Ekman, 1992; Schwarz, 2010). They are characterized by a sharper onset and a shorter duration time than moods (Schwarz, 2010).

These three categories cover the basic spectrum of affective experiences. Within these categories, emotions seem to be distinct from other affective experiences based on their intensity and duration as well as their elicitation. Specifically, emotions have a concrete external stimulus that facilitates elicitation of the emotion. Now that we have covered how emotions differ from other types of affect, we will investigate the structure of emotions.

How are emotions structured? Discrete and constructionist theories

The classical view of emotional structures is that of discrete or basic emotions⁶. According to these theories, emotions are distinct, separate entities that are genetically encoded and linked to unique physiological and behavioral responses (Clore & Ortony, 2008; Ekman, 1992). For example, this view would posit that anger would have a unique set of characteristics such as facial display (scowling), cardiovascular response (increased heart-rate), and skin conductance response, and that this set of responses would be significantly different from the pattern of responses denoting fear.

The most substantive evidence for basic emotions theory comes from research conducted in New Guinea with a pre-literate cultural-linguistic group (Ekman & Friesen, 1971). In this study, researchers read a story and showed pictures of faces expressing different emotions to participants from this ethnic group in New Guinea (Ekman &

⁶ Basic emotion theory and discrete emotion theory are used interchangeably here; previous reviews of the literature have indicated that these terms are synonymous (Barrett, 2006).

Friesen, 1971). Participants were then asked which face portrayed the emotion that matched the emotion in the story (Ekman & Friesen, 1971). Results indicated that participants from this preliterate culture were as adept at judging emotions based on facial expressions as participants from literate Western cultures (Ekman & Friesen, 1971). Due to the fact that participants from this preliterate culture had had very limited exposure to western culture and mass media prior to the study, their ability to recognize Western facial expressions indicates that some emotions may be basic or universal. This makes a strong argument for the existence of emotions as distinct, genetically encoded, entities because it suggests that they are universal and clearly distinguishable by behavioral (facial) expression.

Other evidence for discrete emotion theory comes from studies on neurochemical processes (Panksepp, 1998), nervous system activity (Ekman, Levenson, & Friesen, 1983; Levenson, 2002), and vocal expressions (Scherer, Johnstone, & Klasmeyer, 2003). For example, in one study, researchers induced six emotions (surprise, disgust, anger, sadness, fear, and happiness) in participants using directed facial action and relived emotion tasks⁷. Researchers then measured participants' physiological responses such as heart rate, skin temperature, skin conductance, and muscular contraction (Ekman, Levenson, & Friesen, 1983). Results indicated that physiological responses were significantly different between each of the negative emotions and between positive and negative emotions (Ekman, Levenson, & Friesen, 1983). This work provides support for discrete emotions theory by indicating that these six basic emotions have distinct

⁷ The directed facial action task involved asking participants to activate certain facial muscles that replicated a facial expression congruent to a certain emotion (i.e., contracting the face into a scowl in the anger condition), researchers did not mention the actual emotions during the manipulation. In the relived emotion task, participants were asked to relive a previous emotional experience that was congruent with emotion being induced.

physiological responses that are common across the participant sample. Thus, each emotion has a unique set of observed responses associated with it, creating a discrete category and natural boundaries between emotions.

The extensive literature supporting basic emotions has provided a fairly convincing argument for this model of emotion structure. However, in the 1990's, researchers began to criticize discrete emotion theory and found evidence supporting constructionist models⁸ of emotion structure (Levenson, 2002).

Constructionist models of emotion argue that emotions do not exist as entirely discrete and clearly separate entities (Colombetti, 2009). They question the argument made by basic emotions theorists of the existence of a direct relationship between specific emotions and specific, concrete, physiological and behavioral responses (Colombetti, 2009). Instead, constructionist models argue that emotions are loosely organized, fluid, situation-dependent responses to external stimuli and that boundaries between different emotions are far more flexible (Russell & Barrett, 1999; Barrett, 2006; Russell, 2006; Sabini & Silver, 2005; Barret, Gendron & Huang, 2009; Lindquist, Siegel, Quigley & Barrett, 2013; Barrett, 2011; Barrett, Lindquist, Bliss-Moreau, et al., 2007; Lindquist, Wager, Bliss-Moreau, Kober, & Barrett, 2012; Kirkland & Cunningham, 2012). Furthermore, they argue that basic emotional dimensions of valence and arousal are the only inherent emotional characteristics and specific emotions arise from these dimensions in a situational and context dependent manner (Barrett, 2006). Essentially, this theoretic framework asserts that emotions are semantically derived and culture-specific due to their loosely organized nature and are not cross cultural or universal. In

⁸ Constructionist models have also been called dimensional models in recent literature; these terms are synonymous (Lindquist, Siegel, Quigley & Barrett, 2013).

other words, emotions would be differentiated because fear would result from negative valence and high arousal in a threatening situation as opposed to sadness, which would result from negative valence and low arousal in the context of loss or regret.

One of the fundamental arguments against discrete emotion theory stems from studies indicating that measureable responses that are assumed to result from a given emotion are typically weakly correlated (Barret, Gendron & Huang, 2009; Barrett, 2006). In other words, measures such as facial movements, vocal signals, and physiological arousal for a given emotion, such as anger, will have little correlation both within and between measures (Barrett, 2006). Therefore, contrary to discrete emotion theory, a single emotion does not yield a consistent set of measurable responses across a group of participants.

A recent review of Lench, Flores and Bench's (2011) meta-analysis of emotion literature indicates that effect sizes for physiological responses to different emotions are exceedingly small (Lindquist, Siegel, Quigley & Barrett, 2013). Additionally, the meta-analysis revealed that, "The only consistently significant differences (with moderate effect sizes) across pairwise comparisons of negative emotion inductions...were observed for self-reported emotional experience." (Lindquist, Siegel, Quigley & Barrett, 2013 p. 258). This evidence supports the constructionist view that emotions are constructs of culture, language, and situational variables and only exists on a spectrum composed of arousal and valence (Lindquist, Siegel, Quigley & Barrett, 2013).

A recent study on discrete emotions attempted a reproduction of Ekman and Friesen's (1983) experiment (Gendron, Barrett, van der Vyver & Roberson, 2014). Two participant groups, one from the U.S. and one from the Himba ethnic group in Namibia,

were asked to sort pictures of faces portraying different emotions into groups based on the emotions portrayed (Gendron, Barrett, van der Vyver & Roberson, 2014). The results of this study found that Himba participants sorted the stimuli differently from American participants and that they used behavioral terms (i.e., laughter) to describe emotions rather than the mental terms (i.e., happiness) which American participants used (Gendron, Barrett, van der Vyver & Roberson, 2014). These results indicate that emotions might not be genetically encoded, distinct, categories, but are instead perceived through a cultural lens. Additionally, the researchers posit that the results reported by Ekman and Friesen (1983) supporting basic emotion theory might be a product of the experimental design they used in which emotion concepts (the stories participants were told) were used to structure the perception of the stimuli (pictures of faces) before participants completed the emotion identification task (Gendron, Barrett, van der Vyver & Roberson, 2014).

In addition to physiological and behavioral evidence for constructionist models, as opposed to discrete emotion theory, several linguistics-based experiments also seem to support constructionist models. For example, one study utilizing semantic satiation (repeating a word until it loses meaning) showed that identification of emotions becomes more difficult following a semantic satiation exercise (Lindquist, Barrett, Bliss-Moreau, & Russell, 2006). This indicates that contrary to discrete emotion theory emotional meaning might be derived from conceptual semantic sources, not distinct, genetically encoded emotional categories. Neurological studies have also argued against discrete emotions by citing that emotion elicitation is linked to multiple brain regions, and is thus not confined to distinct neurological processes for each emotion (Barrett, 2006).

A review of the current literature indicates a shift in models of emotion from traditional discrete emotion theory to a constructionist theory of emotion structure. At the basic level, constructionist models evaluate emotions on the foundation of valence (positive or negative) and arousal (high arousal or low arousal). For example, anger is an emotion with negative valence and high arousal whereas sadness is an emotion with negative valence and low arousal and happiness is an emotion with positive valence and high arousal (Lindquist, Siegel, Quigley & Barrett, 2013). The experience of these emotions is framed by cultural, experiential, and situational factors and lack distinct universal boundaries. This thesis will adopt the basic constructionist view of emotion structure as a theoretical basis for the current research.

It is important to note that as Clore and Ortony (2008) state,

If (constructionist views are) confirmed, such observations would not necessarily make specific emotions any less important, powerful, or universal. They would simply change the locus and nature of their distinctiveness. In such a view, what makes emotions universal is not their biological status, but the situations to which they are responses. (p. 3)

Thus, the constructionist view of emotions utilized in the current research does not diminish the validity of using specific emotions (anger and happiness in this study) in an experimental design; it simply increases the situational factors as relevant variables in structuring the induced emotion. Now that we have investigated how emotions are structured, we will turn to an investigation of emotion elicitation.

Emotion elicitation and appraisal theories

At the basic level, an emotion is a reaction to an external stimulus (Clore & Ortony, 2008). Traditionally, psychologists have argued that the link between an external

stimulus and an emotion experience is realized through an emotional appraisal, an evaluative, cognitive, judgment about a situation or context (Clore & Ortony, 2008). In other words the classical view asserts that, when confronted with a situation, people engage unconscious cognition to evaluate what this situation means for them, and what kind of situation it is (threatening, positive, etc.,) and the emotion follows as a result of this cognitive appraisal (Lazarus, 1994).

In recent years, perceptual theorists have contested this classical cognitive view of appraisal theory. Perceptual theorists claim that basic emotion elicitation bypasses any sort of implicit cognitive analysis. In other words, a situation can elicit an emotional reaction such as fear before the unconscious cognitive mechanisms perceive why the situation is scary (Clore & Ortony, 2008). Parkinson states “the minimal precondition for anger is simply resistance stopping us from getting through,” (2007, p. 21). Thus, perceptual models assert that an external stimulus can elicit an emotional reaction automatically, bypassing cognitive appraisal of a situation.

Evidence for perceptual models of emotion elicitation stem from the idea that individuals might perceive emotion too quickly for cognitive appraisal to be activated. One study investigated this possibility by comparing reaction times for inferring appraisals versus inferring emotion reactions (Siemer & Reisenzein, 2007). Participants were given one sentence scenarios intended to be congruent to certain emotion experiences (i.e., ‘you are careless at work, a colleague gets hurt’ would correlate to guilt) (Siemer & Reisenzein, 2007). Participant reactions times were then measured for answers to questions about the emotion inference (guilt) or appraisal dimensions such as the valence, morality, importance, and focus of the sentence (Siemer & Reisenzein,

2007). The results of this study find that the emotion judgments occurred significantly faster than the appraisal judgments. This study provides some support for perceptual models of appraisal by suggesting that people might be faster to infer emotions than appraisals and thus the emotion elicitation process could involve automatic components that bypass cognitive appraisal in order to elicit an emotional experience.

In response to this reaction time study, cognitive appraisal theorists have argued that cognitive appraisals occur at the subconscious level and that emotion inferences in themselves are dependent on extracting relational appraisal-based information (Parkinson, 2007). Additionally, one study employed a series of experiments that tested whether evaluations of an emotional stimulus would be impacted by the valence (positive or negative) of a subconsciously presented, not emotionally charged, prime (Moors & DeHower, 2001). The results of this study indicated that positive or negative appraisals of a prime do in fact impact emotional inferences (Moors & DeHower, 2001). These findings support the existence of automatic appraisals and indicate that there is no reason to believe that emotion reactions occur more quickly than cognitive appraisals of a situation.

The differing viewpoints relating to the cognitive basis of emotion appraisals have resulted in several appraisal models. These models range from the perceptual theorists automaticity models to multiple models that combine cognitive and perceptual approaches of appraisal. At the basic level, these models suggest that in some cases, such as with low-level affective reactions or in the presence of familiar emotional stimuli, affective responses bypass cognitive mechanisms (Clore & Ortony, 2008). On the other hand, they assert that in other situations, such as in the case of full-blown emotional

reactions or a novel and complicated external stimulus, cognitive appraisals are the basis of emotion elicitation (Clore & Ortony, 2008).

Following a review of appraisal literature, it seems that dual-process models, involving both cognitive and perceptual appraisal components, have the most empirical support. Within the realm of dual process models, researchers have proposed different mechanisms by which the processes of emotion elicitation interact and produce observable behavior. These include sequential, chaotic, recursive, and single-network models of emotional appraisal (Barrett, Ochsner & Gross, 2008; Cunningham & Zelazo, 2007; Ortony, Norman & Revelle, 2005). However, the details of these models often find ambiguous and mixed empirical support and the debate on which of these models holds the most weight has proven inconclusive. This research will therefore ascribe to a basic dual-process model of emotional appraisal, which will be further discussed in the framework of appraisal utilized as a theoretical basis for the experimental design in chapter five. Now that we have reviewed how emotions are elicited and the mechanisms of cognitive appraisal, the next section will review literature on how emotions relate to observed responses.

Emotions and observed reactions: Emergence model vs. latent-trait model

Psychological inquiry into emotions is inherently limited by the fact that no direct examination of emotional experience is possible. Instead, psychologists must rely on the behaviors linked to emotional experience for insight into emotions. These behaviors include physiological, neurological, and behavioral expressions of emotional experience.

The classical psychological view of the relationship between emotion experience and emotion expression is that elicitation produces emotion experience, which produces

the expression. Recently, however, some researchers have argued against the notion that an emotion experience results in behavioral and physiological responses. Instead, these theorists argue that the convalescence of physiological and behavioral responses to an external stimulus result in an emotion experience (Barrett, Ochsner, & Gross, 2006; Clore & Centerbar, 2004; Clore & Ortony, 2000). In other words, instead of fear causing us to tremble, these theorists argue that trembling causes us to fear. This theory is known as the emergence model, as opposed to the traditional view, which is known as the latent-trait model (Clore & Ortony, 2008).

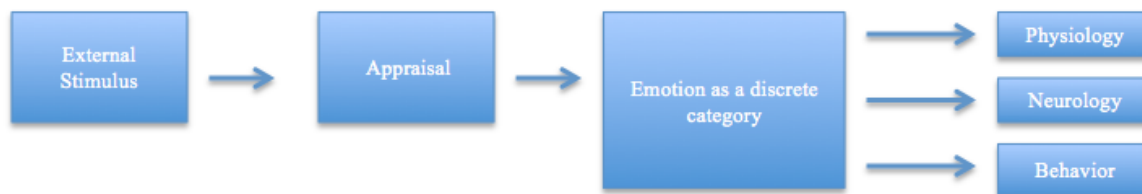
The traditional latent-trait model posits that an emotion can be experienced regardless of whether one expresses it through neurological, physiological, and behavioral means (Clore & Ortony, 2008). In contrast, the emergence model asserts that an emotion only exists as a result of the expression of that emotion across multiple systems in the body (i.e., behavior, nervous system arousal, and neurochemical changes) (Clore & Ortony, 2008).

In relation to the discrete and constructionist models of emotion structure discussed earlier in this chapter, the latent-trait model of emotions naturally fits with discrete emotions theory and the emergence model relates to constructionist approaches to emotion structure (Lindquist, 2013). This is because the emergence model theorizes that emotions relate to observed behaviors by ‘emerging’ from underlying affect and situational contexts. In essence, the physiological, neurological, and behavioral responses arise from underlying affective dimensions (i.e., valence and arousal) and these observed behaviors constitute the experience of an emotion (Lindquist, 2013). In contrast, the latent-trait/discrete emotions nexus argues that genetically coded, distinct emotions with

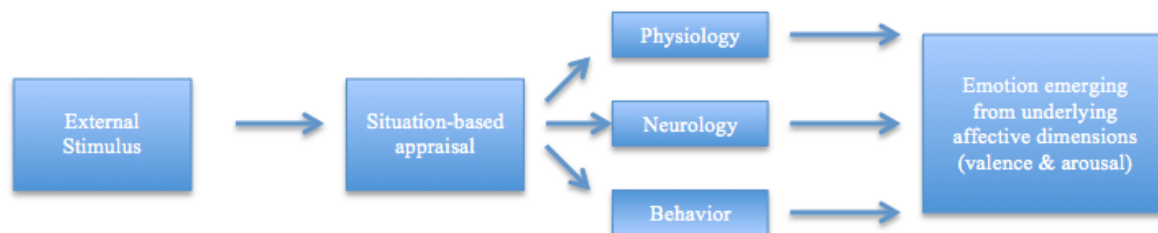
specific boundaries can be experienced and result in observable behaviors (Lindquist, 2013). Representations of the discrete emotion/latent-trait and the constructionist/emergence models of emotion can be found in the flow charts below.

Validation of the emergence model through empirical findings is difficult because the model is purely theoretical. Essentially, it exists as a way of viewing the relationship between emotions and observable reactions in light of new constructionist theories of emotion structure. As a result, data supporting constructionist views of emotion structure are often used to support the emergence model conceptualization of the link between emotions and observed behaviors.

A representation of the discrete emotion/latent-trait models of emotion:



A representation of the constructionist/emergent models of emotion⁹:



In this chapter, I have attempted to define the term emotion by investigating three emotional dimensions that have been debated in the recent literature. At the basic level, it seems that an emotion is an affective experience that has a specific starting and ending

⁹ Both of these representations assume the existence of appraisal prior to emotion experience/ observable reactions, this view is not shared by psychologists who do not agree with the cognitive appraisal or dual process models described in the previous section.

point and lasts for a set period of time. Furthermore, according to constructionist theories of emotion, emotions are entities that arise from underlying affective dimensions such as valence and arousal and are situation and context dependent. Emotions are elicited as the result of an external stimulus either through a cognitive appraisal or as a direct reaction to the stimulus. Finally, emotions seem to exist as the result of constituent factors including physiological, neurological, and behavioral reactions to an external stimulus. Now that we have come up with a working definition for emotions, the next chapter will review literature on the function of emotion within the framework of this study; emotion's impact on decision-making.

Chapter 4

Emotions in Decision-Making and Economics

In chapter three, we reviewed psychological literature on emotion theory and reached a working definition of emotion by analyzing the basic components of affective experience. This chapter will extend this conceptualization of emotion by investigating the effect of emotion on judgment and decision-making, with a specific focus on economic decision-making. The research reviewed here will evaluate psychological frameworks for integrating emotions and judgment and decision-making research in addition to delving further into behavioral economics research that applies to these fields.

Emotions in judgment and decision-making: Theoretical framework

The synthesis of emotion theory in social psychology and the field of judgment and decision-making originally emerged within a cognitive framework during the 1970's. This cognition approach to emotional decision-making yielded two major frameworks for investigating the impact of affect on judgment. The first of these is the priming framework, which asserts that positive and negative moods activate positive and negative information and the accessibility of each of these affective states influences how judgments are made (Bower, 1981; Isen, Shalcker, Clark & Karp, 1972; Mayer, Gaschke, Braverman, & Evans, 1992; Mayer, Gayle, Meehan, & Haarman, 1990).

This priming account provided a solid theoretical basis but eventually evolved and expanded into the second framework, the Affect as Information Hypothesis. In comparison to the priming account, the Affect as Information Hypothesis posits that affective states are evaluated as cues about how an individual feels about a given situation. In other words, while making a decision, any emotions experienced at that time would be evaluated as a relevant piece of information regarding the decision at hand

(Clore, 1992; Clore & Huntsinger, 2007; Schwarz 1990; Schwarz & Clore, 2003). This perspective suggests that individuals implicitly understand that emotional states are a reflection of cues in their surroundings and that this in turn impacts how they perceive their environment.

In recent years, the Affect as Information Hypothesis was further expanded to include a processing style perspective, which essentially generalized the original hypothesis to include moods and emotional traits (these affective traits are discussed in chapter three). However, the experimental design in the current research, which will be presented in chapters five and six, focuses exclusively on fully experienced emotions (not emotional traits or moods). As a result, we will rely on the basic Affect as Information Hypothesis to serve as a theoretical foundation for the effect of emotions on judgment and decision-making.

The Affect as Information Hypothesis proposes that differences in how people evaluate emotional input in a decision is based on their appraisal of the emotion. In this case, due to the decision-making required following the emotional appraisal, the appraisal tendencies will follow a cognitive framework discussed in chapter three. Research has found that the cognitive appraisals that relate specifically to the Affect as Information Hypothesis are influenced by two main appraisal tendencies. The first, and most basic, is the positive or negative valence of the appraisal. This is what differentiates emotions such as anger and sadness from excitement and happiness.

Many studies have investigated the differential impact of positive emotions on decision-making as compared with negative emotions. At the basic level, research indicates that positive emotions broaden the scope of attention and engage heuristic top-

down processing¹⁰ and negative emotions narrow the scope of attention and engage bottom-up, detail oriented processing¹¹ (Bless, Clore, Schwarz, Golisano, Rabe, & Wolk, 1996; Bless, 2001; Fredrickson & Branigan, 2005; Gasper & Clore, 2002; Forgas, 1998; Park & Banaji, 2000). In one study, researchers used film clips to induce emotion and then measured scope of attention and thought-action repertoire (Fredrickson & Branigan, 2005). Results indicated that positive emotions such as amusement and contentment broaden the scope of attention and thought-action repertoire and negative emotions such as anger and anxiety narrow the scope of attention and thought-action repertoire (Fredrickson & Branigan, 2005).

Similarly, another study used two experiments to “test the hypothesis that happier moods promote a greater focus on the forest and sadder moods a greater focus on the trees,” (Gasper & Clore, 2002, p. 34). In these experiments, affect was induced using a self-directed writing task (Gasper & Clore, 2002). Participants were then asked to view a picture for 15 seconds and then draw it from memory. Raters who were blind to the condition then coded these drawings and results indicated that participants in the happy emotion group were more likely to organize their drawings by global concepts (indicating top-down processing) (Gasper & Clore, 2002). Additionally, the second experiment indicated that, when asked to match shapes based on similarity to a stimulus, participants experiencing positive emotions tended to sort them based on global forms rather than details (Gasper & Clore, 2002).

¹⁰ Heuristics are quick information processing rules that individuals employ to make judgments and decisions. Top-down processing refers to conceptually driven processing in which individuals form perceptions based on a larger concept or idea before working down to the details.

¹¹ Bottom-up processing refers to processing that starts with small details and works up to a general concept or idea.

The results of these studies indicate that positive emotions tend to impact judgment and decision-making by inducing people to broaden their scope of attention and engage in superficial analyses of information and that negative emotions induce people to narrow their scope of attention and focus on details. Additional research has also indicated that positive emotions induce people to rely more on heuristics and preexisting schema such as racial stereotypes (Park & Banaji, 2000). This body of research fits in with the Affect as Information Hypothesis by indicating that people tend to incorporate emotions into their judgments and decision-making differentially based on valence appraisals.

The second appraisal tendency that has strong implications for the decision-making process is that of certainty. Certainty regarding a situation and an emotional stimulus has a pronounced impact on how individuals make decisions. Certainty-associated emotions such as anger, disgust, contentedness, and happiness have been linked to confidence about how to act in a given situation and what decision to make (Smith & Ellsworth, 1985). On the other hand, low-certainty appraisals, leading to emotions such as sadness, hope, and fear, result in ambiguity and lack of confidence in the decision-making process. In other words, high-certainty appraisals produce emotions that give more insight and direction on the decision-making process and what judgments to make. In the framework of the Affect as Information Hypothesis, high-certainty emotions would thus have more of an impact on the decision-making process than low-certainty emotions because they would be perceived as more relevant ‘information.’

Multiple studies have indicated the importance of certainty appraisals to judgment and decision-making. For example, anger, an emotion linked with high-certainty

appraisals, seems to induce people to report lower probabilities of anticipating a negative outcome from a situation (Leith & Baumeister, 1996; Tiedens & Linton, 2001). Lerner and Keltner (2001) induced anger (high-certainty) and fear (low-certainty) in a group of participants and then asked them to estimate the likelihood of suffering from various diseases. Those in the (high-certainty) anger condition reported significantly lower estimates than those in the (low-certainty) fear condition (Lerner & Keltner, 2001). Similarly, Lerner, Gonzalez, Small and Fishhoff (2003) found that, in a study conducted after 9/11, angry participants estimated lower probabilities of future terrorist attacks than fearful participants. In addition to affecting probability judgments, research has also indicated that high-certainty emotions led to increased use of top-down processing, heuristic thinking, stereotyping, and over-confidence in personal abilities (Tiedens & Linton). These studies all indicate that, in addition to valence-based primary appraisal tendencies, certainty-based secondary appraisal tendencies also significantly affect judgments and decision-making. Specifically, positive and high-certainty emotions seem to generally induce heuristic thinking and top-down processing. In contrast, negative low-certainty emotions seem to induce reasoning-based, bottom-up processing. Furthermore, because of the feelings of confidence and decisiveness associated with high-certainty emotional appraisals, these emotions are more likely to impact the decision-making process.

The research reviewed here regarding the Affect as Information Hypothesis and certainty appraisals complements a theoretical framework presented in the Affect Infusion model. While the Affect as Information Hypothesis deals with *how* emotions will impact decision-making, the Affect Infusion Model deals with *when*, or under what

circumstances, emotions are most likely to impact decision making. According to the Affect Infusion Model, emotions impact cognitive processes when individuals engage in higher level substantive thinking (Forgas, 1995). Thus, the decision-making process is affected by emotions if it is a complex, novel, decision that requires constructive processing (Forgas, 1995). When an individual faces a simple decision that preexisting knowledge, or heuristics, can be applied to, emotions generally have a smaller impact on his or her cognition.

The Affect Infusion Model has extensive support from a number of studies in the social psychology literature (i.e., Greifender, Bless, & Pham, 2011; Kosnes, Pothos, & Tapper, 2010; Noda, Takai, & Yoshida, 2007; Lerner, Goldberg & Tetlock, 1998; Clore, Gasper & Garvin, 2001; Forgas 1993a; Forgas, 1993b). In one seminal study that served as a foundation for the model, researchers measured participants' judgments of typical or atypical couples following an emotion induction task (Forgas, 1993a). Results indicated that when faced with a novel situation (an atypical couple), the valence of participants' affective state had a significantly greater impact on their judgments (Forgas, 1993a). These findings support the Affect Infusion Model's assertion that affect will have a greater impact on decision-making when the decision-maker is confronted with a novel (atypical) decision.

In a more recent study, researchers asked participants in six different conditions to make product evaluations (Noda, Takai, & Yoshida, 2007). In addition to the emotion conditions (happy and sad), these conditions included a time pressure/ no time pressure condition and a complete/ incomplete information condition (Noda, Takai, & Yoshida, 2007). The Affect Infusion Model framework would suggest that emotions would impact

decision making most when participants would have to use the greatest cognitive capacity to make a decision (Forgas, 1995). The results of this study support the model by indicating that emotions tended to have a greater impact on decision-making when participants faced cognitive constraints (time-pressure) and had to engage greater cognitive processing (more information).

The research reviewed here indicates that, based on certainty appraisals and the Affect Infusion Model, emotions would be most likely to impact decision-making when an individual is faced with a unique, complicated decision, and is experiencing high-certainty emotions such as anger or happiness. In combining the Affect as Information Hypothesis and the Affect Infusion Model, we have a complete framework for analyzing both when and how emotions will impact decision making. Now that this framework has been established, the question becomes; how does this framework apply to economic decision-making? The rest of this chapter will address this question and review the literature on emotions and economics.

Emotions in economic decision-making

When it comes to decision-making, neoclassical economics has been dominated by consequentialist models based on expected utility theory and rational choice (Rick & Loewenstein, 2008). This decision-making theory incorporates probabilistic utility functions into the decision framework of rational economic agents¹²(von Neumann & Morgenstern, 1944). While these models have not directly addressed emotional reactions within the decision-making process, expected utility theory and rational choice theory do make allowances for some types of emotional influences.

¹² See chapter 2 for an overview of neoclassical rationality assumptions and the axioms of expected utility theory as well as behavioral critiques of these theories.

In relation to decision-making, emotions can be categorized into three basic groups. These include expected emotions, immediate integral emotions, and immediate incidental emotions (Rick & Loewenstein, 2008). The first of these groups, expected emotions, can generally be incorporated into neoclassical models of decision-making. These are emotions that are experienced concurrently with the outcome of a decision. In other words when an individual makes the choice to take a gamble and ends up winning \$100, they experience happiness as a result of this payoff. With expected emotions, the decision maker is cognitively aware of the potential for emotional reaction at the time of the decision outcome, but does not actively experience an emotion during the decision making process. Thus, expected emotions do not actively incorporate an emotional influence on the decision-making process itself and are implicitly accepted in neoclassical decision models.

The second emotion group, immediate integral emotions, refers to emotions that are experienced when a decision-maker anticipates the possible outcomes of different choices (Rick & Loewenstein, 2008). In other words, when making a decision, the emotional valence of different payoffs and outcomes (such as happiness from winning \$100) will elicit an emotional reaction, at the time the decision is being made, based on expectation. In some neoclassical models, these emotions are also considered rational in that they are indicators of the potential utility associated with different outcomes.

The third emotion group, immediate incidental emotions, is considered completely irrational under neoclassical assumptions. Incidental emotions are emotional states that are unrelated to a given decision but still influence the decision-making process (Rick & Loewenstein, 2008). An example of this would be something like a

CEO being angry because he spilled his coffee and this anger influencing his decision-making process in firing an employee. These emotions are inherently irrational because, by definition, they are irrelevant to the decision-making process or its potential outcomes.

The work of this thesis will focus on incidental emotions in particular due to their extreme violation of traditional perceptions of rational decision making. However, the remainder of this chapter will investigate ways in which all three of these emotion groups have been found to impact the functioning of the economy.

Emotions and economics

Some of the most interesting research on the link between emotions and economics takes a neuropsychological approach that illustrates the importance of emotions to economic decision-making. For example, Bechara, Damasio, Tranel, and Damasio (1997), conducted a study that investigated the role of subconscious expected emotions in decision-making. Two groups of participants, one normal group and one group with damage to the ventromedial prefrontal cortex played a money-based card game (Bechara et al., 1997). In this game participants selected cards from four decks, two of the card decks were risky and disadvantageous in the long run, and two of the card decks were safe and advantageous in the long run (Bechara et al., 1997). The normal participant group experienced skin conductance responses (denoting a negative affective reaction) before selecting from the risky deck after several trials, this caused them to stick to the safe decks and win out in terms of monetary gains (Bechara et al., 1997). The participant group with prefrontal cortex damage did not develop these physiological responses and ended up selecting from the risky decks and losing money in the long run (Bechara et al., 1997).

These skin conductance responses indicated a subconscious negative affective reaction in preparation for a possible negative consequence of a decision (selecting a poor card and losing money) (Bechara et al., 1997). This experiment indicated that the lack of emotional response, operationalized by damage to the ventromedial prefrontal cortex which plays a role in emotional processing of risk and fear, can lead to irrational decisions (picking from a risky deck with higher losses than gains). Thus, an economic agent that is not subject to emotional responses would not be a rational actor in these circumstances. This leads to several important inferences. The first is that any economic model of decision making purporting rationality should factor in possible emotional influences because the absence of emotional cues results in adverse decisions. The second is that, perceptions of risk, which are one of the most important classes of economic decisions, are subject to the influence of immediate integral emotions.

Another set of studies on risk perceptions deals with incidental immediate emotions. Johnson and Tversky (1983) conducted an experiment in which participants read news articles with either a positive or negative emotional valence. Participants were then asked to estimate probabilities of dying in different circumstances such as car accidents; the group that read the negatively valenced articles estimated significantly higher risks of mortality in different circumstances (Johnson & Tversky, 1983). These results were attributed to the emotion-inducing effects of reading the articles (Johnson & Tversky, 1983). Thus, incidental emotions do seem to have a significant effect on how individuals judge risky choices, however, does this effect translate into macroeconomics in any significant way?

Several studies suggest that financial markets show significant effects from emotion and indicate that these markets might be a mechanism by which affective responses impact the economy on a larger scale. For example, using panel data, Hirschleifer and Shumway (2003), found a strong positive correlation between the amount of sunshine on a given day and stock market performance. They cite studies indicating that sunshine is associated with upbeat mood to attribute this effect to emotions and go on to say that these findings are difficult to reconcile with rational price models (Hirschleifer & Shumway, 2003). Similarly, Edmans, Garcia & Norli (2007) found a strong correlation between poor stock market performance and poor performance of a national sports team in an important competition (ie., World Cup). They also attribute this effect to negatively valenced emotions due to the sports loss impacting investors' equity valuations (Edmans, Garcia & Norli, 2007).

Many studies in behavioral finance have found stock market anomalies relating to emotions. In addition to the ones described above, Monday effects, weekly effects, intraday effects, and January effects have also been documented and these trends have been shown to persist over long periods of time (Thaler, 1987). These findings indicate that emotional influences on decision-making at the micro level do translate into the equity markets in ways that deviate significantly from rational choice and efficient market hypotheses. These equity markets in turn affect macroeconomic functioning by affecting wealth, which impacts consumption, a key economic driver. Additionally they impact macroeconomic trends by impacting valuations of existing equity compared to new capital stock (Tobin's Q), which impacts investment levels (Akerlof, 2001).

Overall, the research reviewed here indicates that emotions have a significant impact on economics at both a micro and macro level. Thus far we have reviewed the influence of trust on economics in chapter two and the influence of emotions on decision-making and economics in chapters three and four. The next chapter will synthesize these topics and look at a subfield of social psychology and behavioral economics relating emotions to trust. This relationship will then be set within an economic framework.

Chapter 5

Emotions and Trust

In recent years, several studies have investigated the impact of emotions on trust in an economic framework. These studies have generally approached this through the combined lens of social psychology and economics. This approach has yielded several interesting results in regard to when and how emotional mechanisms impact trust and what this impact implies for economic performance. This chapter will review the most prominent research on this topic and then introduce the experimental approach taken by the current study to investigate the effect of emotions on trust-based decision-making.

Previous work on emotions and trust

In 2005, Dunn and Schweizer published the most direct investigation to date on the effects of emotions on trust. In their paper, they reported findings from a series of studies that addressed the impact of discrete incidental emotions on unrelated trust evaluations. These studies used emotion induction techniques (film clips or a directed writing task), which were followed by participants' self-reported trust ratings. One of the studies investigated anger, happiness, and sadness and found that these incidental emotions significantly impacted self-reported trust. Specifically, the results indicated that positive valence emotions increased trust and negative valence emotions decreased trust, a finding that is consistent with the Affect as Information Hypothesis covered in chapter four. In addition, they found that secondary control appraisals might moderate the influence of emotional valence on trust.

In another study, Dunn and Schweizer further investigated the role of control appraisals and found that emotions with other-person control (anger and gratitude) influenced trust significantly more than emotions with personal control (pride and guilt).

These control appraisals are closely linked, and may be seen as a component of, the certainty appraisals discussed in chapter four. In other words, emotions with other person control (ie., a person/event responsible for the emotion), would have high certainty as to the object of the emotion and possible responses. In the framework of the Affect as Information Hypothesis, emotions associated with a tangible external stimulus (other person control/high certainty) would be perceived as more relevant information. In contrast, emotions with personal control, such as guilt and pride, have lower certainty due to their internal nature. Such emotions leave ambiguity in regard to how to act in response to the emotional experience because they generally lack an external 'other person' stimulus or directive.

Thus, the results of this study by Dunn and Schweizer can be interpreted as indicating that incidental emotions with high certainty/other-person control appraisals will have the greatest impact on trust decisions. Furthermore, the direction of the effect seems to be driven by the valence of the emotion; positive emotions increase trust while negative emotions decrease trust.

Other studies seem to support this valence-directed account of affective influences on trust. For example, a more recent study also found that negative emotions decrease judgments of trust (Forgas & East, 2008). In this study, participants were found to be more likely to judge a person as guilty, and distrust that person, if they were experiencing negative affect than if they were experiencing positive or neutral affect (Forgas & East, 2008).

Recently, Lount (2010) conducted a series of studies critiquing Dunn and Schweizer's (2005) findings by showing that the effect of positive mood on trust is the

byproduct of heuristic processing associated with positive affect¹³. In essence, Lount (2010) contends that, in Dunn and Schweitzer's study, participants were asked to evaluate trustworthiness of a coworker and that, in the positive mood condition, this led participants to enact a schema of a trustworthy coworker, which led to higher trust. In effect, Lount argues for an intervening cognitive variable of top-down or heuristic processing which mediates the impact of emotions on trust.

Lount's experiments seem to support this account of a mediating cognitive effect of heuristic thinking for positive affect due to both incidental situational factors and direct information about the trustee. For example, in the first two experiments by Lount, interpersonal trust was compared to intergroup trust and it was found that, in a group setting, positive affect actually induced lower trust levels than neutral affect due to negative perceptions of outgroups.

In the third and fourth experiments, positive or negative information on the trustee was combined with emotion manipulations for positive and neutral affect conditions (Lount, 2010). Results indicated that there was a main effect for information on the trustee (positive information cues led to more trust) and that this effect was significant in the positive affect condition but not in the neutral affect condition (Lount, 2010). These results indicate a relationship in which emotions do impact trust, but do so through heuristic thinking and cognitive analysis (e.g., evaluating positive/negative information on the trustee).

It is important to note that Lount (2010) only focused on positive emotions, so as of yet there is no indication that similar effects result from the connection between

¹³ For a review of the link between positive affect and heuristic thinking, see chapter four.

negative emotions and bottom-up processing. Additionally, it is likely that although this heuristic-thinking explanation does explain some of the variance in emotion-based trust, that there is also a direct effect of positive emotions on trust. In fact, the dual-model approach of cognitive and perceptual appraisal presented in chapter three would strongly support the view that positive emotion impacts trust both through valence and through heuristic thinking. Despite this, Lount (2010) does provide strong evidence for the possible impact of heuristic thinking on positive-emotion evaluations of trust. This will be further discussed in the chapter eight of this thesis.

In essence, these three studies (Dunn & Schweizer, 2005; Forgas & East, 2008; Lount, 2010) comprise the major recent developments in studying the impact of affect on trust. The current research builds on these studies to investigate the role of emotions in trust *behavior*.

The current study

The current study will rely on a theoretical framework comparable to the one used by Dunn and Schwiezer (2005). This framework utilizes the Affect as Information Hypothesis, the Affect Infusion Model, and the role of certainty appraisals to build a theory for when, how, and through what channels emotions would impact trust. These theories are described in detail in chapter three and can be summarized in three parts. First, the Affect as Information Hypothesis asserts that emotions are synthesized as relevant pieces of information in the decision-making process. This indicates that counter to rational choice models of decision-making, incidental emotions do impact decisions. Second, the Affect Infusion Model asserts that emotions are more likely to impact decision-making when the decision-maker is faced with a novel decision

involving higher-order substantive thinking. Finally, certainty appraisals indicate that emotions with high certainty, such as anger and happiness would be more likely to impact decision-making.

While this study uses a similar theoretical framework to Dunn and Schweizer, it builds on previous studies and contributes to the existing literature in two ways. The first is that this study will measure actual trust behavior as opposed to self-reported trust scores. Thus, the experiment will investigate how people actually act when faced with a trust decision as opposed to how they say they will act. This has the obvious benefit of reducing problems such as task demands that are inherent in self-reports in addition to measuring the conceptual variable of actual decision-making behavior more directly. The second way in which this study contributes to the literature is that it introduces a post-experimental survey to measure possible confounding demographic and personality-based variables. These include self-reported trust, empathy, risk, and attachment or feelings of belonging in a specific community (Bard College). Of these, risk seems to be an especially relevant conceptual variable. The relationship between risk and trust, which is tested in the experiment, will be covered in detail in the discussion section.

The research on emotions and trust presented here, in conjunction with the psychology and economics-based literature reviewed in the last four chapters, serve to inform the experimental design used in this study. The current research was conducted at Bard College during January 2014. The next chapter will cover the experimental design in detail and this will be followed by an analysis of the results and a discussion and conclusions section.

Chapter 6

Method

Overview

The study utilized two experimental groups and a single control group in order to test the research hypotheses. The study was presented to participants as two separate experiments. This deception was necessary in order to maintain the internal validity of the study and avoid demand characteristics. Demand characteristics refer to circumstances where participants are aware of the experimenter's hypotheses and change their behavior, consciously or unconsciously, to fit the predicted outcome. Deception would thus minimize the systematic error in the experimental design and increase the internal validity.

The first part of the experiment was a film-based emotion manipulation, which was used to induce anger and happiness in the experimental group or neutral affect in the control group. The decision to focus on these two emotions (anger and happiness) stems from the theoretical foundation described in chapters four and five. Three different film clips were used for each of the three conditions respectively. The second part of the experiment involved a slightly modified version of the trust game originally proposed by Berg, Dickhaut, and McCabe (1995), which was intended to measure the trust behavior of the participants.

The dependent variable was operationalized as the trust score from the trust game and the main independent variable was the emotion condition. Based on the literature reviewed in chapters three, four, and five, I hypothesize that the anger condition would decrease trust scores and the happy condition would increase trust scores. The neutral

condition serves as a baseline and I expect the trust scores of this group to fall somewhere between the other two conditions¹⁴. These hypotheses are outlined below:

$$H_{1.1}: \mu_{anger} < \mu_{neutral}$$

$$H_{1.2}: \mu_{neutral} < \mu_{happy}$$

$$H_{1.3}: \mu_{anger} < \mu_{happy}$$

$$H_0: \mu_{anger} = \mu_{neutral} = \mu_{happy}$$

After playing the trust game, participants filled out a questionnaire (see Appendix A) that collected demographic data as well as self-report measures of trust, risk, empathy, and attachment to the Bard community. My secondary hypotheses were: (1) risk would be positively correlated with trust (i.e. higher propensity for risk taking would be associated with more trusting behavior), (2) empathy would be positively correlated with trust (i.e. higher levels of empathy would be associated with more trusting behavior), and (3) attachment to the Bard community would be positively correlated with trust (i.e. greater feelings of attachment or belonging within the Bard community would be associated with more trusting behavior).

Participants

The Bard College Institutional Review Board (IRB) approved this study on November 11, 2013 and data were collected during the Citizen Science program at Bard College. This is a required three-week program for freshman students during the month of January. The participant pool consisted of 102 Bard College students, primarily from the class of 2017. IRB materials and approval can be found in Appendix C.

The experiment was carried out in the President's room at Kline Commons, the main dining hall of the campus. The President's room is a closed-off room adjacent to

¹⁴ Based on previous studies, I expected the neutral condition to correlate to a trust score of around 5 (Berg, Dickhaut, & McCabe, 1995).

the main dining area. The experiment was conducted during dinner hours from 5pm to 7pm on six days between January 16, 2014 and January 23, 2014. Additionally, a pilot study was conducted on three days between January 10, 2014 and January 12, 2014.

Recruiters approached participants in the dining hall and asked them if they would like to participate in a study (see script, Appendix B). Students who showed interest in participating were escorted to the President's room by the recruiters at regular intervals.

Materials

Emotion Induction Task

Based on several studies that manipulated emotions (Dunn & Schweitzer, 2005; Harle & Sanfey, 2007; Hewig, Hagemann, Seifert, Gollwitzer, Naumann & Bartussek, 2005) I used film clips and a short writing exercise in order to induce happiness, anger or neutral emotions and maintain the cover story respectively. The film clips were each between two and three minutes long and were taken from commercially available feature length films. The film clip used to induce anger was a 163-second clip taken from the 1980 movie *My Bodyguard*. In the clip a shy, reserved boy named Rick goes to a park to meet some friends. He is then harassed and attacked by a bully (Hewig et al., 2005). The film clip designed to induce happiness was a 173-second clip taken from the 1989 film *When Harry Met Sally*. In this clip Harry and Sally sit in a restaurant and discuss whether Harry would notice if a woman faked an orgasm (Hewig et al.). Finally, the neutral film clip was 137-second clip taken from the 1986 movie *Emperor*. In this clip, two characters, a young Chinese emperor and his English tutor have a discussion relating to the emperor's studies (Hewig et al.). These films have previously been found to induce the relevant emotions (Hewig et al.). Because they are fairly old, I expected that

participants were unlikely to have recent, emotionally charged, memories from viewing one of these films. Despite this precaution, some participants did have previous experiences with some of the movies the clips were taken from. Notably, several participants had strong positive reactions to the happy condition film clip from ‘When Harry Met Sally’ due to previous experiences with the film.

After viewing the film clips, participants completed a short writing exercise intended to maintain the cover story (deception) that the first experiment was measuring the effect of visual stimuli on motor coordination. They wrote out the sentence “The woman went shopping,” using their non-dominant hand. This part of the exercise generally took approximately one minute¹⁵.

Procedures similar to the one employed here have been shown to effectively induce low to moderate levels of emotion (Hewig, Hagemann, Seifert, Gollwitzer, Naumann & Bartussek. 2005).

Positive And Negative Affect Schedule (PANAS)

The twenty-item Positive and Negative Affect Schedule (PANAS) served as an emotion induction manipulation check. It employs a five-point scale to measure positive and negative affect and has been used with undergraduate and adult participant samples (Watson, Clark & Tellegen, 1988). Participants are instructed to rate the extent to which they are experiencing each of twenty emotions at the present moment from not at all (1)

¹⁵ In the pilot study, a different writing task was used that was supposed to strengthen the emotional manipulation. This writing task asked participants to free-write for three minutes relating the clip they just saw to a personal experience in their lives. However, after the pilot study was conducted, results on this task showed that participants often related the scene from the clip to a similar situation in their lives with a completely different emotional valence. Therefore, this task did not effectively serve its purpose and most likely reduced the emotional impact that the films had on many of the participants. As a result, this section of the exercise was changed in the actual study; none of the data presented used this exercise in the emotional manipulation.

to extremely (5). The instructions and scale can be viewed in Appendix A. The measures of emotional valence collected through this schedule were designed to gauge the effectiveness of the emotion induction task.

Prior to data analysis, the raw PANAS scores were combined into a positive affect scale and negative affect scale as described by Watson, Clark, and Tellegan (1988). Both scales had extremely high reliability with the positive affect scale having a Cronbach's alpha of ($\alpha = 0.88$) and the negative affect scale having an alpha ($\alpha = 0.91$).

Trust Game

In the ostensible second study, participants completed a measure of behavioral trust. The behavioral trust measure consisted of a simple game with the possibility of a large monetary payoff as a performance incentive. This game was proposed by Berg, Dickhaut and McCabe (1995) and has been replicated multiple times. The participants received a page of instructions for the game and were told that they could ask the experimenter any questions they had about the game.

The instructions for the game were as follows:

In this experiment, you will play a game with another participant who will be responding to your decisions at a later date. You have been matched with a single other participant. You will not be told who the participant is either during or after the experiment and vice-versa.

You will play the role of an investor and the other participant will play the role of an investment manager. You will be given 10 points; these will be referred to as your endowment. At the end of the experiment each point will count as one raffle ticket towards the \$200 lottery, so you want to end up with the greatest total number of points.

The rules of the game are as follows:

You can invest between 0 and 10 points of your endowment. Every point you invest will be tripled (that is if you invest 5 points, this will yield 15 points) and sent to the other participant. He or she will then decide if, and what portion, of this new amount of points to give back to you and what portion to keep for themselves.

The total points you will have at the end of this exchange will consist of whatever you decide to keep in addition to whatever the other participant returns to you. The other participant has been given their own 10-point endowment, is aware of all of the same rules, and the points that he or she has at the end of the game will go towards raffle tickets for a *separate* \$200 raffle.

These instructions for the trust game involve deception since there was no actual second group of participants. The reasoning behind not having a second group of participants, as was the case in the original Berg, Dickhaut, and McCabe (1995) study, was that this research was solely interested in trust behavior, not reciprocity. The trust game took a total of approximately two or three minutes and most participants didn't ask questions and seemed to find the instructions clear during a post-experimental interview.

Individual Difference and Demographic Measures

Participants provided demographic information (age, gender, college major) and completed a series of questions assessing individual differences. These questions used a Likert Scale (1-7) to probe differences in risk-taking, chronic trust levels, attachment to the Bard community, and empathy (Appendix A). The instructions for the individual difference questions asked participants to rate how much they agree with a given statement with one indicating 'very little' and seven indicating 'strongly.' Each individual difference measure was compiled using 5 different questions that were all intended to measure the same conceptual variable. As a result, each of these items was ranked on a five to thirty five point scale (5 questions by 7 points on the scale for each question). In all cases, the items were scored so that higher scores would result in higher affinity for the item; a higher score would indicate more trust or more risk.

For the measure of propensity for risk taking, the questions ranged from straightforward self-identification such as "I am a risk taker," to more indirect, reverse-

scored questions such as, “I don’t like to gamble.” The questions for the risk instrument were fairly reliable ($\alpha = 0.68$). Empathy was measured using questions relating to a person’s experiences helping other people, “I have spent time volunteering and will continue to do so,” and whether they would perceive themselves as empathetic towards others, “I do not usually react emotionally to hardships experienced by others.” This measure had much lower reliability, ($\alpha = 0.46$).

The instrument used to measure attachment to the Bard community included general questions about participants’ feelings about their place in the community, “I feel that I fit in at Bard,” as well as questions about the social networks at the college such as, “I have found a group of close friends at Bard.” Crohnbach’s alpha for these questions indicated an acceptable level of reliability ($\alpha = 0.58$). Finally, the self-report trust measure employed both general questions, “I generally trust people,” and more situation specific questions, “I feel that people betray me a lot,” and had fairly good reliability ($\alpha = 0.62$).

The full questionnaire was approximately four pages and was attached to the instruction sheet for the trust game. The questionnaire can be viewed in Appendix A.

Procedure

Due to time constraints, the experimenter generally ran three participants at a time. Recruiters were encouraged to bring up to three participants for each run of the experiment, and this was often the case. The setup of the experimental room was a large table with three laptop computers facing in different directions. Each computer had headphones plugged into it and a pen beside it. The experimenter had a separate desk

with the experimental forms and a computer and a side table were set up to hold the candy bars.

Once participants arrived at the experiment room they were asked to read and sign the first consent form. They were told that they would be participating in two separate experiments and that together they would take approximately ten to fifteen minutes to complete. At the start of the first experiment, participants read and signed the first consent form (see Appendix A). Once they signed the consent form and were verbally consented by the experimenter (see experimenter script in Appendix B), the first part of the experiment was conducted. In the first part, the participants completed the film-clip emotion induction task followed by the PANAS to test whether the emotion induction was effective.

Participants were randomly assigned to watch one of the three video clips. Consequently, participants being run at the same time would often be viewing different clips. However, the computers were facing in different directions and the clips were approximately the same length so participants generally were not aware that different clips were being administered until the debriefing.

Following the completion of the emotion induction task and the PANAS, participants provided informed consent for the “second” study. The experimenter then distributed packets that included instructions for the trust game and the individual difference and demographic measures.

Once all participants in each session had completed the packet, the experimenter debriefed participants. The verbal debriefing started out with the experimenter thanking participants for taking part in the experiment and asking them how they liked it.

Additionally, the experimenter questioned participants on whether all the instructions were clear and whether they understood everything. The experimenter then went on to explain the true research hypothesis and explain the two parts of the deception¹⁶. The participants were then asked whether their data could still be used in the study now that they were aware of the deception. Finally, the debriefing ended with the experimenter thanking subjects for their participation and offering them a candy bar and entry to the \$200 lottery using the points they accumulated in the trust game as raffle tickets. The full script for the verbal debriefing as well as the written debriefing that was offered to participants can be found in Appendix A. Most participants were satisfied with the verbal debriefing and did not take the written debriefing.

Once the participants left, the experimenter stapled the experiment forms for each participant together. This included the motor task/PANAS sheet and the trust game and survey. These sheets were stored in a binder until they could be brought to a secure area at the end of the experiment sessions for that day.

Power

Prior to the experiment, we conducted a proc power analysis using SAS. We used a small effect size (Cohen's $d=0.30$) because, based on previous studies, the standardized difference between the means for the effect of emotions on trust seemed to be fairly small (Dunn & Schweitzer, 1997). Assuming an effect size of Cohen's $d=0.30$ and $\alpha = 0.05$, the study would need 55 participants per group in order to have 80% power. Actual participant count ranged from 29 to 38 per group with a total participant pool of 102 instead of 165, so this study was underpowered.

¹⁶ The first part of the deception is that the 'two experiments' that participants completed were actually two parts of a single experiment. The second part of the deception is that, in the trust game, there is not actually another group of participants who would be reciprocating the trust offers.

After the data were collected, they were transferred from the experimental forms to an excel spreadsheet. The PANAS and individual difference scores were then compiled, as described in the materials section, and dummy variables were created for gender and intended major. The experimenter coded for academic major of the participant by categorizing survey responses to the question about planned major into five distribution categories on the Bard College website. These included arts, languages and literature, science math and computing (SMC), social studies, and undeclared. A dummy variable was then created for condition.

Chapter 7

Results

Data

Table 1 shows basic summary statistics for all variables. All variables have approximately 100 observations. Gender is fairly evenly distributed and age and year (in college) seem to have a very low standard deviation with age ranging between 18 and 24 and most participants being 19 years of age. This indicates a very homogenous sample, which makes sense due to the data collection methods.

Risk, empathy, attachment to the Bard community, and self-reported trust, are all scored on a one to seven point scale. This scale was derived by summing the five questions comprising each item and then dividing by five in order to attain a composite mean on the original scale. The means, variance, and range for these variables all seem fairly similar. Film manipulation susceptibility was also scored on a one to seven point scale, so the standard deviation of 1.65 seems very high in comparison to the other survey questions.

The mean for the positive affect scale was significantly higher than the negative affect scale, which suggests that participants had lower reported levels of negative affect following all film manipulations. Additionally, negative affect scores had a much lower variance than positive affect scores, although affect did not vary by condition in either case. This difference in means and variance might be attributable to issues with self-report and participants being less likely to report negative affect in an experimental setting. This pattern of results seems to be consistent with previous studies that employed the PANAS (Watson, Clark & Tellegen, 1988).

The dependent variable, comprised of the scores from the trust game, had a mean of 5.9, which is slightly higher than the mean of 5.16 in the original experiment (Berg, Dickhaut & McCabe, 1995). Similar to the original experiment, the range of actual offers covered the full spectrum of possible offers, ranging from 0 to 10 (Berg, Dickhaut & McCabe, 1995).

Table 2 shows the breakdown of the condition variable. The anger condition had the most participants with 38, neutral had 35 participants, and happy had 29. This uneven distribution of participants across experimental groups was due to the random assignment of condition using a random number generator.

Manipulation check

To test whether the video manipulation was successful in inducing emotions, I compared positive and negative affect (as measured by the PANAS) across the three conditions. A one-way analysis of variance (ANOVA) on positive affect (Table 3) revealed a significant effect of condition, $F(2, 98)=3.60$, $p=0.03$. According to a t-test, participants in the neutral ($M=2.72$, $SD=0.65$) and happy ($M=2.71$, $SD=0.69$) conditions did not differ from one other, although both groups expressed more positive affect than participants in the angry ($M=2.35$, $SD=0.66$) condition. The results are in the expected direction with participants experiencing greater positive affect in the happy than the angry condition; this can be seen in the scatter plot in Figure 1.

The second manipulation check is an ANOVA of negative affect by condition (Table 4). This manipulation check was significant at the $p=0.10$ level, $F(2, 98)=2.56$, $p=0.08$. Once again, means for the neutral ($M=1.50$, $SD=0.51$) and happy ($M=1.52$, $SD=0.48$) conditions were very similar. The results of this test were also in the expected

direction with participants experiencing less negative affect in the happy condition as compared to the anger condition ($M=1.75$, $SD=0.56$); this can be seen in the scatter plot in Figure 2.

A third ANOVA was conducted for susceptibility to film manipulation by condition (Table 5). Contrary to predictions, the results were in fact significant at the $p=0.10$ level, $F(2,98)=2.66$, $p=0.07$. I predicted that the means in this ANOVA should be equal across all conditions because, due to random assignment, there should not be any significant difference in how emotionally susceptible individuals are to films. However, the survey was administered at the end of the experiment (after the film manipulation) and asked questions such as ‘Do you usually cry when you watch sad movies?’ As a result, this measure might not indicate how naturally emotionally susceptible participants are to films, but instead how susceptible they feel they are as a result of watching the experimental film manipulations. The pattern of means indicates that participants in the anger condition ($M=4.50$, $SD=1.68$) felt more susceptible to the film manipulation than participants in the neutral ($M=3.90$, $SD=1.60$) and happy ($M=3.61$, $SD=1.59$) conditions (Figure 3). This makes sense considering that anger is a more salient emotion than the happiness or neutral conditions. The pattern of means in the positive and negative affect ANOVA’s also reflects this; the means for the neutral and happy conditions were almost the same in both cases.

Essentially, the manipulation check indicated that the results were in the expected direction but there was no significant difference between the happy and neutral conditions. These results suggest that the happiness manipulation was not effective and/or the neutral manipulation induced positive affect. These findings could be

attributed to two things. The first is that participants might have come into the experiment with preexisting positive affect. This is feasible because participants were recruited during their dinner hour and were often recruited in groups of three with their friends. Additionally, the recruiting process was opportunistic in that those individuals who wanted to participate in the study were self-selected. This might have skewed the sample towards individuals who had positive affect and were willing to try new things such as participation in an experiment. The second explanation for this effect is that the neutral condition might have induced happiness. On several trials I noted that some participants in the neutral condition laughed. When asked about it in the debriefing they often cited one of the characters' accents as the reason for why they found it funny. Additionally, the notion that participants in the neutral condition experienced some positive affect would explain why trust scores were on the high end ($M=5.9$) when compared with the original Berg, Dickhaut, and McCabe (1995) experiment ($M=5.16$), despite the fact that the anger condition had more participants.

In conclusion, the emotion manipulation seemed to be effective in the expected direction, the anger condition induced negative affect and the happiness condition induced positive affect. However, the neutral condition was not significantly different from the happy condition. This is most likely due to participants in the neutral condition displaying positive affect as well as the happy condition not being extremely effective.

Effects of emotion manipulation on trust behavior

The main goal of this thesis was to test whether incidental emotions have an impact on trust decisions. To this end, I conducted a one-way ANOVA on trust behavior by condition and a simple regression (Table 6, Table 7). The ANOVA results were not

statistically significant ($F(2,98)=1.49$, $p=.23$) and the regression was marginally significant at the $p=.10$ level ($\beta = 0.58$, $t(101)=1.66$, $p=.10$). However, the results were in the expected direction with greater levels of trust behavior in the happy ($M=6.41$, $SD=2.90$) than the anger ($M=5.27$, $SD=2.70$) conditions. Similar to the manipulation checks, the means for the neutral ($M=6.14$, $SD=2.98$) and happy ($M=6.41$, $SD=2.90$) conditions were extremely close. This indicates that there might be a significant difference in trust between the anger and neutral as well as the anger and happy conditions but no significant difference between the happy and neutral conditions.

In order to explore the interrelationships among the variables, I ran a series of correlations between each independent variable and the dependent variable (trust behavior) both overall and by condition (Table 8). This correlation table yielded interesting findings. The first point of note is that risk seems to be positively and significantly correlated with trust both overall ($R=0.27$) and in the anger ($R=0.29$) and neutral ($R=0.50$) conditions. This indicates that as propensity for risk increases, so does the propensity to trust; this relationship can clearly be seen in the scatter plot in Figure 4. The fact that this effect is only significant in the anger and neutral conditions might be due to the low sample size in the happy condition ($n=29$) or the issues with the effectiveness of the manipulation discussed earlier. However, these results, while exploratory, are very interesting, as they suggest that risk-aversion explains much of the variance for purported trust behavior in the Berg, Dickhaut, and McCabe (1995) trust game, which has been a staple of trust studies in behavioral game theory.

The second statistically significant result is the negative correlation between empathy and trust in the anger condition ($R=-0.36$), which can be viewed in Figure 5.

This indicates that participants with higher levels of empathy towards others were less trusting in the anger condition. This might be because more naturally empathetic participants might have been more affected by the anger manipulation. The film clip used to induce anger consisted of a young man being harassed and assaulted by a bully. More empathetic participants might have felt more empathy for the young man in the film clip and, as a result, the anger manipulation might have had a greater impact on them and thus induced them to trust less.

Finally, attachment to the Bard college community was significantly and positively correlated to trust both overall and in the happy condition. This suggests that as attachment and feelings of belonging at Bard increase, so does trust behavior. This supports the hypothesis and the reasoning behind including this variable. I hypothesized that greater feelings of attachment to Bard would cause participants to view the anonymous (Bard student) trustee in the game as more trustworthy. This would in turn affect their behavior and cause them to invest more.

Overall, these findings fit in with my hypothesis and with data from the manipulation check showing low differences between the neutral and happy conditions. The next section contains the main data analysis, consisting of a multiple regression model for all variables of interest. This model was used in order to investigate the effect of the demographic and individual difference variables (risk, empathy, attachment to Bard, major, self-reported trust) on trust. Additionally, the model was used to clarify the effect of emotions on trust behavior by taking these variables out of the error term and controlling for them within the model.

Multivariate Regression Model

Initial iterations of the multiple regression model indicated that the variables age, year (in college), and gender should be taken out of the model. Age and year posed obvious problems of multicollinearity, and had extremely low variance with 84% of participants between the ages of 18 and 20. Gender had a highly insignificant p-value and significantly reduced the adjusted R^2 so it was omitted as well. The PANAS scores and the film susceptibility scores were also omitted because they also reduced the fit of the model.

As a result, the multivariate regression model regressed risk, empathy, attachment to Bard, self-reported trust, and dummies for major and condition onto the behavioral trust scores:

$$trust1 = \beta_0 + \beta_1 risk + \beta_2 empathy + \beta_3 bardattachment + \beta_4 trust2 + ix.major + ix.condition + e$$

Due to the ordinal nature of both the dependent and independent variables, the data were not normally distributed. A Jarque-Bera test for normality backs up this assumption, indicating issues with skew and kurtosis (Table 13)¹⁷. As a result, I employed an ordered probit model (Table 9) and an ordered logit (Table 10) model to account for the non-continuous dependent variable. These models essentially provided a better fit for the data by utilizing probability and logarithmic-based functional forms in the regression model.

A comparison of the ordered probit, ordered logit, and ordinary least squares models (Table 11) shows that the logarithmic functional form of the ordered logit best fits the data overall ($\chi^2 = 27.80, Pseudo R^2 = 0.06$). As a result, this model will be used as the main multivariate model (Table 10). The equation below represents the ordered

¹⁷ The issues with the normality of the distribution will be discussed in more detail later on.

logit model with y^* being the unobserved conceptual variable ‘trust behavior’ and y being the observed variable of the trust score from the trust game.

$$y = \begin{cases} 0 & \text{if } y^* \leq \mu_1, \\ 1 & \text{if } \mu_1 < y^* \leq \mu_2, \\ 2 & \text{if } \mu_2 < y^* \leq \mu_3, \\ 3 & \text{if } \mu_3 < y^* \leq \mu_4, \\ 4 & \text{if } \mu_4 < y^* \leq \mu_5, \\ 5 & \text{if } \mu_5 < y^* \leq \mu_6, \\ 6 & \text{if } \mu_6 < y^* \leq \mu_7, \\ 7 & \text{if } \mu_7 < y^* \leq \mu_8, \\ 8 & \text{if } \mu_8 < y^* \leq \mu_9, \\ 9 & \text{if } \mu_9 < y^* \leq \mu_{10}, \\ 10 & \text{if } \mu_{10} < y^* \leq \mu_{11}, \end{cases}$$

$$\begin{aligned} \ln \left[\frac{P(y = 1)}{1 - P(y = 1)} \right] \\ = \beta_0 + \beta_1 risk + \beta_2 empathy + \beta_3 bardattachment + \beta_4 trust2 \\ + ix.major + ix.condition + e \end{aligned}$$

In the ordered logistic regression, risk ($z(101)=3.40$, $p=0.001$), empathy ($z(101)=-2.03$, $p=0.04$), Bard attachment ($z(101)=2.86$, $p=0.004$), and the dummy variables for the neutral ($z(101)=2.40$, $p=0.02$) and happy ($z(101)=2.11$, $p=0.035$) conditions¹⁸ were all statistically significant. Self reported trust scores and dummies for major were not

¹⁸ The anger condition was used as the reference category because results from the manipulation check and the simple effects for emotions on trust indicated that there was no significant difference between the happy and neutral conditions.

statistically significant. In order to compare coefficients for the variables, marginal effects for the ordered logit model were calculated (Table 12).¹⁹

According to this model, controlling for all other variables, each unit increase in risk increases the probability of selecting the highest level of trust (giving 10 points to the trustee) by 8.5%²⁰. Similarly, each unit of increase in attachment to Bard increases the probability of selecting the highest trust level by 8.1%. Holding all other variables constant, each unit increase in empathy decreases the probability of entrusting the full endowment by approximately 5.2%. This pattern of results is similar to what was seen in the correlation tables. The negative relationship between empathy and trust stems from a strong negative relationship within the anger condition, which was discussed previously. The positive effect of risk on trust behavior and empathy on trust behavior, controlling for all other variables in the model, is in line with my secondary hypotheses that propensity to take risks increases willingness to trust and that attachment to the Bard community would increase willingness to trust.

The marginal effects for the dummy variables for condition indicated that, controlling for all other variables in the model, a change in condition from the anger condition to the neutral or happy condition increases the probability of selecting the highest level of trust by 15% and 13% respectively. The anger condition was selected as the reference category due to the lack of a significant difference between the means of the neutral and happy conditions. This is reflected in these results, which are in the predicted

¹⁹ For the marginal effects I selected 10 as the outcome category for the dependent variable because it is the highest level of the trust score (the greatest amount of 'trust' a participant could give). Additionally, it was chosen because measuring the effect of an increase in $x_1, x_2 \dots x_n$ on an *increase* in trust makes intuitive sense considering the rest of the data analyses and the nature of the research hypothesis. Also, the increase in the independent variable was calculated with respect to the mean values reported in Table 12.

direction. In other words, moving from an emotional experience of anger to a neutral or happy emotional experience, on average, significantly increases trust behavior. These results allow us to reject the null hypothesis,

$$H_0: \mu_{anger} = \mu_{neutral} = \mu_{happy}$$

Furthermore they provide support for research hypotheses 1.1 and 1.3 that emotions with negative valence (anger) decrease trust behavior and emotions with positive valence (happiness) increase trust behavior.

$$H_{1.1}: \mu_{anger} < \mu_{neutral}$$

$$H_{1.3}: \mu_{anger} < \mu_{happy}$$

Post-testing

Post-testing for the validity of the model was conducted using the OLS regression model. Low variable inflation factor indicated that none of the variables have significant multicollinearity (Table 13). Breusch-Pagan/ Cook-Weisenberg and White's tests for heteroskedasticity (Table 14, Table 15) indicated the presence of heteroskedasticity in the data. A scatter plot of the residuals by the fitted values (Figure 7) and a histogram for the distribution of the residuals (Figure 8) also indicated the presence of skew and heteroskedasticity.

This lack of normality in the distribution could be the result of one or both of two separate processes. The first is that the conceptual variables are not normally distributed. The second is that both the dependent and independent variables are ordinal and, by definition, limited. As a result, linear regression models would not be adept at fitting the functional form for these data. Since there is no reason to believe that the underlying

conceptual variables are non-normal, I addressed the possible mechanical issues of using ordinal variables by using the ordered logistic model described above.

Chapter 8

Discussion and Conclusions

Implications of the study

This study set out to explore the influence of emotions on trust behavior. This is a topic that has recently received growing attention from social scientists that are interested in economic decision-making. It's significance lies in the development of an understanding of trust on both a micro and macro level and the incorporation of this understanding into current analyses of trust behavior in economics, social psychology, and behavioral game theory. Findings relating to emotions and trust could be applied to industrial relations, marketing and sales, and negotiation settings.

On a microeconomic level, the influence of incidental emotions on trust behavior has significant implications for the study of organizations. If, as was argued in the second chapter, trust acts as an economic lubricant and reduces transaction costs, then increasing trust could result in better performance on the part of managers and employees in the workplace. Reducing the presence of negative emotions in the workplace environment and promoting trust between employees and managers could yield higher worker productivity and efficiency. Additionally, programs could be instituted to help make executives and key decision-makers aware of how emotions influence their behavior, and how to utilize the creation of positive affect to increase trust levels.

Similarly, the link between emotions and trust behavior could be applied to marketing and sales techniques in which positive affect induction techniques could be used to increase trust on the part of buyers towards sellers. As was seen in the Resnick et al., (2006) study reviewed in chapter two, consumers even seem to be willing to pay a

price premium for a trustworthy buyer, especially in a market with information asymmetries.

The current study, and future research on this topic, could also be applied to high-stakes negotiation settings. Informing decision-makers of the interaction between trust and other variables such as incidental emotions, risk tendencies, empathy tendencies, and attachment to a common community, could induce better decision-making and more favorable outcomes in negotiation settings. These factors would apply to a wide variety of settings from labor contract negotiation to inter-organizational relations and political negotiations.

The implementation of micro-level changes to increase trust, if applied across different industries and situations, could result in a perceptible impact on broader macroeconomic function. This would be especially true in high-stakes environments such as finance where decision-makers control large quantities of high-risk financial assets.

Overview of key findings

In contrast to previous work (Dunn & Schweizer, 2005), the current study combined an emotion induction task with a behavioral game designed to measure trust decisions. Using anger, happiness, and neutral emotion induction my primary hypothesis was that anger would decrease trust behavior and happiness would increase trust behavior, relative to the neutral condition.

Confirming my hypothesis, one of the key findings of this project is that emotions do seem to impact trust decisions in the expected direction. Anger is associated with less

trusting behavior and neutral or happy emotions are associated with more trusting behavior.

In addition to the primary hypotheses, the results also indicated the relevance of several control variables. These variables include risk tendencies, empathy, and attachment to the same community as the trustee. These variables were included in my three secondary hypotheses. These stated that I expected (1) risk would be positively correlated with trust (i.e. higher propensity for risk taking would be associated with more trusting behavior), (2) empathy would be positively correlated with trust (i.e. higher levels of empathy would be associated with more trusting behavior), and (3) attachment to the Bard community would be positively correlated with trust (i.e. greater feelings of attachment or belonging within the Bard community would be associated with more trusting behavior).

Of these secondary hypotheses, numbers one and three showed significant results in the expected direction and number two showed significant results in the opposite direction (empathy yielded a negative coefficient when regressed on trust in the main ordered logit model). The reasoning behind the unexpected results for the relationship between empathy and trust were discussed in the results section and can most likely be attributed to an experimental artifact relating to the emotion manipulation in which more empathetic participants were more strongly affected by the anger condition film clip.

The results from the third hypothesis indicate that participants who had a higher level of attachment to the community seemed to trust more. In the context of the experiment, the individual they were trusting was an anonymous student who, it was implied, was also a member of the Bard community. This suggests that participants'

level of attachment to the community reflects the level of shared group identity the participants felt with the trustee. The results reported by Lount (2010), covered in the fifth chapter, indicated that heuristics applied to outgroups do impact the effect of emotion on trust. This relationship between group membership, emotions, and trust decisions, which seems to be supported by my data, has important implications for decision-making in the real world. Future studies could investigate how trust operates between members of different racial and ethnic groups and how emotions would play into that. With prejudice and stereotyping often creating environments with high emotional valence, the interaction of emotions, trust, and group membership could be investigated in order to reduce ethnic and racial bias in crucial ways.

The first hypothesis, regarding risk, was an interesting finding especially in the context of the current literature on emotions and trust. Table 16 shows a comparison of two versions of the main multivariate logit model, one including the risk variable and one excluding it. The main difference between these models is that when risk is excluded from the model, the dummy variables for the emotion condition drop in significance. This indicates that part of the effect of emotions on trust relates to risk; the exclusion of the risk measure from the model leads to an underestimation of the effect of emotions on trust. Essentially, by treating trust and risk as two separate, non-synonymous, conceptual variables we control for risk and find that taking risk tendencies into consideration (taking the variable out of the error term) increases the effects of emotion on trust behavior. How can we interpret these findings in relation to the current literature? To answer this question, I will first discuss the link between risk and trust and then assess recent literature on the link between emotions and risk.

Two main conceptual approaches to the relationship between risk and trust exist in the current literature. The first approach views risk as an integral component of trust as well as a separate conceptual variable. According to Rosseau, Sitkin, Burt, and Camerer (1998), “Risk is one condition considered essential in psychological, sociological, and economic conceptualizations of trust,” (p. 395). This statement suggests that risk is an integral part of trust behavior and that, although they are separate concepts, there is a part of risk that overlaps with trust. Looking back at the literature review conducted in chapter two, it seems that the majority of the empirical literature on trust tends to assume that trust has inherent risk components (e.g Resnick et al., 2006; Ortmann, Fitzgerald & Boeing, 2000). In other words, if we think of trust and risk as two separate conceptual variables with an overlap between them, the majority of current empirical literature measures the entirety of trust, including, and ignoring the role of, the risk component. In some cases empirical and theoretical works have separated out risk and trust and treated them as two different conceptual variables. However, risk tendencies has rarely been controlled for in these studies (Kim, Ferrin & Rao, 2008; Chiles & McMackin, 1996). My analysis rectifies these shortcomings by controlling for risk. Essentially, my model removes the part of trust that is risk-based and evaluates the non-risky components of trust. In my analysis, I found that the effect of emotions on the part of trust behavior that is not risk based is greater than the effect of emotions on trust including its risk components. This leads us to the question of how risk has been evaluated in the effect of emotions on trust in the existing literature.

While research on the link between risk and trust only began in the 1990’s (Chiles & McMackin, 1996), research on the link between emotions and risk perceptions dates

back to the 1970's (Fischhoff, Slovic, Lichtenstein, Read, & Combs, 1978; Sjöberg, 2007). Empirical approaches to the relationship between emotions and risk follow from two major frameworks established by Johnson and Tversky (1983) and Isen and Patrick (1983) (in Fessler, Pillsworth & Flamson, 2003). The first framework, by Johnson and Tversky (1983) stems from a study on risk perceptions regarding catastrophes and accidents reviewed in chapter four. The results of this study suggest that emotions with negative (positive) valence increase the perceived probability of the occurrence of negative (positive) events (Johnson & Tversky, 1983). In other words, negative affect would induce less risky behavior due to a higher perceived probability of negative outcomes (Leith & Baumeister, 1996; Dorenfeldt & Roberts, 2006).

The mood maintenance hypothesis proposed by Isen and Patrick (1983) seems to contradict these results by suggesting that individuals experiencing positive affect will attempt to maintain their current affective state and, as a result, will make more conservative, less risky, decisions (Isen & Patrick, 1983). Alternately, individuals experiencing negative affect will have an increased propensity for risk because they will attempt to attain positive affect through possible payoffs from risky decisions (Nygren, Isen, Taylor & Dublin, 1996).

These seemingly contradictory results have been mediated by recent studies investigating the role of situational and context based influences, individual differences such as gender, and emotion components such as appraisal tendencies in the link between emotions and risk (Fessler, Pillsworth & Flamson, 2003; Foo, 2009). For example, one study induced emotions with high certainty and control appraisals (happiness and anger) and low certainty and control appraisals (hope and fear) (Foo, 2009). Participants then

completed a task designed to measure perceived risk in business ventures (Foo, 2009). Results indicated that participants experiencing emotions with high certainty and control appraisals were less risk sensitive and thus had a higher propensity for risk-taking (Foo, 2009). Participants experiencing emotions with low certainty and control appraisals were more risk averse and estimated higher probabilities of risk for a given decision (Foo, 2009). These results suggest that, similarly to trust (Myers & Tingley, 2010), certainty and control appraisals play a role in the relationship between emotions and risk.

Additionally, the frameworks for emotions and decision-making reviewed in the theoretical framework for the current research in chapter four can be applied to the link between emotions and risk. For example, the affect infusion model has been used to evaluate the contexts in which emotions would impact risk assessments and behavior (Foo, 2009). The affect as information hypothesis has also been used to support Johnson and Tversky's (1983) model for emotions and risk. It does so by asserting that negative emotions would induce bottom-up processing (discussed in chapter four) and this would lead to risk aversion because of a focus on possible negative consequences (Martin & Stoner, 1996).

No single framework has been established for analyzing the relationship between emotions and risk (Fessler, Pillsworth & Flamson, 2003). However, it is clear that the same factors that impact the relationship between emotions and trust, and the same frameworks and theories used to analyze the relationship between emotions and trust, have also be applied to the link between emotions and risk. Essentially, this indicates that future research could develop a single theoretical framework for the effect of

emotions on both risk and trust, and utilize a new experimental design treating risk and trust as two separate conceptual variables.

In the current research risk was integrated into the experimental design through the use of self-report measures. This utilization of risk as a control variable sets the current study apart from the existing literature in that it provides some of the first empirical evidence for the existence of a relationship between emotions, risk, and trust. While this was one of the key strengths of the study, the next section will give a brief overview of the limitations of the current research.

Limitations of the study

The key limitation of this study is that it was underpowered. As discussed in chapter six, the generally accepted level of power for experiments in psychology is around 80%. In this study, the preliminary power analysis indicated that, assuming a small effect size, the experiment would need 55 participants per condition in order to attain 80% power. This would indicate a total participant pool of 165 participants across the 3 conditions. The actual sample size was 102 and the participant number in each condition ranged from 29 to 38. This low power indicates that there would be a low likelihood of attaining significant results without increasing the sample size, implying a higher probability of making a type II error. The actual sample size was constrained by time and by the small size of the Bard student population. Very likely, the fact that the results were significant despite the small sample size suggests that we might be underestimating the effect of incidental emotions on trust behavior and that a larger sample could yield more significant results.

The second issue with the current research concerns the happy/neutral condition manipulations. The means for these two conditions were nearly identical, which could indicate that the happy condition was ineffective or that the neutral condition induced positive affect. This conclusion is supported by Table 17, which compares three ordered logit models in which the only difference is that the reference dummy for the condition variable is changed. When the happy and neutral conditions are included with anger as the reference category (this is the setup in the main logit model), both dummies are significant at the $p=.05$ level. However, when the anger and happy conditions are included in the model, results for the happy condition are not significant because the neutral condition is being used as the reference category. The same pattern of results is present when anger and neutral dummies are included in the model with the happy condition as the reference category (Table 17).

The possibilities for why this might have occurred are discussed in the first section of chapter seven. In either case, the happy and/or neutral emotion manipulations seem to be less effective than the anger condition. This implies that we can't establish the extent to which the neutral condition clearly represents a non-emotional baseline. Additionally it is impossible, based on these data, to discern whether there is a significant difference in trust between happy and neutral emotion individuals. Notwithstanding this caveat, the anger condition was robust and the way I dealt with this shortcoming was to focus on anger as the key emotional condition. Future studies could try to employ

different film clips in the happy and neutral conditions and recruit participants from neutral settings²¹.

A third limitation of the current research is the limited number of emotion manipulation conditions. Due to the constraints on sample size discussed previously, I chose anger, neutral, and happy as the three conditions that seemed most likely to impact trust decisions based on the emotion theory presented in chapters three and four. However, with a larger sample size, it would have been interesting to include more emotion groups.

In a recent working paper, Myers and Tingley (2011) do in fact include more emotion conditions in a very similar experimental setup. These researchers test Dunn and Schweitzer's (2005) findings that emotions with strong other-person control appraisals are more likely to influence trust behavior. They used the autobiographical emotion memory task²² to induce anger, anxiety, guilt, happiness and self assurance before instructing participants to play the Berg, Dickhaut, and McCabe (1995) trust game. They found that negative emotions decrease trust, but only if the emotions have low certainty appraisals (Myers & Tingley, 2011). Thus, the inclusion of more emotion conditions allowed these researchers to conduct a more in-depth investigation of the emotion theory behind emotional impacts on trust decisions.

Directions for future research

The current study makes a significant contribution to the current behavioral game theory literature on trust by highlighting the relationship between emotions, risk, and trust

²¹ The results section discusses that participants might have come in with preexisting positive affect because they were recruited at groups (usually with their friends) during their dinner hour at Kline Commons.

²² This task induces emotion by asking participants to write about a time in their life when they felt a certain emotion.

behavior. While previous studies have theorized that risk is a key component of trust decisions, this study provides empirical evidence supporting this claim. Furthermore, this study provides an important insight into the Berg, Dickhaut, and McCabe (1995) trust game, a cornerstone of behavioral game theory trust games, by suggesting that much of the variability in trust levels may be attributable to individual differences in risk preference.

Future research on emotions and trust decisions could build on this thesis by (1) introducing more emotion conditions (similarly to Myers & Tingley, 2011) and (2) investigating the relationship between risk, trust, and emotions. While the former approach would be fairly straightforward in that it could employ the same experimental design used here, the second approach would need a new experimental design in order to separate out the effects of risk and trust. Additionally, the effects of empathy and attachment to a community in relation to trust and emotions could also be effectively investigated using different experimental designs.

Tables

Table 1: Summary Statistics

<u>Variable</u>	<u>Observations</u>	<u>M</u>	<u>SD</u>	<u>Minimum</u>	<u>Maximum</u>
Condition	102	1.91	0.81	1	3
Trust Behavior	101	5.90	2.87	0	10
Positive Affect	101	2.58	0.68	1	4.2
Negative Affect	101	1.60	0.53	1	3.1
Age	101	19.37	1.38	18	24
Gender	100	0.52	0.50	0	1
Year In College	101	1.77	1.09	1	5
Major In College	101	2.17	1.39	0	4
Risk	101	3.76	1.09	1.6	6.4
Empathy	101	4.51	1.00	2.6	6.4
Attachment to Bard	101	4.96	1.00	2.2	6.8
Trust Self Report	101	4.12	1.02	1.6	6.4
Susceptibility to Film Manipulation	101	4.04	1.65	1	7

Table 2: Summary of Condition Variable

<u>Condition</u>	<u>N</u>	<u>Percent</u>	<u>Cumulative Percent</u>
Anger	38	37.25	37.25
Neutral	35	34.31	71.57
Happy	29	28.43	100.00

Table 3: Positive Affect by Condition ANOVA

<i>Summary of Variable</i>					
<u>Condition</u>	<u>M</u>	<u>SD</u>	<u>N</u>		
Anger	2.35	0.66	37		
Neutral	2.72	0.65	35		
Happy	2.71	0.69	29		
Total	2.58	0.68	101		
<i>Analysis of Variance</i>					
<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Between groups	3.18	2	1.59	3.60	0.031
Within groups	43.31	98	0.44		
Total	46.49	100	0.46		

Table 4: Negative Affect by Condition ANOVA

<i>Summary of Variable</i>					
<u>Condition</u>	<u>M</u>	<u>SD</u>	<u>N</u>		
Anger	1.75	0.56	37		
Neutral	1.50	0.51	35		
Happy	1.52	0.48	29		
Total	1.60	0.53	101		
<i>Analysis of Variance</i>					
<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Between groups	1.38	2	0.69	2.56	0.0827
Within groups	26.44	98	0.27		
Total	27.82	100	0.28		

Table 5: Susceptibility to Film Manipulation by Condition ANOVA

<i>Summary of Variable</i>					
<u>Condition</u>	<u>M</u>	<u>SD</u>	<u>N</u>		
Anger	4.50	1.68	37		
Neutral	3.90	1.60	35		
Happy	3.61	1.59	29		
Total	4.04	1.65	101		
<i>Analysis of Variance</i>					
<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Between groups	14.10	2	7.05	2.66	0.075
Within groups	259.44	98	2.65		
Total	273.53	100	2.74		

Table 6: Trust Behavior by Condition ANOVA

<i>Summary of Variable</i>					
<u>Condition</u>	<u>M</u>	<u>SD</u>	<u>N</u>		
Anger	5.27	2.70	37		
Neutral	6.14	2.98	35		
Happy	6.41	2.90	29		
Total	5.90	2.87	101		
<i>Analysis of Variance</i>					
<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Between groups	24.39	2	12.20	1.49	0.230
Within groups	800.62	98	8.17		
Total	825.01	100	8.25		

Table 7: Trust Behavior by Condition Uncontrolled Regression

<i>Independent Variable</i>	<i>β, P, SE</i>
Condition	0.585 (0.352)
Constant	4.778*** (0.733)
Observations = 101	
$R^2 = 0.027$	

*Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Table 8: Correlation of Variables with Trust Behavior

<u>Variable</u>	<u>Overall</u>	<u>Anger</u>	<u>Neutral</u>	<u>Happy</u>
Age	0.03	0.2	-0.04	-0.06
Major	-0.1	-0.25	-0.01	-0.03
Risk	0.27***	0.29*	0.5***	0.11
Empathy	-0.14	-0.36**	0.03	-0.11
Attachment to Bard	0.25**	0.27	0.14	0.43**
Self-Reported Trust	0.037	0.11	-0.13	0.16
Film Susceptibility	-0.15	-0.17	-0.2	0.06
Positive Affect	0.08	0.16	-0.02	-0.03
Negative Affect	-0.06	0.17	-0.04	-0.25

*Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Table 9: Multivariate Ordered Probit Model (*Dependent Variable: Trust Behavior*)

<i>Independent Variables</i>	<i>β, SE</i>
Risk	0.331*** (0.104)
Empathy	-0.213* (0.11)
Attachment to Bard	0.326*** (0.118)
Trust Self-Report	-0.0185 (0.113)
Major Undeclared	-0.137 (0.378)
Major Art	0.185 (0.296)
Major Languages	-0.0435 (0.383)
Major SMC	-0.0755 (0.307)
Condition Neutral	0.638** (0.262)
Condition Happy	0.487* (0.266)
Observations = 101	
$\chi^2 = 25.15$	
$P > \chi^2 = 0.005$	
Log likelihood = -210.774	
Pseudo $R^2 = 0.056$	

*Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Table 10: Multivariate Ordered Logit Model (*Dependent Variable: Trust Behavior*)

<i>Independent Variables</i>	<i>β, SE</i>
Risk	0.626*** (0.184)
Empathy	-0.379** (0.187)
Attachment to Bard	0.594*** (0.208)
Trust Self-Report	-0.0749 (0.202)
Major Undeclared	-0.115 (0.648)
Major Art	0.0895 (0.485)
Major Languages	0.0002 (0.623)
Major SMC	-0.254 (0.532)
Condition Neutral	1.070** (0.447)
Condition Happy	0.973** (0.461)
Observations = 101	
$\chi^2 = 27.80$	
$P > \chi^2 = 0.002$	
Log likelihood = -209.448	
Pseudo $R^2 = 0.062$	

*Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Table 11: Comparison Table for OLS, Ordered Probit, and Ordered Logit Multivariate Models
(Dependent Variable: Trust Behavior)

	OLS	Ordered Probit	Ordered Logit
<i>Independent Variables</i>	<i>β, SE</i>	<i>β, SE</i>	<i>β, SE</i>
Risk	0.776*** (0.258)	0.331*** (0.104)	0.626*** (0.184)
Empathy	-0.487* (0.279)	-0.213* (0.11)	-0.379** (0.187)
Attachment to Bard	0.768** (0.297)	0.326*** (0.118)	0.594*** (0.208)
Trust Self-Report	-0.0195 (0.292)	-0.0185 (0.113)	-0.0749 (0.202)
Major Undeclared	-0.253 (0.957)	-0.137 (0.378)	-0.115 (0.648)
Major Art	0.491 (0.768)	0.185 (0.296)	0.0895 (0.485)
Major Languages	-0.0797 (0.981)	-0.0435 (0.383)	0.000204 (0.623)
Major SMC	-0.22 (0.794)	-0.0755 (0.307)	-0.254 (0.532)
Condition Neutral	1.523** (0.669)	0.638** (0.262)	1.070** (0.447)
Condition Happy	1.14 (0.686)	0.487* (0.266)	0.973** (0.461)
	Observations = 101 F(10,90) = 2.46 P > F = 0.012 R ² =0.215 Adjusted R ² = 0.128	Observations = 101 χ^2 = 25.15 P > χ^2 = 0.005 Log likelihood = -210.774 Pseudo R ² = 0.056	Observations = 101 χ^2 = 27.80 P > χ^2 = 0.002 Log likelihood = -209.448 Pseudo R ² = 0.062

Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 12: Marginal Effects for Ordered Logistic Regression

Variable	dy/dx	Std. Err.	z	P>z	[95% Conf. Interval]
Risk	0.085	0.028	3.06	0.002	0.031 0.139
Empathy	-0.052	0.026	-1.95	0.051	-0.103 0.000
Attachment to Bard	0.081	0.030	2.69	0.007	0.022 0.140
Trust Self Report	-0.010	0.027	-0.37	0.710	-0.064 0.044
Major Undeclared	-0.016	0.088	-0.18	0.859	-0.188 0.157
Major Art	0.012	0.066	0.18	0.854	-0.117 0.142
Major Languages	0.000	0.085	0.00	1.000	-0.166 0.166
Major SMC	-0.035	0.072	-0.48	0.632	-0.176 0.107
Condition Neutral	0.145	0.064	2.26	0.024	0.019 0.271
Condition Happy	0.132	0.065	2.03	0.043	0.004 0.260

Marginal Effects Evaluated in Relation to Means:

Risk	3.756436
Empathy	4.514851
Attachment to Bard	4.961386
Trust Self Report	4.118812
Major Undeclared	0.1287129
Major Art	0.2772277
Major Languages	0.1188119
Major SMC	0.2475248
Condition Neutral	0.3465347
Condition Happy	0.2871287

Table 13: Variable Inflation Factor Table

Variable	VIF	1/VIF
Major Art	1.66	0.603
Major SMC	1.65	0.607
Major Undeclared	1.44	0.694
Condition Neutral	1.42	0.704
Major Languages	1.41	0.707
Condition Happy	1.35	0.739
Trust Self Report	1.23	0.813
Attachment to Bard	1.22	0.821
Risk	1.09	0.916
Empathy	1.07	0.934
Mean VIF	1.35	

Table 14: Breusch-Pagan/ Cook-Weisenberg Test
for Heteroskedasticity

$\chi^2=0.34$
$P>\chi^2=0.56$

Table 15: White's Test for Heteroskedasticity

Source	χ^2	df	P
Heteroskedasticity	82.18	52	0.0048
Skewness	24.09	10	0.0074
Kurtosis	0.32	1	0.5716
Total	106.59	63	0.0005

$\chi^2=82.18$
$P>\chi^2=0.05$

Table 16: Comparison of Main Model With and Without Risk (*Dependent Variable: Trust Behavior*)

	Risk	No Risk
<i>Independent Variables</i>	<i>β, SE</i>	<i>β, SE</i>
Risk	0.626*** (0.184)	
Empathy	-0.379** (0.187)	-0.330* (0.185)
Attachment to Bard	0.594*** (0.208)	0.588*** (0.204)
Trust Self-Report	-0.075 (0.202)	-0.045 (0.196)
Major Undeclared	-0.115 (0.648)	0.243 (0.643)
Major Art	0.090 (0.485)	0.103 (0.490)
Major Languages	0.000 (0.623)	0.243 (0.618)
Major SMC	-0.254 (0.532)	-0.221 (0.528)
Condition Neutral	1.070** (0.447)	0.643 (0.428)
Condition Happy	0.973** (0.461)	0.667 (0.448)
	Observations = 101	Observations = 101
	$\chi^2 = 27.80$	$\chi^2 = 15.70$
	$P > \chi^2 = 0.002$	$P > \chi^2 = 0.073$
	Log likelihood = -209.44	Log likelihood = -215.50
	Pseudo $R^2 = 0.062$	Pseudo $R^2 = 0.035$

*Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Table 17: Comparison of Condition Dummies in Ordered Logit Model (*Dependent Variable: Trust Behavior*)

	Anger Reference Category	Happy Reference Category	Neutral Reference Category
<i>Independent Variables</i>	<i>β, SE</i>	<i>β, SE</i>	<i>β, SE</i>
Risk	0.626*** (0.184)	0.626*** (0.184)	0.626*** (0.184)
Empathy	-0.379** (0.187)	-0.379** (0.187)	-0.379** (0.187)
Attachment to Bard	0.594*** (0.208)	0.594*** (0.208)	0.594*** (0.208)
Trust Self-Report	-0.075 (0.202)	-0.075 (0.202)	-0.075 (0.202)
Major Undeclared	-0.115 (0.648)	-0.115 (0.648)	-0.115 (0.648)
Major Art	0.090 (0.485)	0.090 (0.485)	0.090 (0.485)
Major Languages	0.000 (0.623)	0.000 (0.623)	0.000 (0.623)
Major SMC	-0.254 (0.532)	-0.254 (0.532)	-0.254 (0.532)
Condition Neutral	1.070** (0.447)	0.098 (0.476)	
Condition Happy	0.973** (0.461)		-0.098 (0.476)
Condition Anger		-0.973** (0.461)	-1.070** (0.447)
Observations = 101			
$\chi^2 = 27.80$			
$P > \chi^2 = 0.002$			
Log likelihood = -209.448			
Pseudo $R^2 = 0.062$			

Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Figures

Figure 1: Scatter Plot Positive Affect by Condition

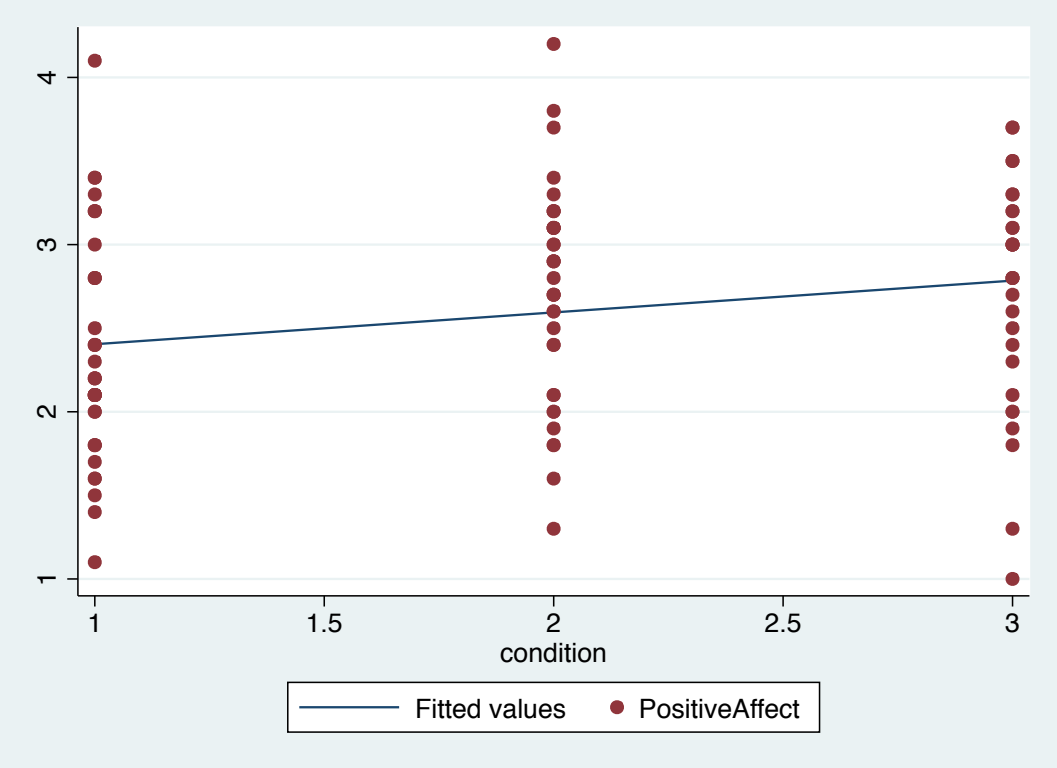


Figure 2: Scatter Plot Negative Affect by Condition

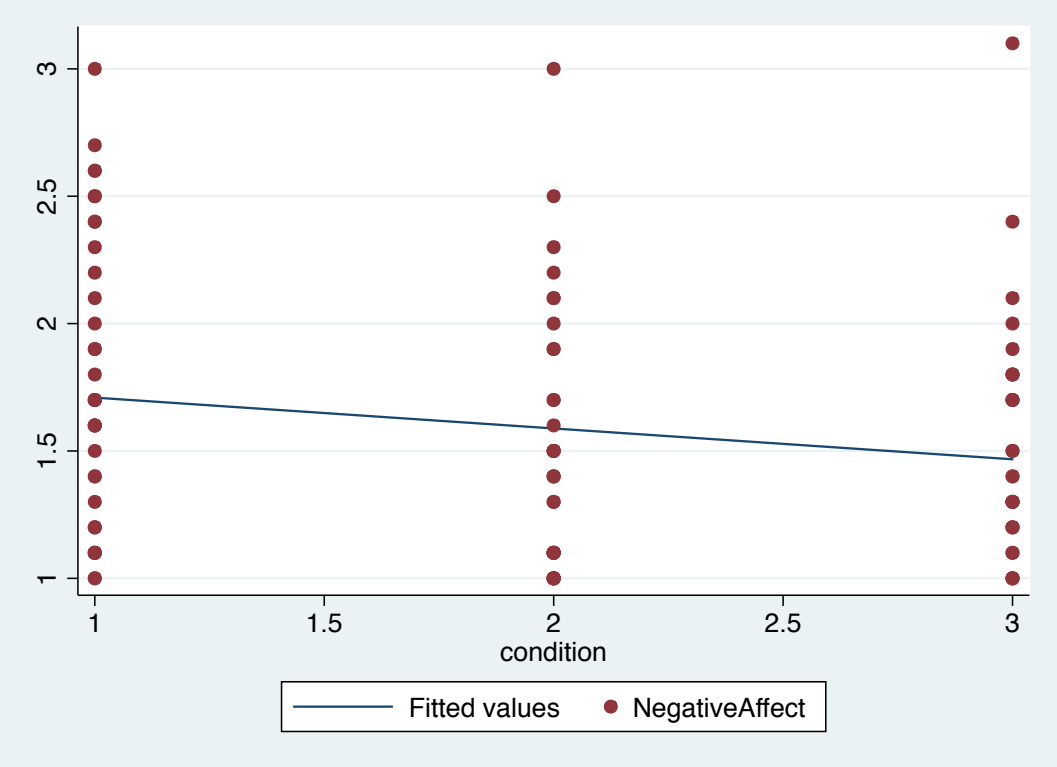


Figure 3: Scatter Plot Susceptibility to Film Manipulation by Condition

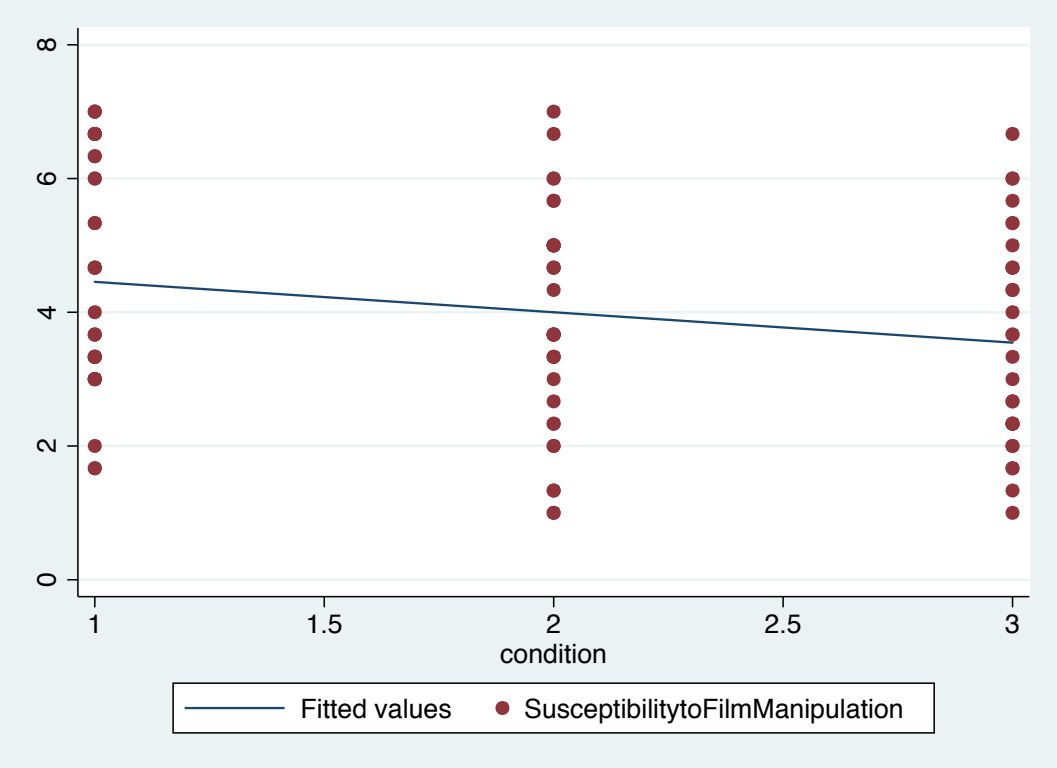


Figure 4: Scatter Plot for Trust Behavior by Risk

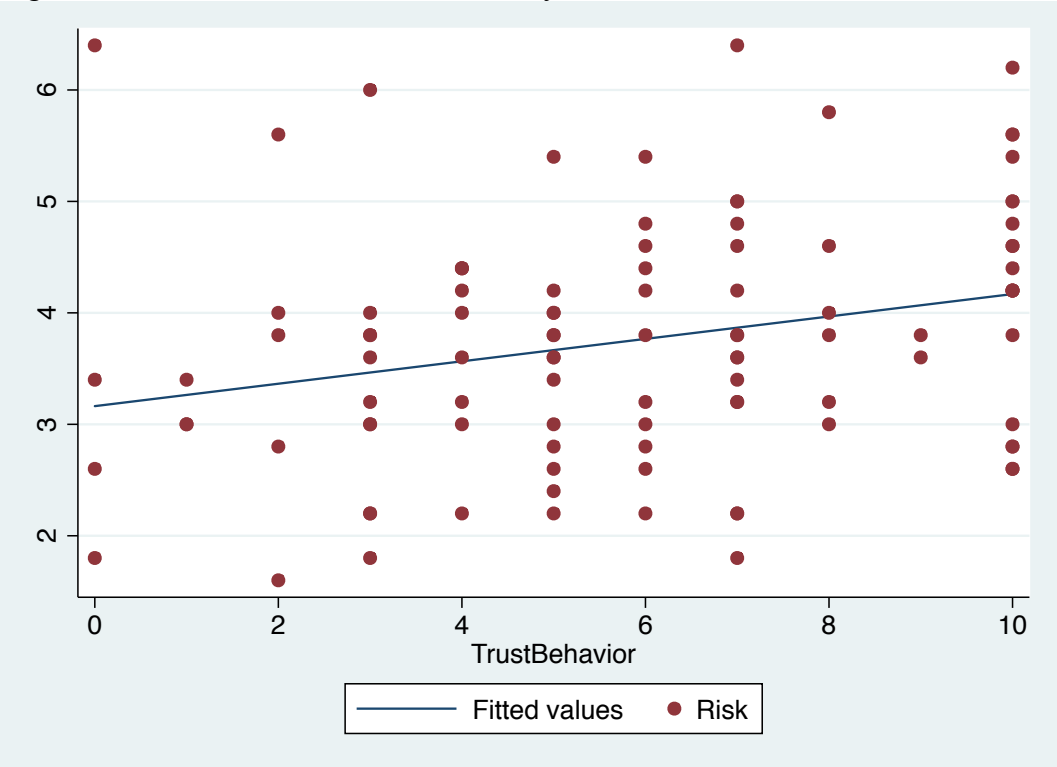


Figure 5: Scatter Plot of Empathy by Trust Behavior in the Anger Condition

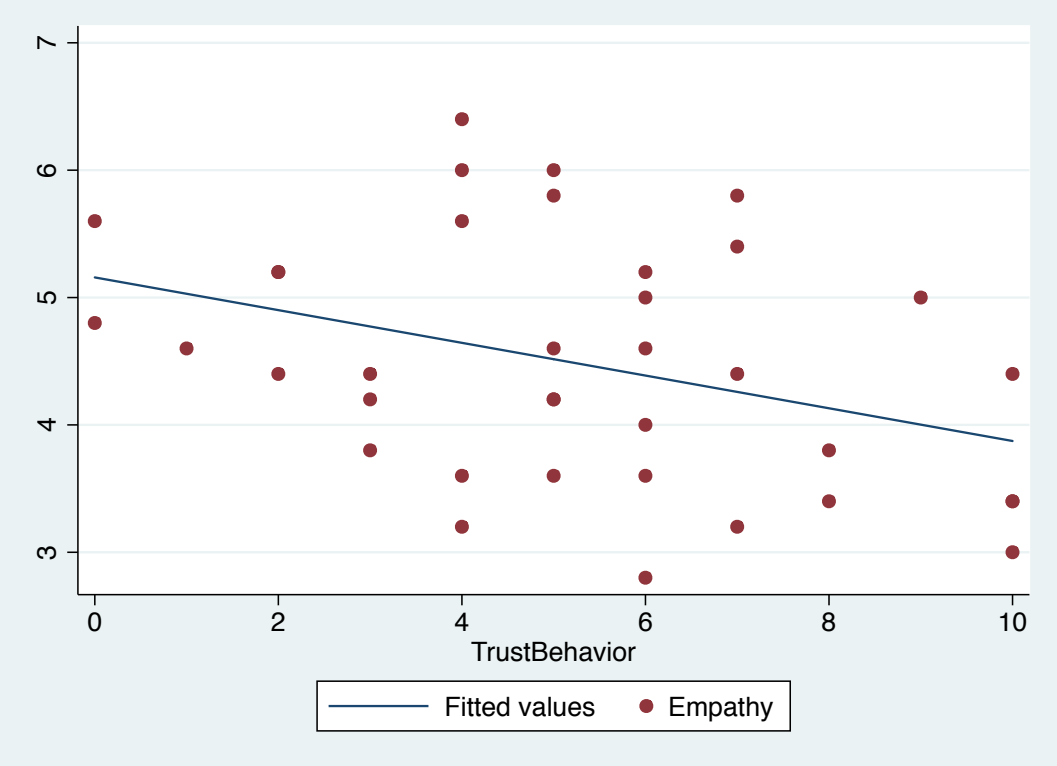


Figure 6: Scatter Plot of Attachment to Bard by Trust Behavior

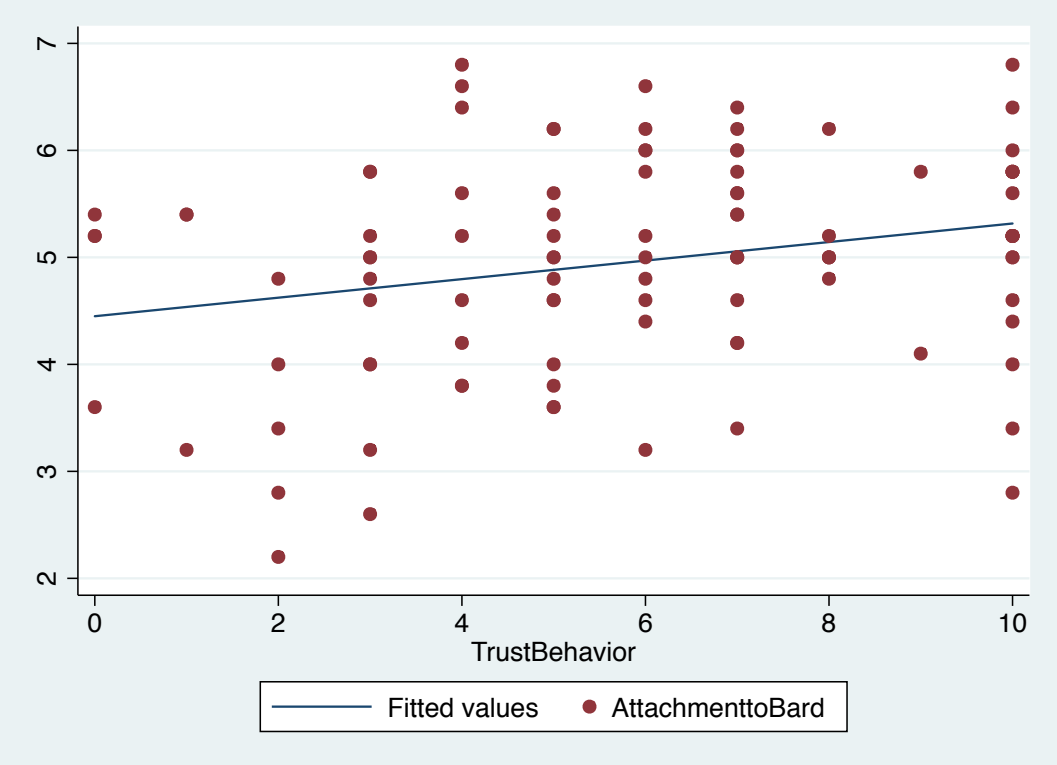


Figure 7: Scatter Plot of Residuals by Fitted Values

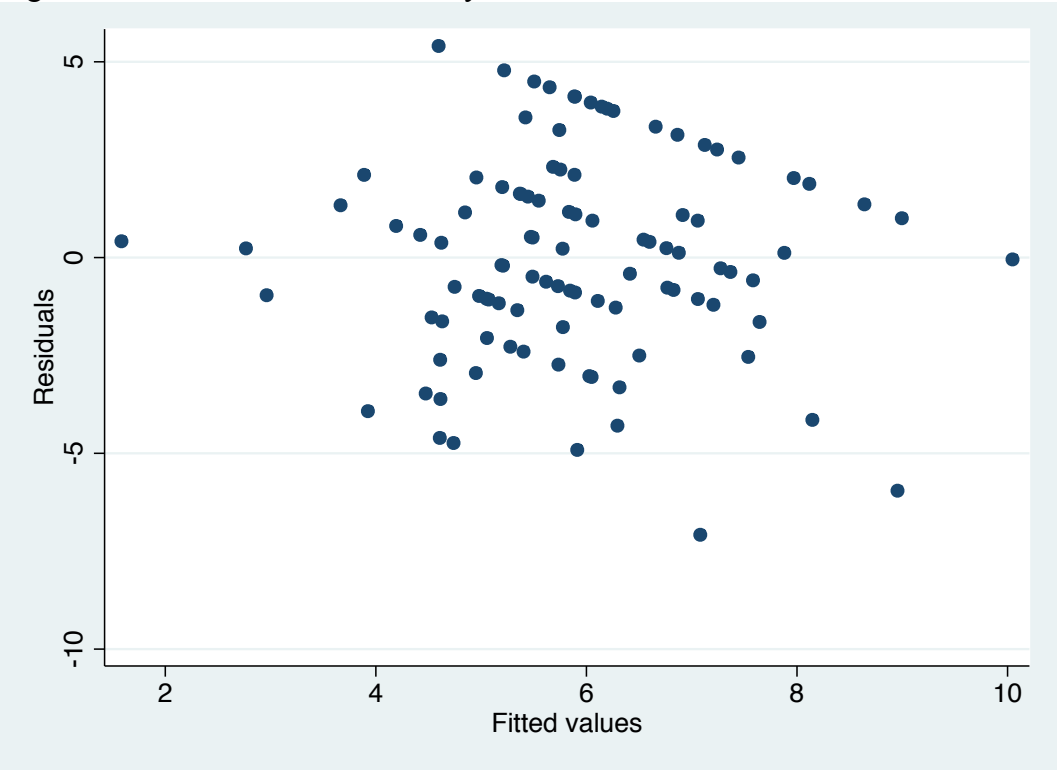
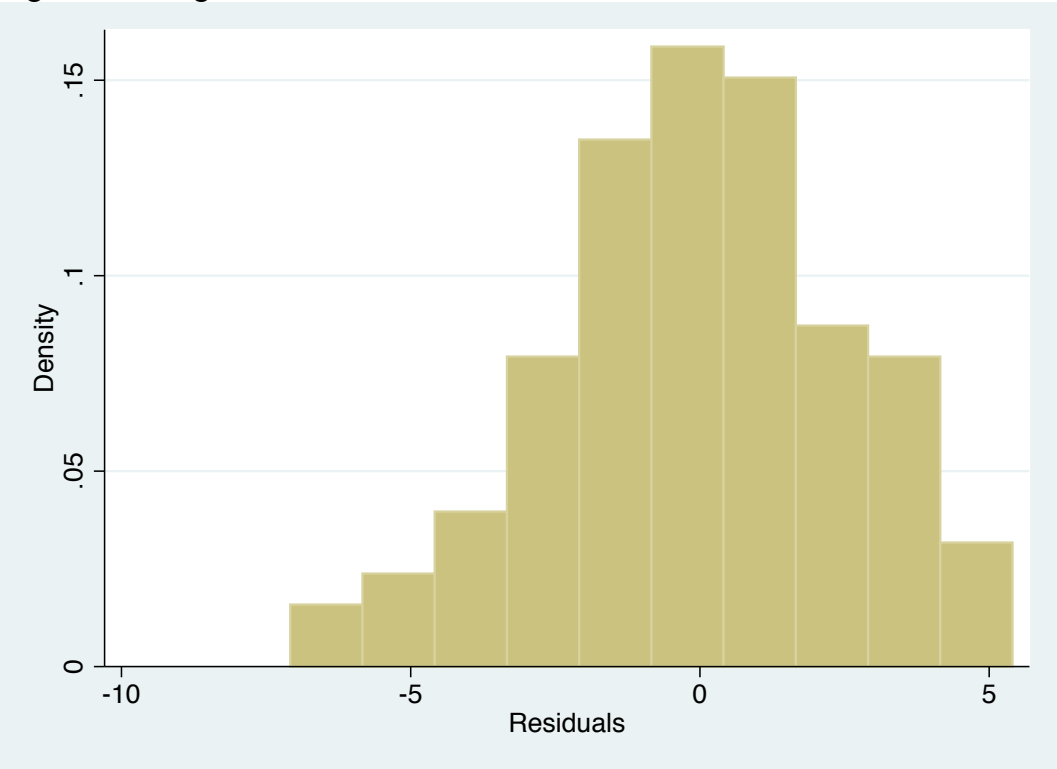


Figure 8: Histogram of Residuals



Appendix A

INFORMED CONSENT AGREEMENT

Thank you for agreeing to participate in this research study!

Background. In the current study, we are interested in how visual stimuli influence performance on a motor task.

What you will do in this study. You will watch a short film clip and then participate in a short writing exercise and survey. This experiment will take approximately 5 minutes to complete. The experimenter will answer questions, although he or she may postpone some of them until the end of the session.

Risks and Benefits. The film clip may include scenes that make you uncomfortable. These clips are taken from popular movies rated “R” or lower, so it is likely that these movie scenes are similar to those you see in your everyday life.

Compensation. In exchange for participating in the experiment, you will receive a candy bar.

Your rights as a participant. Your participation in this experiment is completely voluntary, and you may withdraw from the experiment at any time without penalty. You will still receive payment for participating. You may withdraw by informing the experimenter that you no longer wish to participate (no questions will be asked).

The experimenter will tell you more about the study and our hypotheses at the end of the session. If you wish, you can send an email message to the principal investigator, Kristin Lane (lane@bard.edu) and we will send you a copy of any manuscripts based on the research (or summaries of our results).

Confidentiality. Your answers and performance will remain confidential: your responses will be coded and only the primary researcher and Idan Elmelech, a student working with her, will be able to access a file that will match your name to your responses in this study. This file will be password-protected and securely stored.

I have read the above form and certify that I am 18 years of age or older. I consent to participate in today's experiment.

Date

Signature

If you have questions about this study, please contact Kristin Lane, Department of Psychology, Bard College, Annandale-on-Hudson, NY 12504 or lane@bard.edu. If you have questions about your rights as a research participant, please contact the Bard College Institutional Review Board: irb@bard.edu.

INFORMED CONSENT AGREEMENT

In the current research study, we are interested in how people decide to invest monetary sums.

Participant Role

You will be asked to play a short game involving investment and money. You will be playing this game over the computer against another anonymous participant. This experiment will take approximately 10 minutes to complete. The experimenter will answer questions, although he or she may postpone some of them until the end of the session.

Risks, Benefits, and Compensation

Some participants may find that playing the game makes them anxious because they have to make decisions with real monetary payoffs. In exchange for participating in the experiment, your final monetary sum in the game will be translated into raffle tickets to win \$200.

Participant Rights

I am aware that my participation in this experiment is completely voluntary. I understand the intent and purpose of this research. There will be no consequences of withdrawing from the study, and I will still get paid as indicated above. You may withdraw by informing the experimenter that you no longer wish to participate (no questions will be asked). The experimenter will tell you more about the study and our hypotheses at the end of the session. If you wish, you can send an email message to the principal investigator, Idan Elmelech (ie446@bard.edu) and we will send you a copy of any manuscripts based on the research (or summaries of our results).

Confidentiality

Your answers and performance will remain confidential: your responses will be coded and only the primary researcher will be able to access a file that will match your name to your responses in this study. This file will be encrypted and securely stored.

I have read the above form and certify that I am 18 years of age or older. I consent to participate in today's experiment.

Date

Signature

If you have questions about this study, please contact Idan Elmelech at ie446@bard.edu. The data collected from these experiments will go towards the completion of Idan Elmelech's senior project. A copy of the project will be stored in the library. If you have questions about your rights as a research participant, please contact the Bard College Institutional Review Board: irb@bard.edu.

Thank you for participating in this experiment!

Using your non-dominant hand, please copy the following sentence. "The woman went shopping."

This scale consists of a number of words that describe different feelings and emotions. Please read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now, that is, at the present moment.

1	2	3	4	5
Very slightly or not at all	a little	moderately	quite a bit	extremely

Interested	_____
Distressed	_____
Excited	_____
Upset	_____
Strong	_____
Guilty	_____
Scared	_____
Hostile	_____
Enthusiastic	_____
Proud	_____
Irritable	_____
Alert	_____
Ashamed	_____
Inspired	_____
Nervous	_____
Determined	_____
Attentive	_____
Jittery	_____
Active	_____
Afraid	_____

Instructions

In this experiment, you will play a game with another participant who will be responding to your decisions at a later date. You have been matched with a single other participant. You will not be told who the participant is either during or after the experiment and vice-versa.

You will play the role of an investor and the other participant will play the role of an investment manager. You will be given 10 points; these will be referred to as your endowment. At the end of the experiment each point will count as one raffle ticket towards the \$200 lottery, so you want to end up with the greatest total number of points.

The rules of the game are as follows:

You can invest between 0 and 10 points of your endowment. Every point you invest will be tripled (that is if you invest 5 points, this will yield 15 points) and sent to the other participant. He or she will then decide if, and what portion, of this new amount of points to give back to you and what portion to keep for themselves.

The total points you will have at the end of this exchange will consist of whatever you decide to keep in addition to whatever the other participant returns to you. The other participant has been given their own 10-point endowment, is aware of all of the same rules, and the points that he or she has at the end of the game will go towards raffle tickets for a *separate* \$200 raffle.

Amount You Would like to invest:_____

SurveyHow much do you agree with these statements?

(1-Very Little/ 4-Somewhat/ 7-Strongly)

1. I am a risk taker

1 2 3 4 5 6 7

2. I have spent time volunteering and will continue to do so

1 2 3 4 5 6 7

3. I generally trust people

1 2 3 4 5 6 7

4. I would hold the door open for someone even if it meant missing my train

1 2 3 4 5 6 7

5. I don't usually help out other students

1 2 3 4 5 6 7

6. I don't like to gamble

1 2 3 4 5 6 7

7. It takes a long time for me to feel close to another person

1 2 3 4 5 6 7

8. People consider me to be reckless

1 2 3 4 5 6 7

9. I always act with a high regard for the safety of my friends, my belongings,
and myself

1 2 3 4 5 6 7

10. I feel that I fit in at Bard

1 2 3 4 5 6 7

11. I often feel that I am not able to depend on others

1 2 3 4 5 6 7

12. I fit in more at my high school than I do at Bard

1 2 3 4 5 6 7

13. I usually make conservative or safe decisions

1 2 3 4 5 6 7

14. The average Bard student has a lot of the same worldviews as I do

1 2 3 4 5 6 7

15. I feel that people betray me a lot

1 2 3 4 5 6 7

16. I empathize very strongly with characters in TV shows and films

1 2 3 4 5 6 7

17. The average Bard student is trustworthy

1 2 3 4 5 6 7

18. I feel that some people don't deserve help or kindness

1 2 3 4 5 6 7

19. When watching a movie with friends I'm usually the least emotional person in the group

1 2 3 4 5 6 7

20. I have found a group of close friends at Bard

1 2 3 4 5 6 7

21. I usually cry when I watch sad movies

1 2 3 4 5 6 7

22. I do not usually react emotionally to hardships experienced by others

1 2 3 4 5 6 7

Please Answer the following questions to the best of your ability.

1) What is your age?

2) What is your gender?

3) What year in college are you?

4) What is your major?

5) What do you think the Research Hypotheses of these experiments are?

6) Do you think there is a connection between the two experiments you just participated in? If so, what do you think that connection is?

7) For the purpose of informing you if you win the lottery we ask that you print your email address here.

Survey Coding

- 1) Risk Preference (lower score= less risk taking tendencies)
1, -6, 8, -9, -13
- 2) Empathy (lower score= less empathy)
2, 4, 16, -18, -22
- 3) Attachment to Bard Community (lower score= less attachment)
-5, 10, -12, 14, 20
- 4) Trust (lower score= less trust)
3, -7, -11, -15, 17
- 5) Susceptibility to film manipulation (lower score= less susceptible)***
16, -19, 21

*** This measure ranges between 3 and 21 instead of 5 and 35. It is not included in the main multiple regression and is only used as a manipulation check.

Debriefing Form

Thank you for completing the study!

We are interested in how emotions influence trust decisions. The two studies you participated in were actually part of a single larger study. We felt it necessary to tell you that there were two separate studies in this task in order to keep participants from guessing the true research hypothesis.

The first task primed emotions. Studies have shown that people tend to be more trusting when they experience positive emotions and less trusting when they experience negative emotions. The second task was a commonly used task in behavioral game theory. The decisions you made in this task were designed to gauge how trusting you were in decisions involving money. Normally, people in western societies tend to exhibit a fair amount of trust towards anonymous others in the context of this game. We hypothesized that people with positive emotions such as happiness would be more trusting than people with negative emotions such as anger. Thus, the first part of the study induced a certain emotion, and the second part of the study measured trust levels.

This experiment has implications for how emotions that are unrelated to a decision influence the decision-making process. The points you accrued in the trust game (experiment 2) will be entered into a raffle for a prize of \$200, you will be notified by email if you won this prize.

If you are interested in learning more about the study, or the results, or if you have questions about the lottery winnings, please contact Idan Elmelech at ie446@bard.edu or Kristin Lane at lane@bard.edu.

Thank you again for participating in our experiments!

Appendix B

Recruiter Script

Hi, we are running a series of two psychology experiments today in the president's room. The payoffs for participating in the experiments are a candy bar and raffle tickets to a \$200 lottery. If you are interested in participating please let me know.

Experimenter Script

Hi, are you here for the psychology experiments?

Welcome. Please have a seat at one of the computers. Today we are running a series of two experiments, the first is for Professor Kristin Lane's social psych lab and the second is for my senior project. The payoff for participating in the first experiment is a candy bar and for the second is a entrance to a lottery for \$200. Here is the consent form for the first experiment. Are you all over 18?

If no:

I'm sorry but you can't participate in the experiment, we are only allowed to run participants that are 18 years or older. Please feel free to take a candy bar and thanks for coming in.

If yes:

This consent form says that you have the right to leave at any time during the course of the experiment. All of your responses in this experiment will be completely confidential, any identifying information will be securely stored in the social psych lab and only Kristin Lane and I will have access to it. If you do choose to leave before the end of the experiment you can still take your candy bar.

Once participants have all completed the consent forms:

I can take those if you're done. Thank you. Whenever you're ready you can feel free to put on the headphones and press play.

Once participants have finished watching the film clips the experimenter will hand them the motor coordination task and PANAS:

This next section contains a motor task and short survey; please complete it to the best of your ability.

Once participants have completed the motor task and PANAS, experimenter collects these sheets and hands out second consent form:

So that's it for the first experiment. Here are the consent forms for the second experiment. Once again, you have the right to leave at any time during the course of the experiment. If you choose to leave during the experiment you will still be entered into the lottery. All of your responses in this experiment will be completely confidential, any identifying information will be securely stored in the social psych lab and only my advisers, Kristin Lane and Ani Mitra, and I will have access to it.

Once participants have signed second consent form, experimenter collects consent form and hands out trust game instructions, which are stapled to final survey:

Thank you. Here are the instructions for the experiment, they are attached to another short survey that we would like you to fill out once you have finished the experiment. We ask that you fully complete the first page before moving on to the survey. Let me know if you have any questions.

Once participants finish trust game and survey:

If not all the participants have finished at the same time, experimenter collects trust game instruction and survey sheets from any participants that have finished early and says:

Thanks for your participation. We have a short debriefing for you guys so we ask that you stay a little longer while the rest of the participants finish. If you're in a rush, we have a written debriefing, which you can also take.

Once all participants are finished:

Thank you for completing our experiments. How did you guys like them?

Were all the instructions and questions pretty clear?

I'd like to tell you a little bit more about what we are up to. What we were actually looking at was how emotions influence trust decisions. Although we told you that you were taking part in two separate studies, two tasks were actually separate parts of the same experiment. So the first 'experiment' you guys participated in was supposed to induce a certain emotion by showing you a video. You either saw a video that was intended to make people feel happy or angry, or a neutral third video. The second 'experiment' was designed to measure trust through the game you played with the points for the lottery. We are interested in whether the video you watched influenced how much money you were willing to give to the investor. Does that all make sense?

Another important point is that there is not actually another group of participants responding to your actions in the second experiment. Instead, your entry in the lottery will be based on an algorithm we have that is a function of how much to give back to you based on how many points you chose to invest and how much you kept. Now that everyone is aware of all of this, would it still be okay to use your responses in our data analysis?

Excellent, thank you. We have written debriefing forms that restate what I just told you about the experiment, you're welcome to take one if you'd like. Feel free to take a candy bar and we'll notify you by email if you won the lottery. Thanks again for your participation.

Appendix C

IRB Application**Section 1**

Name (Last, First): Elmelech, Idan

Email: ie446@bard.edu

Phone Number: 8457500170

Program: Psychology/Economics

Status: Undergrad

Name of your adviser or faculty sponsor: Kristin Lane, Aniruddha Mitra

Your adviser's or faculty sponsor's email address: lane@bard.edu amitra@bard.edu

Today's date: October,30, 2013

Section 2

I have read the IRB's [Categories of Review](#), and my proposal qualifies for a:

☐ Expedited Review

Do you have external funding for this research?

☐ No

If so, state name of granting institution and the title of the project as it was submitted to that institution.

*When do you plan to begin collecting data for this project? (**begin date**):* November 18, 2013

*When do plan to end your data collection for this project? (**end date**)* November 18, 2014

*What is the **title** of your project?*

Incidental Emotions and Trust Decisions

*Describe your **research question** briefly (approximately 250 words or less):*

The research question of this project relates to how emotions impact economic behavior, specifically decisions involving trust. Research in both micro and macro economics has indicated that trust is an essential facilitator of economic activity (Knack and Keefer, 1997; Snagnier, 2013; Beugelsdijk, Groot & Van Schaik, 2002; Nichols, Danford & Tasiran, 2009). In addition, research in both behavioral economics and social psychology has indicated that emotional influences significantly impact trust behaviors exhibited by individuals (Camerer, 2004; Elster, 1998; Lowenstein, 2000; Dunn and Schweitzer, 2005). Combining these findings, I would like to investigate whether, and how, incidental emotions (emotions that are unrelated to a decision) would impact the decision-making process and outcomes of a trust decision.

Will your participants include individuals from specific populations (e.g., children, pregnant women, prisoners, or the cognitively impaired)?

☐ No

If your participants will include individuals from specific populations, please specify the population(s) and briefly describe any special precautions you will use.

N/A

*Briefly describe **how** you will recruit participants. (e.g., Who will approach participants? What is the source of the participants?)*

1. Campus center: We will set up tables at the campus center to recruit and run participants. Participants will be approached as they walk through the campus center. If they wish to participate, they will be escorted to a private room to complete the experiment.
2. Kline commons: We will reserve a room at Kline to recruit and run participants. Participants will be approached as they are leaving or entering the meal area. If they wish to participate, they will be escorted to a private room to complete the experiment.
3. Classrooms: In consultation with professors, we will make announcements at the end of classes and offer compensation to any student who wishes to stay and complete the study. These data collection sessions will not take any class time.
4. We will post flyers in the campus center, at Kline, at the shuttle stops, in the computer labs, and in freshman dorms on campus.

*Briefly describe the **procedures** you will be using to conduct your research. Include descriptions of what tasks your participants will be asked to do, and about how much time will be expected of each individual.*

NOTE: If you have supporting materials (recruitment posters, printed surveys, etc.) please email these documents separately as attachments to IRB@bardresearch.com. Name your attachments with your last name and a brief description (e.g., "WatsonConsentForm.doc").

PROCEDURE

Deception will be necessary in order to maintain the validity of the experiment and reduce demand characteristics. Therefore I would like to present the experiment to participants as two separate, unrelated, experiments. The experimental manipulation will be the first 'experiment' presented to the participants. Based on studies by Dunn and Schweitzer (2005) and Harle and Sanfey (2007), I would like to employ film clips and a short writing exercise in order to induce emotion.

The film clips will be fairly short (approximately 5 minutes) and the writing exercise will ask participants to reflect and write about a time when they felt the same way as the main character or characters in the film. This has been shown to effectively induce low to moderate levels of emotion (Hewig, Hagemann, Seifert, Gollwitzer, Naumann & Bartussek. 2005).

Three different film clips will be employed for the two experimental groups and single control group. The emotional manipulations for the two experimental groups are anger and happiness. For example, one film clip that has previously been used to manipulate anger is a 128 second clip from the 1982 film Ghandi, in which a policeman beats a man for illegally burning apartheid passes (Hewig, Hagemann, Seifert, Gollwitzer, Naumann & Bartussek. 2005). These manipulations have been shown to induce low to moderate levels of these emotions. The control group will be given an emotionally neutral film clip in order to maintain experimental validity and establish a baseline.

The second 'experiment' will consist of a simple game with small monetary payoffs as performance incentives. This game was proposed by Berg, Dickhaut and McCabe (1995) and has been replicated multiple times. In this game, the participant is given a certain 'endowment' (these will be a representation of money such as poker chips that will go towards a lottery prize of \$200 at the end of the experiment– the number of chips they have at the end will be their number of entries into the raffle). The participant is told that they are an Investor and that they can choose to keep or invest this endowment. If the participant chooses to invest, they give a portion (or all) of their endowment to an anonymous 'Trustee'. The Trustee then 'invests' and earns a certain return on the investment. The Trustee must then decide what portion, if any, of the investment to return to the Investor. In my experiment, the game would be played over the computer on a chat program. The participants would all be Investors and the role of the Trustee would be played by a confederate who would be instructed to give predetermined responses with respect to the return. This game would be played for up to 3 rounds.

Following the second part of the experiment, participants will be given a post-experiment questionnaire to collect demographic information and check that the manipulation was effective. The questionnaire will also investigate whether the deception was effective. Participants will then be debriefed by the experimenter and rewarded for their participation with a candy bar and the possibility of winning the \$200 lottery using the points (poker chips) they accumulated in the trust game as raffle tickets.

Approximately how many individuals do you expect to participate in your study?
120

*Please describe any **risks and benefits** your research may have for your participants. (For example, one study's risks might include minor emotional discomfort and eye strain. The same study's benefits might include satisfaction from contributing to scientific knowledge and greater self-awareness.)*

Risks: Participants in the experimental group for 'anger' may feel angry after watching the film clip and writing about it. If they strongly identify with the main character they might experience moderate anger levels. However, because these manipulations for anger have been used before and will be taken from feature films, the risks are expected to be minimal (Hewig, Hagemann, Seifert, Gollwitzer, Naumann, Bartussek, 2005). Also, because these are popular movies, this risk is no different than that assumed in going to a movie in everyday life.

Benefits: Participants will earn a candy bar and a chance of winning \$200 in a raffle. They can also learn more about psychology research and become more self aware in learning about how trusting they are in decisions involving money.

*Have you prepared a **consent form** and emailed it as an attachment to IRB@bardresearch.com?*

[See attached at the end of this document.]

*Please include here the **verbal description of the consent process** (how you will explain the consent form and the consent process to your participants):*

For "public locations": Participants will be recruited as they walk by and asked if they'd like to receive candy and the possibility of winning \$200 in exchange for completing two short studies. After confirming that they are at least 18 years of age, they will read over the consent form.

For class recruitment: Researchers will make the following announcement: My name is [name] and I am a student working with Professor Kristin Lane in Bard College's Social Psychology lab. We're collecting data for two short studies today and we are seeking volunteers. The total time to complete the two studies is approximately 20 minutes; if you stay and participate we can offer you a candy bar as well as a chance to win \$200. All participants will then receive a copy of the written consent form.

If your project will require that you use only a verbal consent process (no written consent forms), please describe why this process is necessary, how verbal consent will be

obtained, and any additional precautions you will take to ensure the confidentiality of your participants.

*What procedures will you use to ensure that the information your participants provide will remain **confidential**?*

Due to the fact that the number of chances in the lottery depends on participants' performance in the study, we will need to match participants' names to their data. Participants' responses will be kept in a password-protected document. Only Kristin Lane, Ani Mitra, and I will have the password to this document. Once the lottery payment is made, participants' names will be deleted from the computer file, thus anonymizing the data.

*Will it be necessary to use deception with your participants at any time during this research? Please note: withholding details about the specifics of one's hypothesis **does not** constitute deception. However, misleading participants about the nature of the research question or about the nature of the task they will be completing **does** constitute deception.*

☐ Yes

*If your project study includes deception, please describe here the **process** you will use, **why the deception is necessary**, and a **full description of your debriefing procedures**.*

Deception will be necessary in order to maintain internal validity. If the participants were to know the hypothesis (the emotions are expected to influence decision making in the trust game) this would introduce task demands and skew the results of the study. The deception used will involve presenting the study as two separate experiments. There will be a separate consent form for each experiment that will fit into the deception. Participants will be told that the first experiment is being conducted for Kristin Lane's social psychology lab in order to see how visual stimuli influence performance on a motor task (ie., handwriting). The second experiment will be presented as a short study involving economic decision-making that is being conducted for a senior project in economics. At the end of the second study, participants will be given a debriefing sheet (included in the appendix) that informs them of the actual research hypothesis and why the deception was necessary. They will be informed of the benefits of the study and asked to keep the research hypothesis to themselves so that the participant pool will not be contaminated. The use of deception here will be solely in regards to the research hypothesis, not the content or tasks involved in the study. Participants will be fully and accurately informed of the tasks we wish them to complete prior to the start of each part of the experiment. The deception will simply serve to hide the true research hypothesis from participants in order to avoid task demands that would skew results. At the end of the experiment, after the participant reads the debriefing form, the experimenter will ask them if they have any questions or comments regarding the experiment. This will give participants the opportunity to voice any questions or concerns regarding the use of deception.

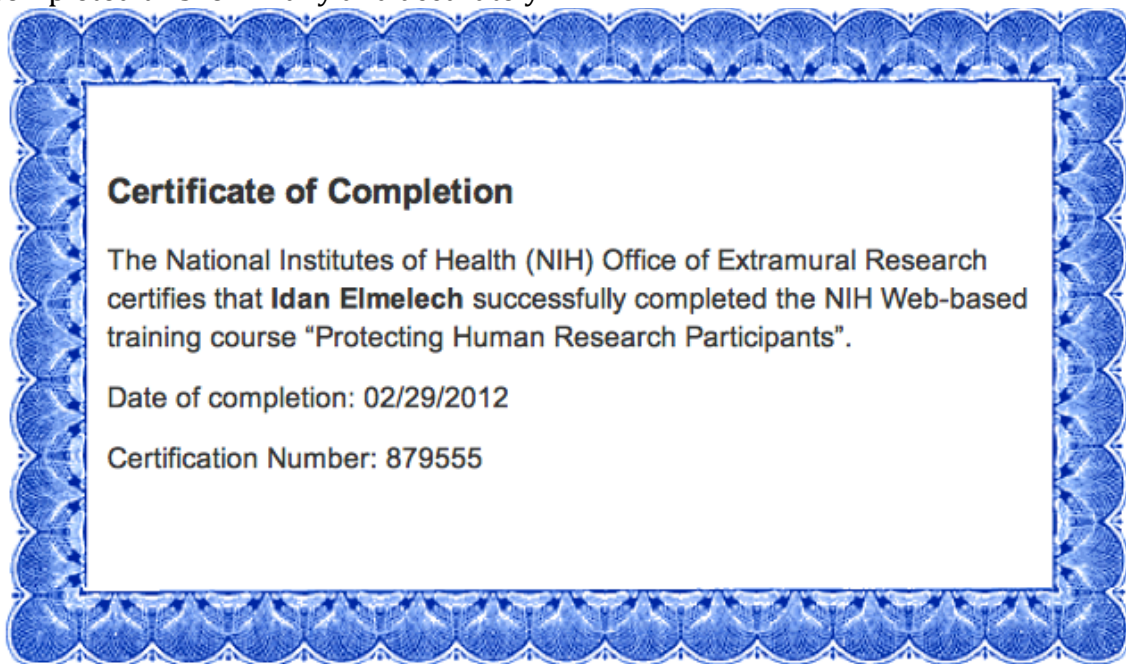
*For projects not using deception, please include your **debriefing statement**. (This is information you provide to the participant at the end of your study to explain your research question more fully than you may have been able to do at the beginning of the study.) **All studies must include a debriefing statement.** Be sure to give participants the opportunity to ask any additional questions they may have about the study.*

See emailed attachments.

Section 3.

N/A

Section 4. To finalize and submit your application. Please verify that you have completed this form fully and accurately.



IRB Approval

Bard College

Institutional Review Board

Date: November 11, 2013
To: Idan Elmelech
Cc: Kristin Lane, Aniruddha Mitra
From: Michelle Murray
Re: Incidental Emotions and Trust Decisions

DECISION: APPROVED

Dear Idan,

The Bard Institutional Review Board reviewed your proposal at our November meeting. Your proposal is approved through November 11, 2014.

Please notify the IRB if your methodology changes, or unexpected events arise.

We wish you the best of luck with your research.

Michelle Murray
mkmurray@bard.edu
IRB Chair

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