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EVOLUTIONARY INFLUENCES ON SOCIAL EXCHANGE: COGNITIVE BIASES IN PERCEPTION AND RECALL

by

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Abstract

Four studies investigated the existence and characteristics of proposed perceptual and cognitive biases in social exchange. From the perspective of evolutionary psychology, these biases could be considered as outputs from psychological mechanisms that evolved to regulate social exchange in the ancestral environment. The existence of three types of biases in individuals was predicted: those favouring kin over non-kin, those regulating reciprocal altruism, and those that assist in subtle cheating, to be found in the form of selfish biases. Studies I and II used hypothetical role-playing scenarios to manipulate the relationship and/or reproductive value of a person to be helped. Support was found for kin-favouring biases in these studies. The reproductive value of the potential recipients appeared to have no effect. Studies III and IV used reports of actual giving and receiving instances. Although some support was found for the existence of reciprocal altruism, few kin-favouring biases were found, and although several self-other differences were significant, they were in opposite direction to the predicted selfish-biases. These unexpected findings seem to provide evidence of the importance of maintaining reciprocal relationships, in order to maintain the possibility of receiving future benefits, and to avoid the costs of incurring debts. From an evolutionary perspective, this pattern of behaviour could be considered ultimately selfish. The data also seem to describe a strategy for giving to others that would also be in an individual's best interests. The possible effects of differences between the ancestral and current environment and the variability in actual instances are discussed with respect to the lack of evidence for kin-favouring biases in studies III and IV.

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Dedication

I would like to dedicate this thesis to my father,

Zbigniew Stanislaw Janicki

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Introduction

Given the widespread acceptance of selfishness at the genetic and individual level as both a by-product and driving force of evolution through natural selection (Alcock, 1989; Daly & Wilson, 1983; Dawkins, 1989), any phenotypic or genotypic characteristics that seem *unselfish* should be of special interest to evolutionary scientists. Altruism, defined from a biological perspective, is any behaviour that confers a benefit to the recipient at a cost to the donor in terms of reproductive fitness (Alcock, 1989). The costs of altruistic behaviours, relative to selfish behaviours, theoretically should have resulted in their elimination through natural selection. The prevalence of unselfish, seemingly altruistic behaviours in both humans and animals was once considered paradoxical to evolutionary theory. From evolutionary biology, two theories have since provided explanations of how seemingly unselfish behaviours, such as helping others, could have evolved in order to actually benefit the individual's fitness. These theories are Hamilton's (1964) theory of inclusive fitness and Trivers' (1971) theory of reciprocal altruism. The benefits obtained by helping under certain conditions made it adaptive. From an evolutionary perspective, this behaviour would be ultimately selfish.

Since helping would have been adaptive only when specific conditions were met, regulatory mechanisms can be hypothesized to have evolved to monitor and control it. These mechanisms may be revealed through cognitive and perceptual biases in the way people think about, perceive, and recall their past instances of exchange. In this series of four studies, perceptions about helping were explored by testing predictions based on the assumption that psychological mechanisms, including those regulating helping mechanisms, were selected because they promoted the fitness of our early ancestors. The objective of these studies was to investigate the existence and characteristics of biases whose basis can be derived from the theories of inclusive fitness and reciprocal altruism. In general I predicted that cognitions pertaining to social exchange (past, present, and future) would be influenced both by the relationship category of exchange partners and by the self-serving interests which aided in maximizing ancestral fitness. The occurrence of reciprocal altruism was also investigated. Using the framework developed by evolutionary psychologists, several specific predictions can be derived from the two aforementioned theories.

To provide the background and framework for the predictions made in this study, the following paragraphs will explain the main tenets of evolutionary psychology and review the two major evolutionary theories of helping behaviour.

Evolutionary Psychology

Evolutionary psychology is a specialized Darwinian approach to the study of human nature. The focus of study is upon the design of innate psychological mechanisms that were selected because they produced adaptive behaviours in our ancestral environment (Symons, 1989, 1992; Tooby & Cosmides, 1989). The ancestral environment refers to the physical and social environment of early humans in the Pleistocene. Humans existed at that time in nomadic hunter-gatherer groups. Evolutionary psychologists argue that since we have lived for most of our existence as hunter-gathers, human psychological mechanisms are adapted to Pleistocene conditions, rather than present-day conditions (Tooby & Cosmides, 1989; Symons, 1992).

Evolutionary psychologists argue that the most productive method of studying humans is to focus upon the problems faced by early humans in the ancestral environment and to explore cognitive programs and mental mechanisms that are hypothesized to have evolved to solve those problems. (see Barkow, Cosmides, & Tooby, 1992 for current papers). It has been argued that the mind is composed of "...a multitude of domain-specific, special-purpose adaptive mechanisms..." (Tooby & Cosmides, 1989, p. 31). These psychological mechanisms are conceptualized as cognitive and information-processing models. Also labelled Darwinian Algorithms, the mechanisms are defined in terms of procedures, algorithms, or decision rules that guide behaviour, perceptions, and cognitions. Darwinian Algorithms may also be thought of as strategies, defined in terms of decision rules, that evolved to maximize an individual's reproductive success given the environmental constraints imposed by natural selection in the ancestral environment.

With regard to helping behaviours, Darwinian Algorithms are assumed to have evolved to regulate behaviour so as to maximize the benefits and minimize the costs associated with social exchange in the early human social environment. Social exchange can be defined as interactions where two or more individuals behave in ways in which they mutually benefit (Cosmides & Tooby,

1989). It can take many forms, such as helping a friend, gift-giving, or international trade and barter. In the present studies, the decision rules affecting the cognitions, perceptions, and recall concerning exchange between friends, relatives, and casual acquaintances were investigated. Decision rules that should exist for mediating behaviour in exchange situations were derived from inclusive fitness theory and the theory of reciprocal altruism. Each theory defines the circumstances in which helping would have been adaptive, and hence identifies the constraints imposed by natural selection under which Darwinian Algorithms evolved. Selfishness, in the form of subtle cheating in reciprocal exchanges, was also considered as an influence upon the evolution of decision rules.

Strategies and Decision Rules for Social Exchange

The main goal of these studies was to determine if perceptions of exchange are influenced by three factors: the relationship of the participants (in particular kin versus non-kin), the principles guiding reciprocal altruism, and by the selfish interests of individuals. In the studies, subjects were asked about actual or hypothetical helping instances between relatives, friends, and casual acquaintances.

Specific predictions were made by hypothesizing adaptive strategies for social exchange, as well as the decision rules of which they are composed. The strategies and decision rules are hypothesized to be adaptive in the sense that they would have been selected because of the reproductive advantages they conferred to individuals in their ancestral environments.

The following sections will discuss the theoretical basis behind the predictions made for these studies, beginning with descriptions of inclusive fitness theory and reciprocal altruism. All predictions are found at the end of the introduction.

Inclusive Fitness Theory

According to Hamilton's (1964) theory, the costly trait of altruism could have initially spread through a population only if individuals selectively helped kin, with whom they had a high probability of sharing that trait. The evolution of the altruistic trait in this manner would have necessitated the formation of a predisposition towards helping kin, in proportion to their degree of relatedness.

This is a behavioural tendency one might expect to find, and one does find, in many social animals. Two classic examples of kin-directed help in animals are alarm calling in Belding's ground squirrels (Sherman, 1977) and helpers at the nest in Florida scrub jays (Woolfenden, 1975).

Hamilton argued that an individual's total fitness includes not only the individual's reproductive success (direct fitness) but also the influence he or she has upon the reproductive success of relatives, multiplied by their degree of relatedness (indirect fitness). In combination, these constitute the individual's *inclusive fitness*.

The net benefit derived from helping a relative depends on both the cost of the help and the degree of relatedness between the helper and the helped. Hence, the cost to the helper must be less than the benefit to the relative multiplied by the degree of relatedness. Degree of relatedness refers to the probability that two individuals share an allele due to common descent. According to Tooby and Cosmides (1989), the condition, $C < B * r$ represents a constraint imposed by natural selection, under which helping kin could evolve. Therefore an important characteristic of any hypothesized strategy or decision rule that evolved to regulate altruistic behaviour toward kin is that it must operate under this constraint. Several are considered in the next section.

Decision Rules Derived from Inclusive Fitness Theory

If altruistic behaviour were adaptive only under the constraint of $B*r>C$, the cognitive machinery must have evolved the ability to determine r, the degree of relatedness. It has been hypothesized that there are algorithms designed to assess costs and benefits of helping, and to recognize cues that would have been associated with genetic relatedness in the ancestral environment. Several kin-recognition mechanisms have been proposed to operate in both humans and animals, and there is some evidence for their existence (Alexander, 1979; Hepper, 1991; Porter 1987)

In the present studies, I tested the importance of the relatedness in influencing decisions to help others and in perceptions of helping. There are a few other researchers who have also studied the significance of relatedness. Cunningham (1983, as cited in Cunningham, 1986) studied how relatedness affects decisions to help using hypothetical role playing scenarios in which someone needed help. He found significant positive correlations between

degree of relatedness and the percentage of subjects volunteering to help. In a cross-cultural survey, Essock-Vitale and McGuire (1980) found support for their predictions about the importance of kinship in exchange. In another study, concerned with patterns of helping among white middle-class women, the same researchers found that blood relatives constituted on average 36% of the women's helping partners, with an additional 21% being non-blood relatives, in-laws, and spouse (Essock-Vitale & McGuire, 1985). They also observed that major help was received and given primarily between kin, while minor help was exchanged mainly between [illegible]-kin.

Aside from degree of relatedness, the reproductive value (RV) of individuals should be of importance when calculating net benefits of helping kin (Milinski, 1978). RV refers to the relative number of offspring likely to be produced in the future by an individual of a given age (Fisher, 1930). This value usually rises sharply early in life, peaks at the beginning of the reproductive phase and decreases to zero at the end of that phase (Crawford, 1989; Milinski, 1978). Evolutionary theory predicts that help among kin should tend to flow from individuals of relatively low RV to individuals of higher RV. Individuals with high RV should be favoured recipients over those with low RV, all things being equal. Research has partially supported these predictions. Crawford, Salter, and Jang (1989) explored how the intensity of human grief varied with the reproductive value of the deceased. A study of probated wills, conducted by Smith, Kish, and Crawford (1987), found that individuals appear to consider both relatedness and reproductive value when dividing up their estates. In their study of women's helping patterns, Essock-Vitale and McGuire (1985) found that help among kin tended to flow from older to younger kin.

One exception to this prediction concerns parental care. The RV of infants rises steeply from birth. However, for a period, the reproductive value of babies and infants is less than their parents. An evolutionary prediction might state that infants should invest more in their parents than vice versa. For two reasons this is unlikely. Since infants are relatively helpless compared to their parents, they benefit more from each unit of investment than would the parents (Dawkins, 1989). As well, the parents' reproductive success depends upon the infants reaching maturity and therefore it is likely that the beneficial cognitive mechanisms associated with parental care 'override' this tendency to give to those of higher RV.

In these studies the effects of both relatedness and RV upon perceptions and cognitions of helping were examined. The following strategy is proposed to have evolved for regulating kin-directed altruism:
Decrease the perceived cost of helping relatives proportionally with their degree of relatedness, modified by their reproductive value.

Put in other terms, the benefits of helping relatives should increase with the degree of relatedness, modified by the reproductive value of the person helped.

Reciprocal Altruism

In his theory of reciprocal altruism, Trivers (1971) asserts that altruistic acts are beneficial to the helper under conditions in which there is a high likelihood of being helped in return. As with kin-directed altruism, helping is ultimately selfish in nature. That is, this type of helping benefits the individual and would have been favoured by natural selection (Krebs, 1987; Trivers, 1985). Since obtaining benefits from helping depends on being helped in return at a future time, reciprocal altruism works only if there is sufficient interaction among individuals. The conditions necessary for reciprocity to evolve include a social organization in which individuals interact often and in which there is a large degree of sociality, some degree of mutual interdependence, low dispersal rate, long lifespan, and sufficient intellectual ability to be able to remember helpers (Trivers, 1971, 1985). The environment of early hominid groups featured these conditions and hence favoured the evolution of reciprocity (Krebs, 1987; Trivers, 1971,1985).

Since reciprocal altruism, by definition, involves help that is repaid at a later time, cheating, accepting a benefit without paying a cost, is a possibility. The potential for cheating imposed a constraint upon the evolution of reciprocity and the cognitive mechanisms regulating it. Thus, in order for reciprocal altruism to have evolved, there must have been psychological mechanisms that functioned to minimize the probability of being cheated (Cosmides & Tooby, 1989; Trivers, 1985). Strategies used in reciprocal altruism, such as those designed to detect cheaters are discussed in the next section.

Strategies and Decision Rules Derived from Reciprocal Altruism Theory

The theory of reciprocal altruism provided an explanation of how helping between non-kin could have evolved. For this to have occurred, the net benefits of exchange behaviour must have outweighed the costs. Thus cognitive mechanisms enabling individuals to assess costs and benefits associated with single exchanges and with long term relationships based on exchange can be hypothesized to have evolved.

Cosmides and Tooby (1992) have outlined four requirements necessary in order to obtain a net benefit in a reciprocal exchange. They are:

1) I do an act that benefits you at a cost to me

2) You do an act that benefits me and costs you

3) The benefit to you from my doing my act is greater than the cost to you from doing your act.

4) The benefit to me from your doing your act is greater than the cost to me of doing mine for you.

Basically, this means each individual in the exchange endures a cost and receives a benefit, and the benefit they receive is higher than their cost, hence the net benefit.

In reciprocal altruism there is always the opportunity for cheating. Cheating can range from reciprocating only partially to not reciprocating at all (Trivers, 1985). Being non-responsive to cheaters would be very costly. Indiscriminate cooperation was found to be a maladaptive strategy by Axelrod and colleagues, when they used an iterated Prisoner's Dilemma game as a model of natural selection (Axelrod & Hamilton,1981; Axelrod, 1984). Hence, cooperative behaviour could only have evolved if specific mechanisms to detect possible cheating co-evolved with it. These mechanisms would function to indicate the likelihood of being reciprocated, to detect if one had been cheated, and to regulate behaviour accordingly, for example by refusing further help to cheaters.

All of the above conditions are necessary for reciprocal altruism to evolve and be maintained. Given these, evidence for reciprocal altruism within a population would be supported by five criteria (Wilkinson, 1990, as cited in Cosmides & Tooby, 1992):

i) individuals associate for long periods

ii) the likelihood of an individual helping another is predicted on the basis of past association.
iii) the roles of donor and recipient frequently reversed
iv) the short-term benefits to the recipient are greater than the costs to the donor
v) donors have the ability to recognize and discriminate against cheaters.

The above and similar criteria have been used to find evidence of reciprocal altruism in various animal species, including, among others, vampire bats (Wilkinson, 1988), and baboons, (Packer, 1977). One of the present studies investigated the existence of reciprocal altruism within human exchange using some of the above criteria. The following general predictions were made (they shall be specified in more detail later):

1) The perceived cost of giving should be negatively correlated with the likelihood of future interaction (from criterion 1)
2) Considering past history of exchange, the balance between giving and receiving should tend to be equal (criteria 2 & 3)
3) The perceived average cost of giving to another should be lower than the perceived average benefit to the recipient (criterion 4)

Recognition and discrimination of cheaters were not explored in these studies, since strong evidence for the existence of specialized cheater-detection mechanisms has been provided by the work of Cosmides and Tooby (1989, 1992).

Reciprocal Exchanges Among Kin

The decision rules that regulate reciprocity should operate during exchanges between relatives as well as between non-relatives. Wilkinson (1988) ran a computer simulated model of exchange that calculated benefits due to inclusive fitness and due to reciprocity. He concluded that when reciprocal behaviours occur relatively often within a large social group, there can be significant selection for reciprocal altruism, independent of kin selection, even when performed among related animals. I propose that strategies and decision rules for reciprocal exchanges and those for kin-directed altruism should operate in combination, to assist the individual in determining the net benefits of an exchange. For example, if you have twin brothers of equal reproductive value, one of whom tends to reciprocate help while the other does not, you should preferentially help the one who reciprocates.

Cheating Strategies

As earlier mentioned, the possibility of being cheated in social exchange likely produced a strong selective force favouring cheater-detection mechanisms. Psychological mechanisms that functioned to prevent the individual from being cheated would have been adaptive. However, in certain conditions, utilizing cheating should also have been adaptive, since one would reduce the costs incurred in a reciprocal exchange and thus increase the net benefit. Trivers (1985) suggests that cheating is favourable if the individual will not be caught, if the cheated individual does not discontinue altruism, or if the recipient is unlikely to survive long enough to reciprocate. The costs of cheating can be very high. At the very least, if one was found out, the cost could be the loss of future benefits from exchange. At the worst, the cost could be severe punishment or death. I suggest that the probability of being caught was and is a major deterrent of cheating, and that individuals may modify the type of cheating used to reduce this possibility. Hence, selection may have favoured the increased subtlety of cheating (Barash, 1982). Trivers (1985) defines subtle cheating as reciprocating, but attempting to give less than one was given. This type of cheating can be difficult to detect, especially if one is calculating net benefits over a span of exchanges over time. I propose that subtle cheating can be revealed in exchanges as selfish biases are discovered. Predictions of selfish biases are discussed in a later section.

Strategies that maximize the benefits from cheating should take into account not only the probability of being caught, but also the type of relationship the individual has with the person(s) he or she intends to cheat. Cheating certain individuals would entail higher costs than cheating others. Cheating would be least costly when the mutual interests of two individuals are minimal. Alexander (1987) describes conflicts between individuals as conflicts of interest, arising mainly from genetic differences. The extent of deception is proposed to vary inversely with the extent that interests overlap. For example, if many mutual benefits are achieved through cooperation, as in friendships, then deception should be minimized because the costs of being discovered would be too great. Competitors would have few interests overlapping, so a large degree of cheating would be expected.

There should be an overlap of interests with one's relatives, increasing with degree of relatedness. Therefore, all else being equal, cheating should

increase in cost proportionally to relatedness. I acknowledge this as an oversimplification of the matter. Costs and benefits would vary for each instance and between different individuals and for relatives an in depth analysis would have to take into account the reproductive potential of the person helped, relatedness, number of offspring, cost of help, benefits gained, etc. Considering the above, I propose a general equation for the costs of cheating:

Costs of cheating = likelihood of being caught X costs of being caught
+ degree of relatedness X cost to fitness of kin

Before discussing the relevance of cheating to the studies reported here, I will mention how cheating may be represented in our conscious or unconscious perceptions of our exchanges with others.

Self-Deception

The preceding section paints a gloomy picture of a society of self-serving individuals. One may disagree with the above image, arguing that he or she does not usually think about cheating others to maximize selfish gains. However, as mentioned earlier, cheating is not beneficial at all times. Individuals who score high on a Machiavellian scale, (measuring social detachment, manipulativeness, competitiveness, and exploitativeness of others for personal gain) were found not to be more economically successful or socially mobile than those that score low on the scale (Christie & Geiss, 1970, as cited in Barber, 1992). If social status and financial success are linked to increased fitness, as some evolutionary scientists believe (Perusse, 1992), then the above finding suggests that being highly selfish and exploitative of others is not very adaptive (at least in our current environment).

We may not view ourselves as taking part in subtle cheating because, as with other cognitive mechanisms, those regulating cheating may operate at an unconscious level, and we may not even be aware of them. In this case self-deception may prevent us from comprehending our true motivations. Self-deception is adaptive in that it can make individuals better deceivers (Krebs, Denton & Higgins, 1988). Trivers (1985) argues the adaptiveness of self-deception:

> "Individuals readily create entire belief systems with self-serving biases, and the more skilfully these self-serving components are hidden from both the self and others, the more difficult it will be to counter them." (p416)

Aside from allowing the individual to be more skilful at deception, self-deception has other advantages. Since the benefits of behaving prosocially in society are great, psychological mechanisms guiding individuals to behave prosocially likely evolved (Alexander, 1987). It has also been suggested that docility, a social learning ability to accept instructions from society, was adaptive (Simon, 1990). To enforce prosocial behaviour internally, psychological mechanisms may have evolved that allowed individuals to internalize belief systems and cognitions supportive of societal norms and values. Being able to cheat while at the same time appearing to support these values (to oneself and others) confers several advantages. Individuals would be able to present themselves as non-cheaters, promote prosocial behaviour in others, and through self-deception, be more capable of deceiving others. Thus a cognitive strategy to uphold moral norms, while unconsciously cheating may have been favoured by natural selection.

Predictions of Selfish Biases

One of the present studies investigated the occurrence of subtle cheating in social exchange by hypothesizing the existence of selfish biases influencing perceptions and recall of exchanges. I predicted that biases exist that assisted individuals in being able to undercontribute to others. This kind of bias would enable individuals, behaving under a strong influence to maintain reciprocity, to pay back less than would be expected if the exchange were equitable. One type of selfish bias might operate by causing individuals to underestimate the contributions of others and overestimate their own contributions. This type of bias might operate by affecting the recall of exchange instances. A potential selfish bias existing in this area would enable individuals to be better able to recall instances where they had given to others than instances where others had given to them. As a result, the amount owing to others would be underestimated, and the amount owed would be overestimated. It should be stressed, however, that although this hypothesized bias might be valuable, the importance of keeping an accurate record of debts should not be devalued. It

should be kept with sufficient proficiency or the reciprocal relationship may terminate, which could be very costly. These biases can be thought of as decision rules, e.g. *Overestimate your own contributions, underestimate the contributions of others, within certain limits given the importance of the reciprocal relationship and overlap of shared interests, genetic or otherwise.* As earlier mentioned, the biases should be influenced by the degree of conflict of interest between individuals.

How biases and their underlying decision rules differ with relationships

Inclusive fitness theory and the theory of reciprocal altruism are assumed to have a combined impact on the selection of cognitive mechanisms regulating exchange. The varying relevance of these theories to different types of relationships should result in varying patterns of perceptual and cognitive biases among them.

Because of shared inclusive fitness interests, individuals should have kin-favouring biases. Consider how this bias interacts with the cost/benefit analysis of reciprocity. If debts owed by a relative were not repaid, the cost to the benefactor would be smaller than if they were owed by a non-relative. Help given to relatives should seem less costly than help given to non-relatives (friends and casual acquaintances). Correspondingly, individuals may give items of greater value to relatives than to non-relatives, however, *compared to items of the same objective value given to non-relatives, the perceived cost of giving should be lower when giving to relatives.*

Exchanges among relatives and among non-relatives should also differ in the extent and balance of reciprocity. Helping of non-kin should be more reciprocal than helping of kin because the inclusive fitness benefits obtained by helping kin offset the costs of unidirectional helping. Essock-Vitale and McGuire found support for this prediction in both a cross-cultural analysis (1980) and in a study of women's friendships (1985). I predict that individuals will perceive the exchange in their friendships as more balanced, i.e. more reciprocal, and that they will perceive their exchange relationships with kin as more unidirectional.

Among non-kin, differences in perceptions and cognitions about helping will likely be due to the strength of the relationship. By strength, I refer to the individual's perception of the future duration of and mutual commitment to

the relationship. The strength of the relationship gives the individual an indication of the likelihood of future interaction and likelihood of future exchanges. This information is used to make decisions concerning the amount of cost one is willing to take at the present. Friendships could be considered long-term reciprocal relationships. Relationships with casual acquaintances might be long-term, but there is usually less commitment to the relationship. I therefore predict that *compared to items of the same objective value given to casual acquaintances, the perceived cost of giving to friends should be lower.*

Selection environment of psychological mechanisms

The environment in which these psychological mechanisms and decision rules were selected is the hunter-gatherer environment of our early Pleistocene ancestors. Although the data collected was from our present environment, which is assumed to have changed greatly from the selection environment, I argue that the same strategies are operating today. As evolutionary psychologists have discussed (Crawford, 1989; Symons, 1989; Tooby & Cosmides, 1989), the cognitive mechanisms are likely unchanged and can be studied in the current environment. Symons (1989, 1992) has argued that the study of the design of psychological mechanisms is the only way Darwin's theory of evolution can useful in understanding human nature. If the environmental stimuli activating a particular psychological mechanism has greatly changed from the ancestral to current environment, (e.g. the number of people we come in contact with), behaviour evoked by that mechanism may not seem adaptive. The method of determining if currently observed behaviours are adaptive by studying their influence upon reproductive success has been strongly criticized (Tooby & Cosmides, 1989; Symons, 1989, 1992).

In these studies, the method of investigating the cognitive mechanisms used in helping involves obtaining information about how subjects make decisions and perceive helping in hypothetical helping scenarios, and about subjects' perceptions and cognitions concerning actual instances of exchange. Although the latter is a report on current behaviour, I believe that obtaining perceptions about that behaviour will help to uncover the cognitive mechanisms regulating the behaviour.

Influence of the emotional system

The above strategies and decision rules may appear to be logical and rational processes involved in decision-making. However, as Cosmides and Tooby (1989, 1992) have demonstrated, the proper decisions regarding social exchange can counter logic. Emotional reactions and decisions are sometimes considered illogical but some evolutionary theorists believe they serve an adaptive function (Kenrick & Hogan, 1991; Trivers, 1985). The limbic system is believed to be an ancient part of the brain which controls our emotions, directs our cognitions in a manner which was adaptive to our ancestors (Kenrick & Hogan, 1991). With regard to the importance of emotions to exchange, Trivers (1985) suggested that humans likely evolved a complex emotional system that helped us maintain reciprocal relations that were beneficial to us. For example, individuals should experience negative emotional reactions when they are involved in costly reciprocal relations, such as those in which they feel they are being cheated or not reciprocated sufficiently. I predict that individuals will experience a high level of upset if they are not reciprocated, and the level of upset should depend upon their relationship with the other individual. Also, considering selfish biases, individuals should be more upset if they are not reciprocated than if they do not reciprocate the other person.

An Outline of the Studies and All Predictions

Four studies were conducted. The first two studies were role-playing scenario studies designed to detect the presence of predicted Darwinian Algorithms. The first study focused on the effects of relationship types, and the second investigated the effects of both degree of relatedness and reproductive value. The third study was the largest and most complex. It utilized actual instances of exchange, as recalled by subjects. This study tested for the existence of kin-favouring biases, for the necessary criteria of reciprocity, and for the existence of selfish biases. The fourth and final study was a short study designed to clarify some of the findings of the third study.

The first three studies had several dependent variables in common. They include measures of: reluctance to give, perceived cost of giving, importance of being reciprocated, probability of being repaid, and upset at not being reciprocated. Below I describe all of the predictions tested in this series of studies, grouped according to the general theory from which they were derived.

Following this general overview, each study will be presented separately, outlining its purpose and the specific predictions that were tested in each. The results and discussions will be reported separately, followed by a general discussion.

General Predictions

PREDICTIONS DERIVED FROM INCLUSIVE FITNESS THEORY

1. Compared to mean ratings for helping non-kin, mean ratings for helping kin (given items of the same objective value) should be lower for:
   i)reluctance to give
   ii)perceived cost of giving
   iii)importance of being repaid
   iv) upset at not being repaid

2. The mean probability of giving should be higher for kin than for non-kin.

3. Relatedness and reproductive value should both affect all of the above ratings. There should be both significant effects for relatedness and for reproductive value. As relatedness increases, the perceived costs of giving etc., should decrease. For related individuals, the costs etc. would be reduced as RV increased.

PREDICTIONS DERIVED FROM RECIPROCAL ALTRUISM

4. There will be a significant negative correlation between the perceived cost of giving and likelihood of future interaction.

5. i) Relationships among non-kin are proposed to be more reciprocal in nature than relationships between kin. It is predicted that relationships with non-kin will be perceived more often as equal in terms of giving and receiving than will relationships with relatives. That is, a larger mean percentage of relationships in which the subject and the person listed "both give equally" should be found in the relatives group than in the other two non-relatives groups.

ii) For Study III, the perceived balance of exchange is obtained from both giving and receiving questionnaires. No significant differences are expected between the two.

iii) The proposed greater reciprocal nature of non-kin over kin relationships should also be reflected in a greater mean percentage of items repaid and a greater mean probability or repaying being found in the friends and casual acquaintance groups than in the relatives group.

6. The mean perceived cost of giving to another should be lower than the mean perceived benefit to the recipient.

7. Among non-kin, the perceived costs of giving should vary with the strength of the relationship. It is predicted that the mean ratings of reluctance to give, perceived cost of giving, importance of being repaid, and upset at not being repaid should be higher for casual acquaintances than for friends (given items of the same objective value). The mean probability of giving should be higher for friends than for casual acquaintances.

PREDICTIONS BASED ON SELFISH BIASES

8. Subjects should recall more giving than receiving instances, for all categories of relationships.

9. The importance of being reciprocated should average higher than the importance of reciprocating.

10. The perceived costs of giving to others should average higher than the perceived costs to others of giving to self.

11. The reluctance to give to others should average higher than the perceived reluctance of others' giving to self.

12. When individuals rate the level of upset from not being reciprocated, they should on average rate their upset greater than that of others to whom they do not reciprocate.

13. The mean percentage of relationships where the self is perceived as giving more should be significantly higher than the mean percentage of relationships where the other is perceived as giving more.

Study I

Rationale

This study was designed to test for evidence of cognitive mechanisms that predispose individuals to be more helpful to kin than to non-kin. Subjects (Ss) were presented with a scenario in which an individual was asked for help from a sister, friend, or casual acquaintance. Predictions 1 and 2 were tested. They stated that subjects will, on average, give the lowest ratings on reluctance to give help, importance of being repaid, cost of giving, and upset at not being repaid to the sister. The casual acquaintance should receive the highest rating on these questions. As well, it was predicted that subjects would choose the sister as the individual most likely to be given the help, and the casual acquaintance as the least likely. Ratings for the friend on each question should fall between the ratings of sister and casual acquaintance.

I argued that if no cognitive biases exist, Ss should logically see no difference in the cost to give (or importance of being repaid etc) since the item remains constant and all individuals are equally in need[1] and are seen with equal frequency[2]. Ss should especially see this "rational" relationship with this particular questionnaire set-up, since they are presented with the three alternatives (the three individuals) simultaneously.

Method

Subjects. Eighty-one undergraduates at Simon Fraser University were participants in this study. There were 58 women, 21 men, and 2 unknown (form was left blank) participants. Almost all of the subjects (Ss) were obtained from a subject pool and received participation credit for their time. A few Ss were

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[1] Gouldner (1960) proposed that a recipient's need influenced reciprocity. To prevent subjects from responding differently due to perceived differences of need of the potential recipients, the statement that all potential recipients were equally in need of the help was added.

[2] According to Trivers (1985), the frequency of future interaction with a potential recipient should affect decisions to give help. Thus it was stated on the questionnaire that all potential recipients were seen on a regular basis.

obtained by asking students on campus for their voluntary assistance in filling out a questionnaire. The mean age of the Ss was 21.2 years.

Materials and Procedure. A short questionnaire was designed (see Appendix A) that featured a brief hypothetical scenario in which a graduate student, Grace, was being asked for twenty dollars by either her sister, friend, or a casual acquaintance. It was mentioned that Grace saw all of the individuals on a regular basis and that each of them were in equal need of the money. A series of questions followed, to be answered on a 7 point scale with 1 being low, 7 being high. Ss were asked: 1) How reluctant Grace was to give the money? 2) How important it would be to get paid back if she gave the money? 3) How costly it would be for her to give the money? 4) How upset she would be if she did not get repaid? 5) What is the benefit to each recipient? and 6) What was the likelihood of her giving the money?

The Ss were told to imagine three hypothetical scenarios, in which each of the individuals were asking Grace for the money (i.e. they were not asking simultaneously). Each of the above questions were then answered three times, once for each target individual. The order in which the three individuals were listed was fully counterbalanced so that there were actually six versions of the questionnaire.

Results

Each of the questions above was considered a dependent measure. Systat 5.1 for the Macintosh was used to carry out statistical analyses reported in all of the studies. A repeated measures analysis with one trials factor was carried out once for each dependent variable to determine if subjects' responses significantly varied when answering for the different target individuals. A significant effect was found for all variables except for 'benefit to the recipient', and the pattern of means for each group were in the predicted pattern. The ANOVA table for these analyses is found in Table 1. The mean ratings for each question (except probability of giving) are shown in Figure 1. The mean probability of giving was 90.16% for sister, 81.11% for friend, and 46.76% for casual acquaintance.

To compare Ss ratings for the different relationship types, two planned comparisons were carried out: one that compared the ratings for the sister versus those for the friend, and one that compared the ratings for the friend with those for the casual acquaintance. For all previously significant variables,

all comparisons were significant. An ANOVA table for these analyses is found in Table 2.

Table 1
Study I - Tests for Treatment (Relationship Group) Effects

Variable	SS	df	MS	F
Reluctance to give	439.051	2	219.526	147.509***
Error	238.115	160	1.488	
Importance of being Repaid	312.700	2	156.350	136.973***
Error	182.634	160	1.141	
Cost to give	172.123	2	86.067	100.087***
Error	135.867	158	0.860	
Upset at not being repaid	228.156	2	114.078	84.303***
Error	216.510	160	1.353	
Benefit to recipient	2.591	2	1.295	1.152
Error	175.409	156	1.124	
Probability of giving	8905.506	2	42452.753	184.338***
Error	36847.827	160	230.299	

***$p<.001$

Note. $n=81$ for all variables except Benefit to recipient, where $n=79$ and Cost to give, where $n=80$.

Fig 1 - Mean Ratings for Variables in Study I

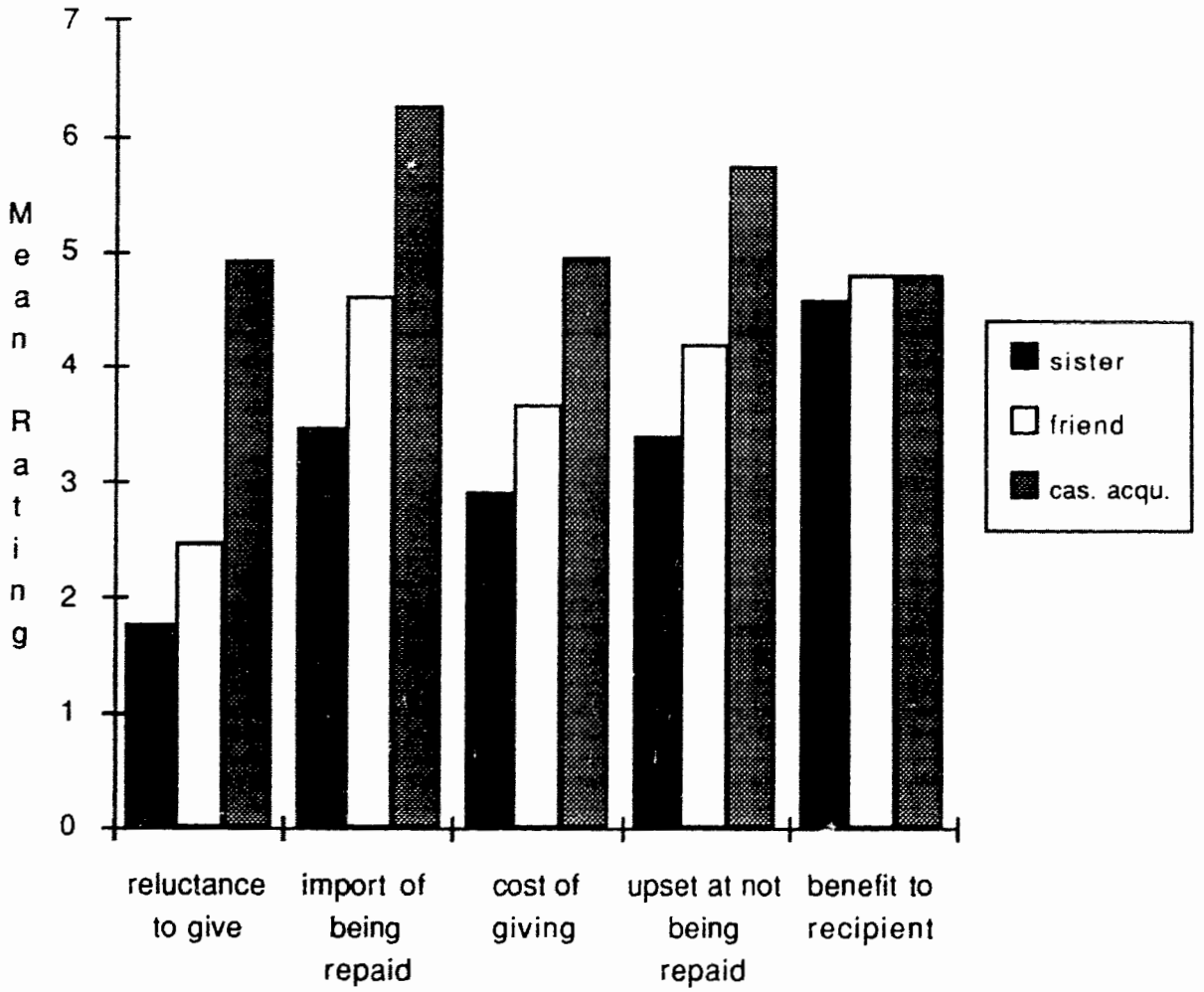


Table 2

Study I - Contrasts Between Relationship Categories

Variable	Contrast and Error	SS	df	MS	F
Reluctance to Give	Rel & Frd	37.346	1	37.346	29.80***
	Error	99.654	80	1.246	
	Frd & CA	486.448	1	486.448	171.585***
	Error	226.802	80	2.835	
Importance of being Repaid	Rel & Frd	106.778	1	106.778	60.919***
	Error	140.222	80	1.753	
	Frd. & CA	211.864	1	211.864	112.145***
	Error	151.136	80	1.889	
Cost to Give	Rel & Frd	45.000	1	45.000	51.522***
	Error	69.000	79	.873	
	Frd. & CA	135.200	1	135.200	101.916***
	Error	104.800	79	1.327	
Upset at Not Being Repaid	Rel & Frd	50.568	1	50.568	25.374***
	Error	159.432	80	1.993	
	Frd. & CA	192.901	1	192.901	86.649***
	Error	178.099	80	2.226	
Benefit to Recipient	Rel & Frd	3.658	1	3.658	0.129
	Error	121.342	78	1.556	
	Frd & CA	0.013	1	0.013	0.008
	Error	118.987	78	1.525	
Probability of Giving	Rel & Frd	6663.198	1	6663.198	25.388***
	Error	20901.802	80	261.273	
	Frd & CA	95549.679	1	95549.679	204.953***
	Error	37296.321	80	466.204	

***p<.001

Discussion

This study found that subjects believe an individual: is less reluctant to help kin over non-kin; finds it less important to be repaid and would be less upset if she was not repaid by kin than by non-kin; perceives it to be less costly to help kin over non-kin; and feels kin would more likely be helped over non-kin. These findings are supportive of the hypothesis that individuals have cognitive mechanisms biasing them towards helping relatives.

Relatives were distinguished from friends, and favoured over them. This finding seems contrary to the argument that the closeness of the social relationship is the key factor affecting helping. That is, close and intimate relationships, such as with relatives and with friends, are seen as qualitatively different than casual relationships (Austin & Tobiasen, 1982). In this study, the two "intimate" relationships were differentially treated. The degree of relatedness may be an influencing factor, although degree of closeness cannot be ruled out since the perceived closeness to the relative and friend were not measured. Closeness definitely does seem to have some effect in distinguishing friends from casual acquaintances, since degree of relatedness cannot explain the differences in treatment. However this may also be explained in terms of strength and history of the reciprocal relationship.

The finding that the subjects' ratings of benefit to recipient were similar for all targets indicates that the objective value of the help was perceived as consistent for all recipients. The fact that costs, importance of being repaid, upset at not being repaid, and reluctance and probability to give varied significantly between relationships, although the objective value was seen as consistent, seems to demonstrate cognitive biases in action, distorting costs, etc, in a manner that would benefit inclusive fitness.

Study II

Rationale

Given the finding from Study I that individual's perceptions about helping others varies with relationship, Study II was designed to further explore the cognitive mechanisms proposed to have evolved to assist in interactions with kin. The relatedness of a potential recipient was again manipulated, but to a finer degree. The potential recipient was either a sister (r= .5), a cousin (r=.125), or a friend (r=0). The reproductive value of the potential recipient was also

manipulated. The RV of a recipient enter calculations of inclusive fitness benefits when deciding to help kin, but should have no influence on decisions to help non-kin.

Predictions 1 & 2 were made for this study, as in Study I, however the order of ratings (lowest to highest) should be sister, cousin, friend, instead of sister, friend, acquaintance as before. Prediction 3 was added to this study. It states that reproductive value should have an added effect on the responses, for related individuals. Hence, main effects should be found for both relatedness and reproductive value.

Method

Subjects. The participants of this study were 170 undergraduates at Simon Fraser. The subjects were composed of 112 women, 54 men, and 4 unknown (left blank on questionnaire). The majority of Ss received participation credit for their involvement. A small percentage of the Ss were students from around the campus who were asked to participate. The mean age of Ss was 22.7 years.

Materials and Procedure. Unlike Study I, this study was a between-groups design and featured two levels of RV (high, low) and three levels of relatedness (r=.5, .125, 0). Six scenarios were constructed, depicting a 30 year old woman of middle income, who was being asked for a $500 loan from either her sister, cousin, or friend. The potential recipient was either twenty-one or forty-five years of age. Ss were told that the woman saw the potential recipient on a regular basis. The identical questions were used as in Study I: "How reluctant is she to help, how costly would it be for her to help, how important is it for her to be paid back if she helps, how upset would she be if she is not repaid, and what is the likelihood of helping?" Unlike Study I, Ss answered the questions for only one of the six possible recipients. One of the questionnaires (r=0.5 , high RV) is found in Appendix B.

The six versions of the questionnaire were randomly distributed to the Ss, who completed them under supervision.

Results

Three MANOVAs were carried out on the data, one testing relatedness effects, one testing RV effects, and one testing for interaction effects. Significant relatedness effects were found, Wilk's Lambda $F(10, 320)= 2.697$, $p<.001$.

Univariate tests were also done for each variable. Significant relatedness effects were found for importance of being repaid and for upset at not being repaid. All analyses results for relatedness effects are shown in Table 3 and the means for each group, collapsed across RV, for the first four variables are illustrated in Figure 2. The means for probability of giving were 75.05(±16.99), 72.93(±14.50), 69.33 (±17.49), for sister, cousin, and friend respectively.

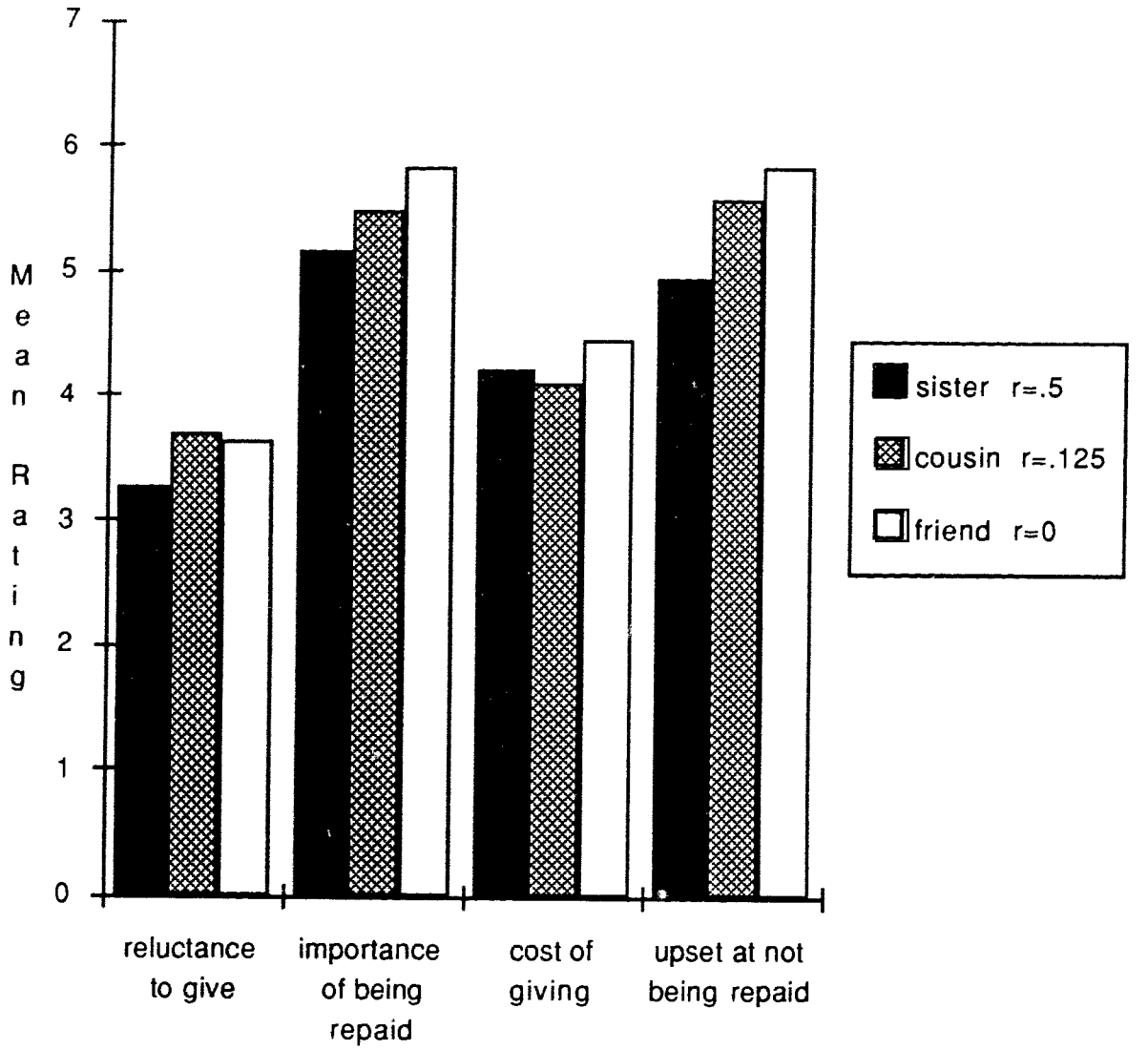
Table 3
Study II- Tests for Relatedness Effects for each Question

Variable	SS	df	MS	F
Reluctance to give	6.850	2	3.425	1.934
Error	290.382	164	1.771	
Importance of being Repaid	13.032	3	6.516	3.775*
Error	283.058	164	1.726	
Cost to give	3.581	2	1.790	1.188
Error	247.151	164	1.507	
Upset at not being repaid	24.172	2	12.086	9.400***
Error	210.869	164	1.286	
Probability of giving	931.453	2	465.726	1.748
Error	43701.832	164	266.475	

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

For importance of being repaid, significant differences were found between sister and friend. For level of upset at not being repaid, significant differences were found between sister and cousin, and sister and friend. All differences and effects were found in the predicted directions.

Fig 2 - Mean Ratings for Each Variable, Collapsed Across High and Low Reproductive Value Groups for Study II



A MANOVA carried out for effects of reproductive value was not significant $F(5, 160)= 0.928$, ns. The results of the univariate analyses are shown in Table 4.

Table 4

Study II- Tests for Reproductive Value Effect for each Question

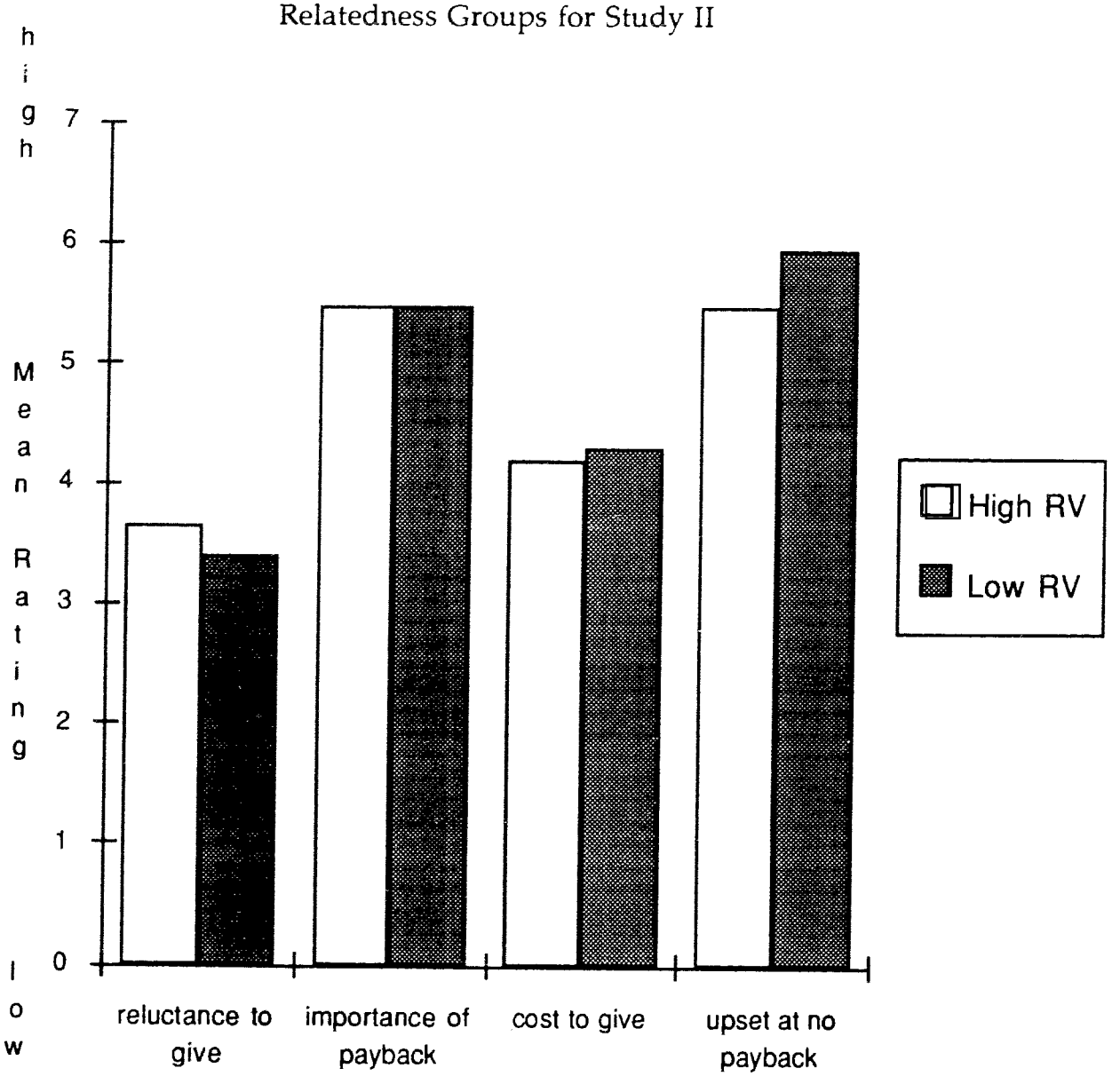
Variable	SS	df	MS	F
Reluctance to give	2.646	1	2.646	1.495
Error	290.382	164	1.771	
Importance of being Repaid	0.007	1	0.007	0.004
Error	283.058	164	1.726	
Cost to give	0.490	1	0.490	0.325
Error	247.151	164	1.507	
Upset at not being repaid	0.113	1	0.113	0.088
Error	210.869	164	1.286	
Probability of giving	716.518	1	716.518	2.689
Error	43701.832	164	266.475	

No significant effects were found. The means for each group, collapsed across relatedness, for the first four questions are illustrated in Figure 3. The means for probability of giving were 70.42 (±17.75) and 74.56 (±14.80) for high and low RV groups respectively.

In case the non-related group, friends, was obscuring the effects of RV, another analysis was carried out that ommitted the friends group. Again, no effect was found for RV.

No interaction effects were found, Wilk's Lambda, $F(10,320)=.872$, ns.

Fig 3 - Mean Ratings for Each Variable, Collapsed Across Relatedness Groups for Study II



Discussion

Predictions 1(iii) and 1(iv) were supported. Degree of relatedness had an effect on subjects' perceptions of the importance of being reciprocated and the level of upset at not being reciprocated. The mean ratings for each of these questions was lowest for the sister, and highest for the friend. Ratings for sister were significantly different from the friend on the former question and significantly different from both the friend and the cousin on the latter question. Although no differences in means were found for most of the variables, there is still appears to be some support for the importance of relationship, and also, in this case, relatedness, as an influence on the perception of helping. Both variables with significant effects concern being repaid, so perhaps considering degree of relatedness (or relationship) is most important for calculating costs of not being repaid, rather than costs and reluctance to give.

Prediction 3 was not supported. Reproductive value did not appear to influence helping decisions or perceptions. It is possible, though from an evolutionary perspective unlikely, that individuals do not consider RV when making decisions about helping relatives. It is also possible that the undergraduate students judged the reproductive value of the potential recipients using real life models, rather than the ages given. Sisters, cousins, and friends of the Ss would likely be of similar reproductive value in real life, and hence in the minds of the Ss there may have been no difference. This idea is supported by the statements a few subjects made after the study that indicated that they had not really paid attention to the age of the recipients. Perhaps in a future study, the manipulation of RV would be made more salient by using recipients who are more easily seen to vary in RV. A mixture of siblings, aunts/uncles, nieces/nephews and possibly grandparents could make this manipulation more effective. Providing photographs of the individuals to be helped would also make their age more apparent.

Study III

Rationale

The previous studies provided some empirical support for kin favouring biases using hypothetical scenarios. Study III was designed to accomplish three goals: to determine if kin-favouring biases could be found by looking at *actual* instances of helping, to look for evidence of reciprocal altruism, and investigate the existence of proposed selfish biases.

Method

Subjects. The participants were 128 undergraduates at Simon Fraser. Ss were obtained from an introductory psychology student subject pool and received participation credit for their time. The mean age of the Ss was 20.6 years.

Materials and Procedure. In this study, subjects completed two questionnaires that were designed by the author. Ss first filled in a General Information Form (see Appendix C) that asked descriptive questions about the Ss themselves. The questions included, among others, their age, marital status, number of children, number of siblings, how many relatives they had, how often they interacted with their relatives, where their relatives lived, how many friends they had, and how often they interacted with them. These variables are considered descriptive variables in the results section.

The second questionnaire given to Ss was the Social Exchange Questionnaire. It comprised the major source of data. Two factors were manipulated in this study: relationship category (relatives, friends, casual acquaintances) and direction of help (giving or receiving). Subjects were randomly assigned to one of six groups in this 2 by 3 completely between groups design. In case of possible gender differences, the placement of males into groups was not completely random near the end of the study, in order to obtain an equal number of males (who were in the minority) in each group.

The first part of this questionnaire (see Appendix D) featured a description of social exchange and exchange items. The purpose of this section was to emphasize to Ss that exchange items can vary greatly, in type and in size. Subjects both read this section to themselves and had it explained to them orally. Ss were given instructions to list as many instances of exchange as they could recall in the past six months. Two versions of the instructions were presented, one asking Ss to recall giving instances, and the other to recall receiving instances.

Subjects were given four minutes (timed) to fill out the second part of the questionnaire, a chart, by briefly describing a giving or receiving instance, and providing the first name and age of the donor or recipient (see Appendix E for a Friend/Giving chart). Subjects were informed that this task was timed only to maintain consistency, and that it was not a test of speed or memory. They were told to take their time and fill in the chart as needed (12 spaces were provided),

and that it was alright if they could not fill in the entire chart or if they needed more room.

Prior to filling out the chart, Ss were provided with a definition of the relationship category (one of three) for which they were to recall instances. The relationship categories are defined to the subjects as follows: A friend is someone who you consider a good friend, and with whom you've been friends with for at least one year, with whom you have always had a platonic relationship and to whom you are not related. A relative is someone with whom you are related to by blood, and excludes in-laws, spouses of relatives, and step-siblings and parents and grandparents. Parents and grandparents were excluded because it was felt that kin-favouring biases would be best investigated by separating their influence from the influences of the important social roles that parents and grandparents have. Likely both the social role and kin-favouring biases effect perceptions about exchange, but in this study only the former were investigated.

A casual acquaintance was defined as someone to whom you are not related, with whom you have a platonic relationship, and whom you consider to be a "casual acquaintance". Subjects were told that they could list any individual more than once, but that each instance had to be listed on a separate line.

After the four minutes had elapsed, subjects were asked to start answering a set of questions concerning the instances they had written down. (See Appendix F for example of giving questionnaire) Several questions were based directly upon the predictions. These questions constituted most of the prediction variables that appear later in the results section. The questions are found below. If the question differed between giving and receiving forms, the version on the receiving form is found in the parentheses.

-how reluctant were you (or was the other person) to give the help?

-how costly was the help to give?

-how important is it for you to be repaid (or to repay)

-how upset would you be if you were not repaid (or if you did not repay).

-how much of a benefit was the item to the recipient?

-how likely is it that you will be repaid (or that you will repay)

-what is the probability that you will be interacting with each person in the future

-who gives more in your relationship with each person, you, the other person, or do you give equally.

-what is each person's relationship to you

Several other questions were included, to assist in interpretation of the results. They are considered interpretive variables in the results section. They included:

-how valuable was the help given to the recipient?

-how important is your relationship with each person?

-how willing would you be to give (or receive) help with each of these individuals if there was no possibility of being repaid (or of repaying)

The overall prediction for this study was that both relationship type and direction of help should have an effect on the various dependent variables. Evidence for kin-favouring biases (prediction 1), reciprocal altruism (predictions 4-7) and selfish biases (predictions 8-13) was investigated.

Results

Before beginning analyses, the subjects' accuracy in completing the questionnaires was assessed. Occasionally subjects listed individuals who did not belong in their assigned relationship category. For example, a parent was included in the relatives category, or a boyfriend in the friends category. If these errors represented a small percentage of the total number of items listed, these items were eliminated from future calculations and the questionnaire retained. If the majority of the people listed did not fit the assigned relationship category, that questionnaire was eliminated from the analysis. Eight subjects were eliminated from the study for this reason, leaving 120 subjects, 20 in each group (13 women and 7 men in each).

For most variables/questions, (e.g., cost of giving) subjects gave a 1 to 7 rating for each instance listed. For these, means were calculated across instances on each questionnaire, and these means became the data for each subject input into the analyses. For the questions concerning the people listed, means were calculated by averaging ratings across those people on each questionnaire. One additional subject was eliminated from these analyses when her responses were found to be outliers on several of the variables. This left nineteen subjects in the casual acquaintance/receiving group.

The analyses for Study III are reported in three parts. First, the analyses of the variables directly related to the predictions are presented. The analyses of interpretive and descriptive variables follow.

PREDICTION VARIABLES

Most of the variables included in these analyses of the predictions variables were described in the method section. For these variables, means were calculated for most questions, on each questionnaire as stated above. Additional variables were calculated by other methods. The number of instances recalled was the sum of instances listed by each subject. The percentage of items repaid was calculated by summing the number of repaid items in the probability of repaying question.

The balance of exchange variables were calculated as follows: for the percentage of relationships where the self gives more, the number of individuals the subject had labelled "S" were counted and this number was divided by the total number of people listed. The procedure was identical for calculating the percentage of relationships where the other gives more, and percentage of relationships where both give equally (i.e. on each questionnaire, the totals for "self", "other" and "equal" would sum to 100 percent).

Two additional measures of cost were calculated. Total cost refers to the sum of all the cost ratings on each questionnaire (as opposed to the mean). The total cost by frequency was a sum of the products of cost times frequency that exchange took place in the past six months.

For the first part of the analysis, all of the prediction variables were grouped together for a multivariate analysis of variance (MANOVA). Three effects were tested: relationship, direction of help, and interaction. The MANOVA was significant for both relationship effects (Wilk's Lamda $F(34,194) = 3.049$, $p < .001$.) and directional effects ($F(17,97) = 7.723$, $p < .001$). The interaction effect was not significant ($F(34, 194) = 0.746$, $p > .05$). Univariate tests were conducted for relationship and directional effects. Table 5 reports the F-statistics from the analyses for relationship effects, as well as the group means by relationship. Table 6 reports the results of the analyses for directional effects as well as the group means by direction of exchange.

Table 5

Study III- Group Means (±SD) by Relationship and F statistics from Test for Relationship Effects for the Prediction Variables

Variable	Category of Relationship			F
	Relatives[a]	Friends[a]	Casual[b] Acquaint.	(df=2,113)
Number of items recalled	6.82 (3.10)	7.88 (2.32)	6.82 (2.29)	2.139
Mean reluctance to give	1.80 (1.05)	1.70 (.71)	1.69 (.64)	0.222
Mean import. of being repaid (or repaying)	3.52 (1.65)	3.78 (1.31)	3.47 (1.57)	0.628
Mean cost to give	2.63 (0.95)	2.81 (.92)	2.65 (.92)	0.489
Total cost	18.10 (10.14)	22.10 (9.39)	17.82 (8.59)	2.538
Total cost times frequency	249.48 (685.57)	348.62 (578.14)	221.58 (264.77)	0.610
Mean upset at not being repaid (or not repaying)	3.11 (1.53)	3.50 (1.10)	3.10 (1.33)	1.558
Percent of items repaid	45.4 (33.0)	39.2 (24.6)	27.7 (24.8)	4.095*
Mean probability of being repaid (or repaying)	55.5 (34.2)	67.1 (28.5)	57.4 (26.6)	1.718

Continued...

Table 5 (Continued)

Variable	Category of Relationship			F
	Relatives[a]	Friends[a]	Casual[b] Acquaint.	(df=2,113)
Mean benefit to the recipient	4.36 (1.30)	4.67 (1.04)	4.91 (.83)	2.769
% Self gives more	27.1 (31.8)	23.9 (20.2)	29.9 (22.3)	0.530
% Other gives more	31.9 (29.1)	14.7 (18.5)	18.5 (16.9)	6.534**
% Both give equally	41.0 (35.0)	61.1 (26.2)	51.6 (24.3)	4.817*

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

[a] $n=40$ [b] $n=39$

Table 6

Study III- Group Means (±SD) by Direction of Exchange and F Statistics from Test for Direction Effects for the Prediction Variables

Variable	Direction of Exchange		F (df=1,113)
	Giving[a]	Receiving[b]	
Number of items recalled	7.40 (2.37)	6.95 (2.87)	0.892
Mean reluctance to give	1.93 (.95)	1.52 (.59)	7.799**
Mean import. of being repaid (or repaying)	2.71 (1.20)	4.49 (1.25)	63.754***
Mean cost to give	2.40 (.78)	3.00 (.96)	13.632***
Total cost	18.25 (9.07)	20.48 (9.93)	1.659
Total cost times frequency	238.02 (476.58)	309.91 (599.28)	0.504
Mean upset at not being repaid (or not repaying)	2.51 (1.13)	3.98 (1.11)	52.153***
Percent of items repaid	33.77 (27.03)	41.28 (29.63)	2.173
Mean probability of being repaid (or repaying)	56.75 (29.93)	63.38 (30.32)	1.493

Continued...

Table 6 (continued)

Variable	Direction of Exchange		F (df=1,113)
	Giving[a]	Receiving[b]	
Mean benefit to the recipient	4.43 (1.13)	4.86 (1.00)	5.081*
% Self gives more	33.72 (23.75)	20.07 (24.94)	9.630**
% Other gives more	17.65 (18.52)	26.03 (26.66)	4.288*
% Both give equally	48.59 (27.98)	53.90 (31.60)	1.035

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

[a] $n=60$ [b] $n=59$

Relationship effects

Significant effects were found for only three variables: percent of items repaid, percentage of relationships where other gives more, and percentage of relationships where both give equally.

Planned comparisons were carried out, comparing relatives to friends, relatives to casual acquaintances, and friends to casual acquaintances, for the above three variables. A modified Bonferroni test (Keppel, 1982) was used to correct for familywise error.

The relatives group had a higher mean percentage of items repaid (45.4%) than did casual acquaintances (27.7%) There were no differences, however, in the likelihood of being repaid or repaying (overall mean was 60 percent). It was expected that the percentage of items repaid and likelihood of repaying would be lower for kin than non-kin (Pred 5iii). This prediction was not supported.

Subjects in the relatives group produced a higher mean percentage of other-gives-more relationships (31.9%) than did subjects in the friends (14.7%) or casual acquaintances (18.5%) groups. As well a great mean percentage of relationships where both give equally were found among friends (61.1) than among relatives (41.0). These two findings are supportive of prediction 5i, that exchanges among relatives are less balanced than exchanges among non-relatives. It is interesting to note that the majority of relationships listed were balanced (mean = 51.2 % across relationship categories). Although there appeared to be more relationships in which the self was perceived as giving more (mean = 26.9%), than the other person was perceived as giving more (21.8%), although this difference was not significant (paired t (118)=1.471, p>.05, two-tailed). Prediction 13 was not supported.

Directional effects

Several directional effects were found. As predicted (Pred 11), the reluctance to give was perceived to be lower by the recipients than by the givers of help. Contrary to prediction 10, the mean perceived cost of giving was rated lower by the givers than by receivers. Another finding that was opposite to the prediction made (Pred 12), was that receivers reported they would be more upset if they could not repay the help than the givers reported being upset at not being repaid the help.

Three additional findings of differences due to direction of help were found for variables where no differences were expected. The benefit to the

recipient was rated higher by receivers than by givers. The average percentage of relationships where the self gives more was higher for the giving group than the receiving group. Also the mean percentage of relationships where the other gives more was higher for the receivers than for the givers. The last two results were in contradiction to Prediction 5ii.

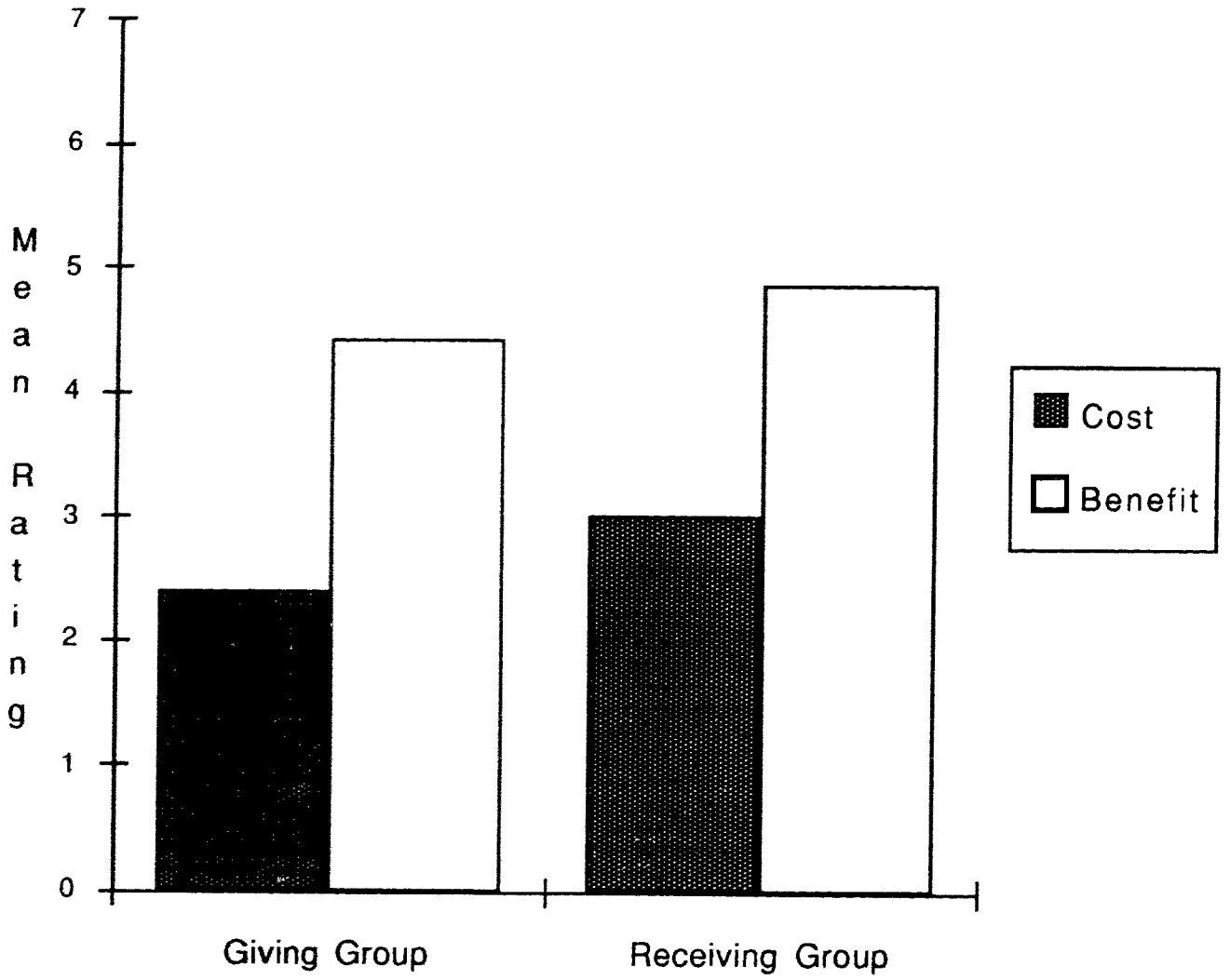
ADDITIONAL PREDICTION VARIABLES

Other analyses, aside from the two-way ANOVAs reported above, were used to test some of the predictions. To test the prediction (6) that the cost of giving should be lower than the perceived benefit to the recipient, a paired t-test was carried out using the cost and benefit variables for the giving group only. The average benefit rating (4.43) was found to be significantly higher than the average cost (2.40), $t(59)=2.027$, $p<.001$, two-tailed. The prediction was supported. Interestingly, similar results were found for the receiving group. The average perceived cost of the other person giving (3.00) was also found to be lower than the benefit to the recipient (4.86), t (58)=-12.376, $p<.001$. An illustration of the contrasting costs and benefits, for each group, is found in Figure 4.

A correlation between perceived cost and frequency of future interaction was calculated using the giving group data to test prediction 4, but was not found to be significant, $r= .099$, $p>.05$.

In summary, few relationship effects were found, and several directional effects contrary to the predictions were found. To assist in interpreting these unexpected findings, the analyses of several additional variables were examined and appear in the next section.

Fig 4 - Mean Cost and Benefit Ratings for Giving and Receiving Groups in Study III



INTERPRETIVE VARIABLES

The interpretive variables included: the perceived value of the item exchanged, the frequency of interaction, mean importance of the relationship, and willingness to give help if one could not be repaid or willingness to receive help if one could not repay. These variables were included in the previously mentioned MANOVAs. The relationship and directional effects are reported below.

Relationship effects

The means for the interpretive variables by relationship group, and the F statistics are shown in Table 7.

Table 7

Study III- Group Means (±SD) by Relationship and F Statistics from Test for Relationship Effects for the Interpretive Variables

Variable	Category of Relationship			F
	Relatives[a]	Friends[a]	Casual[b] Acquaint.	(df=2,113)
Value of item	4.45 (1.05)	4.68 (1.01)	4.72 (.88)	0.974
Frequency of interaction	2.89 (.94)	2.47 (.68)	2.84 (.78)	3.254*
Importance of relationship	5.64 (1.21)	5.48 (.89)	4.26 (.96)	22.075 ***
Willingness to give/receive help if no repayment	5.90 (1.33)	5.44 (1.56)	4.97 (1.50)	4.559*

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

[a] $n=40$ [b] $n=39$

Three relationship effects were found, for expected frequency of future interaction, the importance of the relationship, and the willingness to give or

receive help if repayment was not possible. Planned comparisons were carried out as before, using a modified Bonferroni. For predicted frequency of future interaction, the relatives group had a higher mean frequency than the friends group. Relationships with relatives and friends had higher mean ratings of importance than those with casual acquaintances. The willingness to give or receive help if there was to be no payback was lower for casual acquaintances than for relatives. That is, subjects indicated that they would be less willing to have their relationship in an inequitable state with casual acquaintances than with relatives.

Directional Effects

The means for the interpretive variables by direction of exchange, along with the F-statistics are found in Table 8.

Table 8

Study III- Group Means (±SD) by Direction of Exchange and F Statistics from Test for Direction Effects for the Interpretive Variables

Variable	Direction of Exchange		F (df=1,113)
	Giving[a]	Receiving[b]	
Value of item	4.42 (.97)	4.81 (.96)	5.054*
Frequency of interaction	2.81 (.77)	2.65 (.87)	1.114
Importance of relationship	4.88 (1.27)	5.39 (1.06)	7.194**
Willingness to give/receive help if no repayment	5.94 (1.28)	4.93 (1.55)	15.914***

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

[a] $n=60$ [b] $n=59$

Some interesting results were found. Subjects in the receiving group rated the value of the items they received to be higher on average than did the subjects in the giving group (rating perceived value of the items given). The subjects in the receiving group gave higher ratings, on average, for the importance of their relationships with the people they listed, than did the subjects in the giving group for the people they listed. Also, individuals were less willing to receive help if they could not repay it than they were to give help if it could not be repaid.

In summary, it appears that there were several unexpected differences found between giving and receiving groups. Before attempting to interpret these findings, analyses of the descriptive variables were conducted, in order to rule out the occurrence of any systematic differences occurring between the directional groups that may have accounted for the differences found.

DESCRIPTIVE VARIABLES

Subject characteristics

One set of descriptive variables that were analyzed included most the information given by the subjects about themselves on the General Information Form. Two-way ANOVAs (relationship & direction of help) were ran on the following: number of siblings, number in immediate family, number of relatives, percent of relatives in lower mainland, percent in BC, percent in Canada, frequency of interaction with immediate family, frequency of interaction with relatives, number of friends, number of casual friends, and frequency of interaction with friends.

No significant effects were found for direction of help. Category of relationship was found significant for "percent of relatives in lower mainland" with mean percentages were 49.8 for relatives, 25.1 for friends, and 33.3 for casual acquaintances. The mean percentage for the relatives group was higher than the mean for the friends and casual acquaintance groups. An interaction effect was found for "frequency of interacting with friends". The means for each of the six groups are found in Table 9.

In summary, it appears that differences in the subjects' characteristics do not account for differences between directional groups.

Table 9

Study III - Mean Ratings (±SD) for Interaction with Friends for All Groups

	Direction of Exchange	
Relationship	Giving	Receiving
Relatives	2.00 (74)	1.70 (.92)
Friends	1.85 (.88)	1.25 (.44)
Casual Acquaintances	1.40 (.68)	1.68 (.82)

Note: n=20 for all groups except casual acquaintances receiving, where n=19

Donor and Recipient Characteristics

The characteristics of the individuals that the subjects listed were also examined. A two-way ANOVA performed on the mean ages of individuals listed on each questionnaire found no directional effects $F(1,106) = .830$, $p > .05$. Relationship effects were found, $F(2,106) = 4.310$, $p < .05$. The data were then collapsed across directional groups and a one-way ANOVA carried out, with comparisons between groups. The mean age of individuals listed by the relatives group (26.7) was significantly higher than the mean age of individuals listed by the friends group (22.2), Tukey, $p < .05$).

To determine if there were any group differences in types of relationships listed within each relationship category, relationship types were devised and each individual listed was assigned to a category. For each questionnaire, the percentage of listed individuals in each of the categories was calculated. These percentages were then entered as dependent variables into one-way ANOVAs (by direction of help), one being done for each relationship category. The results are shown below.

Relatives

The five types of relationships in this category were sibling, aunt/uncle, cousin, child, and niece/nephew. No main effect for direction of exchange was found. The analysis could not be carried out for the niece/nephew and child relationship types because there was no variance (none reported) in one of the groups.

The mean degree of relatedness was also calculated for each questionnaire by averaging the coefficient of relatedness (r) of all individuals listed. No differences were found between directions of exchange.

Friends

There were four types of relationships in this category, best friend, close friend, friend, and other. A higher percentage of best friends were listed by the receiving group (mean=26.5%) than by the giving group (mean=11.6%), $t(38)=-2.050$, $p>.05$.

Casual acquaintances

There were six types of relationships in this category: casual friend, classmate/school chum, co-worker, teacher/TA, friend of a friend, neighbour, and other (e.g stranger, acquaintance). There were no significant effects found for direction of exchange.

In summary, the only directional differences found in relationship types was that the percentage of best friends was higher in the receiving group. The probability was close to the cut-off ($p=.047$), and hence there is not strong support for group differences. I conclude that individuals varied somewhat with direction of exchange, for the friends group.

Differences between directional groups could not be accounted for by subject characteristics or by the characteristics of the individuals the subjects listed. The next set of analyses investigated possible systematic differences in the types of items listed.

Analyses of Item Types

Every exchange instance that was listed on every questionnaire was placed into one of six categories: Personal/emotional, money, material items, companionship, services, and niceness/considerateness. Examples of each of these item types, taken from the questionnaires, are found in Appendix G.

The percentage of items in each category was calculated for each subject. Those percentages were entered into two-way ANOVAs to determine the effects of category of relationship and direction of exchange. Relationship effects were found for material items, companionship, services, and niceness/ considerateness. The mean percentages for each item type for each relationship group, and the F statistics from the ANOVAs ,are found in Table 10.

Table 10

Study III- Mean Percentages of Each Item Type by Relationship Group and F Statistics from Test for Relationship Effects

Item Type	Category of Relationship			F (df=2,117)
	Relatives	Friends	Casual Acquaintance	
Personal	13.00	17.27	22.54	2.253
Money	5.65	2.17	2.49	1.194
Material items	56.15	33.44	16.15	14.966***
Companionship	11.14	18.23	4.29	7.511**
Services	21.73	32.13	53.79	16.561***
Niceness	4.11	0.50	0.42	6.255**

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

Note. $n=40$ for each category of relationship

Significant relationship effects were found for material items, companionship, services, and niceness/considerateness. Post-hoc pairwise comparisons were made using the Tukey test. For material items, relatives exchanged a higher mean percentage than friends, and friends exchanged a higher mean percentage than casual acquaintances. For companionship, both the relatives and friends groups had higher mean percentages than the casual acquaintance group. The casual acquaintance group had a higher mean percentage of services listed than the other two groups. For niceness/considerateness, the relatives group had a higher mean percentage than the other two groups.

In summary, the type of items listed may account for some differences found between relationship categories. Although item types may have differed, recall that the value of items exchanged did not differ between relationship

groups. As with the other descriptive analyses reported, the directional differences cannot be accounted for by item type differences.

Discussion

Study III was designed to test predictions concerning kin-favouring biases (Prediction 1), reciprocal altruism (Predictions 4-7), and selfish biases (Predictions 8-13) using data from actual instances of exchange.

Support was not given to any part of Prediction 1, that stated individuals should be less reluctant to give to relatives than non-relatives, that the cost of giving, importance of being repaid and upset at not being repaid should be less for relatives for non-relatives. This set of predictions may not have been supported because the condition under which it was made, "given items of the same objective value" was not present in this study. In studies I and II, where more support was found for these predictions, the object (to be) given was held constant. Perhaps the lack of control over and variability of exchange items obscured any kin-favouring biases that may have been present.

Support was found for Prediction 5i, that was derived from both inclusive fitness theory and reciprocal altruism, that stated that exchanges should be more balanced among non-relatives than among relatives. Essock-Vitale and McGuire (1985) reported similar findings.

Regarding the predictions derived from reciprocal altruism, Prediction 4, expecting a significant negative relationship between cost of giving and frequency of future interaction was not supported.

Prediction 5 i) was supported, as indicated above. Unexpectedly, differences in balance of exchange were found between giving and receiving groups, in contrast to Prediction 5ii. Support was given to Prediction 6, stating that the perceived cost of giving to another should be, on average, lower than the perceived benefit to the recipient.

Prediction 7 expected that differences in the strength of reciprocal relationships in friends and casual acquaintances would result in differences in perceived cost, reluctance, importance to be repaid and upset at not being repaid. As indicated above for Prediction 1, no relationship differences were found for these variables However, relationships with relatives and friends were found to be more important than those with casual acquaintances. Individuals were also more willing to give items to or receive items from relatives and friends than

casual acquaintances if no repayment could be made. Perhaps this finding reflects an individual's greater willingness to "go out on a limb" and endure temporary imbalances for longer-lasting relationships that have a future ahead of them to re-establish balances than for relationships with futures of less certainty (i.e. with casual acquaintances). This is just a hypothetical explanation for these findings, and to get empirical support would require evidence that individuals expect relationships with casual acquaintances to be of shorter duration than those with friends or relatives.

There was an unexpected lack of support for most of the predictions that assumed selfish biases existed in perceptions of social exchange. Subjects recalled no more giving instances than receiving instances (Pred 8); it was found to be more important to pay others back than to be paid back (Pred 9); the cost of giving to others was perceived as lower than others' perceptions of the cost to give (Pred 10), and subjects were more upset at the thought of not being able to pay the other back than at not being paid back (Pred 12). Additionally, the mean percentage of relationships where the self is perceived as giving more was not significantly different that the mean percentage where the other is perceived as giving more (Pred 13). The only support for selfish biases was the finding that individuals are more reluctant to give than others perceive them to be (Pred 11).

Although there seems to be a lack of support for most of the evolutionary hypotheses proposed for this study, upon closer examination, the results still seem represent selfish biases, but in a different form than originally expected. This form differs from the one previously proposed in that the importance of selfishness in the form of subtle cheating is minimized and selfishness in the form of maintaining reciprocal relationships that can provide future benefits is maximized.

Recently, some researchers have focused on tactics of competition among individuals (Buss, 1988; Walters, 1990). Competition may have many purposes, including the attainment of status, mates, and resources. From the perspective of the selfish gene, individuals with different genotypes are expected to be competitive (Dawkins, 1989). While the ability to compete is likely adaptive, the importance of the ability to cooperate should not be undervalued. As we can see from the iterated Prisoner's Dilemma game, cooperation can lead to more future benefits than defecting (Axelrod & Hamilton,1981; Axelrod,

1984). I believe that Ss in the present study demonstrated their (intuitive) knowledge of the importance of this concept. The following paragraphs provide an organized presentation of the results to demonstrate how they might be seen as consistent with this hypothesis.

Cognitive mechanisms should have evolved to maintain reciprocal relations with those from whom we receive benefits. Trivers (1985) proposed that within humans, selection favoured a complex psychological system to regulate and maintain reciprocal relations. Although cheater detection is important, so is a sense of fairness and guilt, the latter two helping to regulate one's own reciprocal interactions. Individuals who are perceived as fair and honest are more likely to be thought of favourably and hence will be more likely to engage in reciprocal exchanges than those who are not. The finding that subjects would rather be owed than owe others in this study may have reflected the desire not to upset reciprocal relations. It was more important to repay than to be repaid, and it was more upsetting to imagine not repaying than to consider not to being repaid. There was a significantly lower willingness to receive help if one could not repay than to give help if one could not be repaid. Hence, feeling and being indebted appears to be less desirable than being owed.

The social psychologist Greenberg and his colleagues (Greenberg & Shapiro, 1971) have studied indebtedness in detail. Greenberg defines indebtedness as an aversive state that motivates the individual to reduce it. One way that individuals do this, as Greenberg and Shapiro (1971) have demonstrated, is to decline to accept help if they feel they will not be able to reciprocate. From an evolutionary perspective, the negative feelings produced by indebtedness could function not only to maintain the benefits of future reciprocal relations, but to avoid the costs of being in another's debt. Being owed gives one power over those who are in one's debt, which can prove quite costly to the persons owing. Greenberg and Shapiro would agree, stating that one of the reasons why indebtedness is so aversive is that it is a threat to the recipient's status, power and freedom of action.

The value that individuals place upon reciprocal relations seems to be further reflected in the finding that relationships listed by the receiving group were rated as more important than relationships listed by the giving group. Those individuals on the receiving lists were also more likely to give more to the subjects than the subjects gave to them than the reverse. The opposite was found on the giving lists. More "self-gives-more" than "other gives more"

relationships were found on the giving lists. So it appears that those individuals we value the most are those we remember receiving items from, and those who tend to do a relatively large proportion of the giving. Reciprocal relations appear to be valued, but especially those with individuals who tend to give to us. From an evolutionary perspective, this is an adaptive way of reasoning, and it could be argued, a selfish one as well.

The differences between the giving and receiving groups, in terms of feelings towards the individuals listed, suggests that if individuals were to fill out both lists, they might include different people on each. That is, on one we would recall receiving items for those from whom we tend to receive from and giving items for those to whom we tend to give. This suggestion cannot be tested using the data from Study III, since it was a completely between-groups design. However, Study IV was designed to test this idea.

The last part of the discussion on this study concerns a group of similar findings: individuals rated received items as having a higher value and benefit to them and a higher cost to the giver than did individuals who rated items given. That is, individuals rating items given saw them as having a lower cost to them and a lower value and benefit to the recipient than did those rating items received. How is it possible for received items to be on average, of greater benefit and value than items given? It does not, at first, seem logically possible. Most relationships would seem inequitable, however, the majority, as indicated in this study, do not (approximately 51 percent of all relationships listed were considered balanced in terms of giving & receiving). It may just be that the perceptions of value, cost and benefit are incorrect. Only the giver knows the true cost, and only the recipient knows the true value and benefit. The recipient's perceptions of cost, and giver's perception of value and benefit are just that, perceptions. What would be the function of devaluing what one gives to others, and inflating the cost of what others give, if that does occur? If they exist, what was the adaptive function of such a set of processes?

It is possible that these perceptions, as different as they may be to the receiver and the giver, could be accurate readings of costs and values. For example, suppose a man owns a set of expensive cooking pots. He rarely uses them. He knows some friends who are gourmet cooks and gives the set of pots to them as a gift. The cost to him is small, he rarely uses the pots. To the recipients, the value is high and the cost to the donor might be perceived as high as well. The above description of events could be encapsulated into an adaptive

strategy: give items that are of relatively low cost to you and high value to others. This is essentially a criterion of reciprocal altruism that Cosmides and Tooby described: the cost to the donor should be lower than the benefit to the recipient. This criterion was tested (Pred 6) and gained support in this study. This criterion seems to be met in both the receiving and giving groups, where the mean benefits to the recipient were larger than the mean costs to the donor, in each group (refer to Figure 4).

To further test the above criterion, the percentage of questionnaires where the mean benefit was greater than the mean cost (B>C) was calculated. Ninety-five percent of the giving questionnaires and 96.6 percent of the receiving questionnaires met this requirement (with little or no differences between relationship groups). To conduct further tests, the role-playing scenario questionnaires of Study I and II were examined. Since the individual ratings, instead of means, were compared, there was a greater opportunity for B=C, so the following numbers report the percentage of questionnaires where the benefit is greater than or equal to the cost. In Study I, the percentage for sister ratings was 82.7%, the percentage for friend was 85.2%, and the percentage for casual acquaintance was 60.5%. In Study II, the percentage of questionnaires meeting the requirement was 85.36%. In conclusion, it appears that in both real-life and hypothetical scenarios, individuals tend to give items that are of relatively low cost in comparison to the benefit to the recipient. It would seem to be a beneficial strategy.

Study IV

Rationale

This study was designed to test the suggestion that individuals think of different individuals when listing receiving items and giving items. It was a much shorter version of Study III, and had subjects providing lists of both giving and receiving instances. Given the finding that a higher percentage of "self-gives-more" individuals appeared on giving than receiving lists and vice versa, this study tested for this effect using pairs of lists filled in by the same subjects.

Method

Subjects Thirty-two undergraduates at Simon Fraser University participated in this study. Voluntary participation was solicited from several third year psychology tutorials. The mean age of the subjects was 23.3 years.

Materials and Procedure. Subjects received a modified version of the Social Exchange Questionnaire used in Study III. The first page, as before, described instances of exchange, and the instructions. The only difference in this form was that subjects were free to list any individuals in their lists. Two charts were attached, a giving, and receiving, in random order. Subjects were given three minutes each to complete each (timed).

When the time had elapsed, subjects were asked to indicate in the margins the following: the relationship of each individual listed to themselves (to assist in identifying the same individuals on both lists), and who had given more in the history of their relationship (self, other, or equal).

Results

The percentage of individuals appearing on both giving and receiving lists was calculated by counting the number of people that appeared on both lists and dividing by the total number of people listed. The mean percentage of total individuals that were listed on both the giving and receiving lists was 34.3 (±16.12).

The percentages of self-gives-more, other-gives-more and both-give-equally were calculated in the same manner as for Study III. A greater mean percentage of relationships where self-gives-more (36.09) was found in the giving lists than in the receiving lists (18.57), $t(19) = -3.520$, $p<.01$. Conversely, a higher percentage of other-gives-more relationships (30.43) were found in the receiving lists in comparison to the giving lists (18.28), $t(19)= 2.429$, $p<.05$. No differences were found between the means of the giving (45.62) and receiving (50.79) lists for percentage of relationships where both give equally, $t(19) = 0.934$, ns.

Discussion

Study IV confirmed two suggestions that arose from Study III. When recalling instances of exchange, mainly different people come to mind when thinking of giving than when thinking of receiving. When asked to list receiving items, people tended to list individuals from whom they usually receive from more than to whom they give. When asked to list giving items, individuals tended to list people to whom they give more than those from whom they receive. Although there is some overlap, with roughly one third of the people listed appearing on both lists, that still leaves two-thirds being delegated to only one list.

In summary, it appears that there is a group of individuals to whom we tend to give and another group of individuals from whom we tend to receive (with some overlap). Remarkably similar findings to these have been found elsewhere. In their study of women's helping patterns, Essock-Vitale and McGuire found that subjects tended to receive help from those who had helped them in the past, rather than from those they had helped. Subjects also gave to persons who received more help in the past from them than they had given. Prior direction of help was found to be the best predictor of the present direction of help.

Several of the differences found between the giving and receiving groups in Study III may be explained by the fact that the two groups were essentially listing different types of people. This issue will be discussed further in the next section.

General Discussion

The purpose of this set of four studies was to investigate the existence of particular Darwinian algorithms, revealed as perceptual and cognitive biases, in social exchange The biases and regulatory mechanisms of social exchange expected to be present were kin-favouring mechanisms, characteristics of reciprocal altruism, and selfish biases that operated to carry out subtle cheating.

Some evidence for kin-favouring biases was found using hypothetical, role-playing scenarios (Studies I and II), but not in the study involving actual exchange instances (Study III). Cunningham (1986) and Barber (1992) have also found support for kin-favouring biases. Cunningham found that the degree of relatedness was positively correlated with willingness to help and amount of help given in hypothetical situations. By substituting relatives and other people for target individuals in two psychological scales, Barber (1992) found that subjects were less Machiavellian and more helpful to family members than to people in general.

Like Studies I and II, the studies of Cunningham and Barber used hypothetical situations to examine kin-favouring biases. From the perspective of evolutionary psychology, this is an appropriate method of testing for the existence of psychological mechanisms. It has been argued that the problem with studying behaviour is that our psyche, along with our biological make-up, is adapted to an early hunter-gather existence (Symons, 1989, 1992; Tooby & Cosmides, 1989). The operation of psychological mechanisms in the current

environment may result in non-adaptive behaviour either because the environment no longer contains the proper cues to elicit the appropriate mechanisms or the behaviours that were adaptive in the ancestral environment may no longer be appropriate (Crawford, 1989; Tooby & Cosmides, 1989). The fact that similar kin-favouring biases were not found in Study III, using reports of actual exchange instances, may be reflecting the difference between the current environment and the ancestral environment.

In the ancestral environment, humans existed in small extended-kin groups and led a nomadic hunter-gatherer existence. The evolution of altruism through kin-selection necessitated the ability to distinguish kin from non-kin and determine degree of relatedness. Kin recognition mechanisms are believed to function by assessing cues that were associated with kinship in the ancestral environment. Such cues include phenotypic or genetic similarity, familiarity, association, and spatial location. In the current environment we probably interact with non-kin much more often than we did in the ancestral environment. As a result, it is possible that in our current environment, we treat some non-relatives, such as friends, as kin because of the kinship cues present, i.e. familiarity, similarity, and frequent association (Crawford, 1989; Janicki, 1991; Krebs, 1987). Hence our behaviours towards friends and relatives might not be highly distinguishable. Although attitudes towards friends and relatives were often distinguishable in the scenario studies, in the study of actual instances, few distinctions could be made (although significant differences were found between casual acquaintances and the other two groups). It is possible that in Study III, subject's responses reflected the similar treatment of kin and friends, due to changes in the current environment from our ancestral one.

An alternative explanation for the lack of evidence for kin-favouring biases in Study III is the lack of control over the instances listed, which was inherent in the study design. The predictions stated that costs, reluctance, etc. should be lower for relatives than non-relatives, given items of the same objective value. In Studies I and II it was possible to control this value. In the third study, it was impossible to control the objective values of items. The variability within and between subjects of the objective value of the instances may have obscured actual relationship differences for any predictions concerning the instances themselves.

Although kin-favouring biases were not found in Study III, differences *were* found between friends and relatives when asking about the balance of

exchange within relationships. As predicted, more balanced exchange relationships were found among friends than among relatives. The fact that relationships with casual acquaintances were also found to be more balanced than relationships with relatives illustrated a greater frequency of reciprocal altruism among non-kin than kin, as predicted. This finding seems to support the second explanation above.

Evidence for the existence of reciprocal altruism was also found in Study III with the finding that people tended to give items that they perceived benefited the other more than it cost them (Wilkinson, 1988).

The main finding of Study III was that selfishness, in the form of subtle cheating, did not appear to be present. Only one of the predicted selfish biases was found (reluctance to give was higher than perceived reluctance of other to give). As discussed earlier, these findings may still be interpreted as demonstrating selfishness, but in the form of actively looking after self-interests by i) maintaining reciprocal relations that will likely provide benefits in the future, and by ii) removing future costs of being indebted to another. Subjects indicated that on average, paying back others was more important than being paid back themselves. It was more upsetting to not reciprocate others than to not be reciprocated. Also, subjects indicated that they would be more willing to give help without being repaid, than to accept help, if they could not repay. Either these findings reflected the strong desire not to be in debt, which could be an adaptive cognitive mechanism, and/or they demonstrated the importance to the subjects of maintaining relationships with potential future benefits.

Support for the latter interpretation was given by the finding that a relatively high percentage of the individuals that subjects worried about repaying (individuals listed by the receiving group) were the main givers in the relationship. That is, subjects worried most about repaying people who gave relatively more often more to the subjects than the subjects gave to them. Furthermore, these same individuals listed were valued more by the subjects than were individuals listed by the giving group. In the giving group, there was a relatively higher percentage of individuals listed who gave less in the relationship than the subject.

The suspicion that individuals list different groups of people when recalling giving versus receiving instances was supported by Study IV. Only a third of the individuals listed by subjects recalling both types of exchange instances were present on both the giving and receiving lists. Given these

findings, it appears that subjects value those people from whom they tend to receive items more than those from whom they tend to give items. The subjects placed a relatively high importance on their relationship with these people and showed concern about repaying them. In summary, the results seem to support the hypothesis that subjects were concerned about maintaining reciprocal relations. This way of thinking could be considered ultimately selfish.

The hypothesis that subjects are more concerned about being in debt than being owed would have to be tested. The hypothesis that acting to relieve feelings of indebtedness is an output of a psychological mechanism that benefited fitness in the ancestral environment would also have to be tested. Whether or not feeling indebted prompts action, and if the amount of indebtedness and action depends on the person owed, could also be tested. For example, the individual to whom a subject is indebted could be manipulated. One would predict, from Study III, that those individuals from whom the subject receives the most benefits would cause the greatest amount of aversive feelings if they were owed. In Study III the subjects listed individuals with whom, presumably, they were on a friendly basis. Perhaps the concern for paying back would decrease if the other person were a competitor. Gouldner (1960) argued that there are four factors that influence whether debts will be repaid: the intensity of the recipient's need, the resources of the donor, the motives of the donor, and the perception of the voluntary or involuntary nature of the giving. Evidence has supported the influence of these factors, but additional factors that are evolutionarily meaningful, such as those suggested above, could be added.

The finding that subjects listed generally separate groups of people for giving and receiving is intriguing. As earlier mentioned, Essock-Vitale and McGuire (1985) had similar findings. In their study, people tended to give to those to whom they usually gave, rather than those whom they owed. They also tended to receive from those whom they usually received, rather from those who owed them. It is possible that this type of behaviour could be the expression of a "conservation rule", a hypothetical cognitive structure that affects decision-making in a manner that conserves the time and energy that would be spent in searching for all possible options. That is, individuals may just "go with the best bet", or "go with what they know", rather than taking a chance on another option that may not deliver what is wanted. For example, if I want some help with my statistics, I may ask the person who has helped me

before, rather than try someone who owes me some help. If I ask someone else, he or she may refuse to help, or not do a very good job at helping. On average, this pattern of decision-making, if it can be shown it exists, may proven very beneficial in the past. However, this notion is very speculative and would have to be researched further.

Another set of findings from Study III that might represent a *giving* strategy that is ultimately selfish. Ratings from subjects in the giving group indicated that the cost, value and benefit of items they gave to others were on average lower than the cost, value and benefit of items received by those in the receiving group. Either subjects tend to underestimate the value of what they give in comparison to what they receive, or, as suggested earlier, subjects give items that are of subjectively lower cost to them and of subjectively higher value to the recipients. In terms of reciprocal exchange, this would be a good strategy, giving items that are of relatively small cost to you and relatively large value to the recipient. Of course this would not mean that people would never give items of large value. However it should be remembered that exchange instances encompass a large variety of items, not just material goods. Items can also be services, companionship, emotional support, consideration, information, good feelings and many other possibilities. If one considers how wide the range of possible exchange items is, it is easier to see how costs to the giver could often be lower than the value to the recipient. For example, looking after your cats when you go out of town may be of little cost to me but of high value to you. The presence of this proposed giving strategy would also have to be further investigated.

The above interpretations that some of the findings represent selfish strategies in social exchange depend on the responses of the subjects being taken at face value. It is possible that subjects were trying to "look good" when stating that what they gave was of lesser value than what they received. To test for this possibility, the Marlowe-Crowne social desirability scale was administered to subjects along with the study questionnaires (Crowne & Marlowe, 1960). The correlations of subjects' scores on the Marlowe-Crowne with sixteen dependent variables used in this study were calculated. All were quite low and none reached significance. Another control of social desirability was built directly into the study design by having subjects answer questions about giving *or* receiving instances. It was thought having subjects answer questions about both

types of instances might encourage them to balance their answers on both. In conclusion, it appears social desirability did not influence subjects' responses.

Although the subjects' responses did not appear to reflect a need for social desireability, the possibility that subjects' perceptions reflected a positive bias or self-concept cannot be eliminated. It is possible that individuals have a need to believe that they are doing well and are liked by others. In this regard, they might believe that others give more to them than they give to others, that others are less reluctant to give, and that others give items of higher cost and value to them than the they give to others. The possible adaptiveness of such a cognitive strategy requires consideration. It has been suggested that individuals who see things somewhat rosier than how they actually are tend to be more confident and are better able to achieve their goals. Individuals who tend to view situations closer to reality, such as depressed individuals, may be less successful at achieving their goals. These ideas are very speculative. Further investigation is required to determine if a such a positive bias exists, and if so, to determine its function and effects.

A few comments should be made regarding the selfish strategies that I am saying may have been found in the data of Study III. Selfishness versus altruism as sources of human motivation has been debated for centuries. Several psychological studies have been conducted in an attempt to determine if motivations for helping were egoistic or altruistic (e.g. Batson and colleagues). In a review of a series of studies, Batson and Shaw (1991) have argued that empathic emotions can evoke true altruistic motivation. From an evolutionary perspective, whether or not a motivation is altruistic or selfish depends on the level of analysis (Kenrick, 1991). At the proximate level, the motivation may appear altruistic. However, if one considers the consequences of some "altruistic" actions, the potential benefits associated with them (whether or not the actor is aware of them) may make the actions ultimately selfish.

Our psyche was shaped by natural selection. A psychological mechanism that regulated behaviour in the ancestral environment would have been selected if the behaviour was, on average, adaptive (Cosmides & Tooby, 1987). Put in another way, our psychological mechanisms were designed in such a way that the behaviours they evoked, in the long run, would not be costly to the individual. Any behaviour that increases benefits and avoids costs to the self could be considered selfish.

The fact that human behaviours are often called selfish by evolutionary scientists does not mean that we were designed to consider only our individual needs and to be hurtful and competitive with others. Instead it means that we have the cognitive mechanisms we do because they were selected by natural selection as a result of the benefits they conferred upon the fitness of the individuals who possessed them. Fitness is increased in more ways than by harming others. For example genes for nurturing young were selected because of the fitness advantage they gave to the bearers over those not possessing those genes. Parental care is ultimately selfish, but it is not a malicious behaviour towards others (unless of course it evokes hostile behaviour towards predators).

There are many ways in which individuals benefit themselves by helping others. Shared interests, whether genetic of non-genetic, make it valuable to cooperate (Alexander, 1987, Axelrod & Hamilton, 1981). A complex emotional and psychological system has likely evolved to manage social interactions with others because they are so valuable (Trivers, 1985). Components of this system include feelings of gratitude, guilt, sympathy, and friendship.

There are several ways these studies could be improved. The scenario/role playing studies manipulated category of relationship, relatedness, and reproductive value in situations where someone was asked for help. To make a proper comparison with the study of actual instances, scenarios where the subject puts him/herself in the place of receiver, rather than just giver, could be used.

Repeating the methodology of Study IV, having subjects fill in both receiving and giving questionnaires, while completing the full questionnaires as in Study III would prove very beneficial. Comparing perceptions of giving and receiving within the same subjects might give a better idea of the structure of potential biases. An even better suggestion would be to have pairs of subjects enlist in the study and have them each rate mutual instances of giving and receiving. This method would be most accurate in determining how perceptions vary between self and other.

The debate over altruism versus selfishness has often used behavioural studies in which individuals have a choice of helping another, under various conditions (e.g. Batson & Shaw, 1991). A good suggestion is to manipulate the person to be helped in an evolutionarily significant manner (Crawford, 1989; Kenrick, 1991). For example, the individual needing help could be a sibling, friend, parent, casual acquaintance, spouse, or stranger.

Since the subjects used in these studies were mainly undergraduates, the generalizability of the results are somewhat limited. Individuals in this age range that are still attending school usually do not have a large amount of resources. It is possible that exchange patterns could be different if older, and more affluent subjects took part in the studies.

In conclusion, the findings from this series of studies seem to have provided a small amount of evidence for the existence of kin-favouring biases. Reciprocal altruism appears to be present in social exchanges, particularly among non-kin. The lack of evidence for selfish biases in the form of subtle cheating, and the apparent presence of concern for reciprocal relationships may provide evidence for a more optimistic view of human social exchange. As Richard Dawkins has discussed, perhaps "nice guys finish first".

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Appendix A - Study I Sample Questionnaire

Age:_____ Sex: M F (circle one)

Occupation: _____ If student, list major:

In the following scenario, an individual is asked for help from one of three people. We would like you to consider the three possible situations, with a different person, represented as X, asking for help in each (i.e., All three are not asking at the same time). Read each question, and answer separately for each individual who is asking for help.

Grace is a 26 year old graduate student. X asks Grace for twenty dollars.

X is either:
Grace's friend Elizabeth **OR**
Grace's sister Helen **OR**
A casual acquaintance from her department

All three people are around Grace's age, have the same income, and are equally in need of the twenty dollars. Grace sees each of them on a regular basis.

Questions:

1. How reluctant is Grace to give X the money?

1 2 3 4 5 6 7

Not at all reluctant — Extremely reluctant

Grace's friend Elizabeth _____ Grace's sister Helen _____
Casual acquaintance _____

2. If Grace gave X the money, how important would it be to her that X pays her back?

1 2 3 4 5 6 7

Not at all important — Extremely important

Grace's friend Elizabeth _____ Grace's sister Helen _____
Casual acquaintance _____

3. How much of a cost is it for Grace to give the money to X? Cost need not refer only to financial cost, but also to *relative* cost. For example, if someone asked a student to babysit and he or she had an exam the next day, it would be more costly to him or her than if there wasn't an exam. Choose a number from the scale below to indicate how costly it would be for Grace to give X the money.

1 2 3 4 5 6 7

No cost at all — Extremely costly

Grace's friend Elizabeth _____ Grace's sister Helen _____
Casual acquaintance _____

4. How upset would Grace be if X did not pay her back?

1 2 3 4 5 6 7

Not at all upset — Extremely upset

Grace's friend Elizabeth _____ Grace's sister Helen _____
Casual acquaintance _____

5. How much of a benefit would X gain if Grace gave X the money?.

1 2 3 4 5 6 7

No benefit at all — Extremely beneficial

Grace's friend Elizabeth _____ Grace's sister Helen _____
Casual acquaintance _____

6. What is would you say is the likelihood of Grace giving X the money? (Give a number from 0 to 100 percent)

Grace's friend Elizabeth _____ Grace's sister Helen _____
Casual acquaintance _____

Appendix B - Study II Sample Questionnaire

Your age: _____ Sex: M F (circle one)

Your occupation:

If student, indicate major:

The following paragraph depicts a situation where one person, Linda, is asked to help someone. After reading the paragraph, please answer the questions that follow by circling the appropriate number on the scales provided.

Linda is a 30 year old woman who has a middle income job. Linda's younger sister Jennifer, age 21, wants to borrow $500. Linda sees Jennifer on a regular basis. Jennifer also has a middle income job. She may not be able to pay Linda back for a while.

1) How reluctant do you think Linda would be to lend the money to Jennifer?

1 2 3 4 5 6 7

Not at all reluctant — Extremely reluctant

2) How important do you think it would be for Linda to have the money returned if she gave it to Jennifer?

1 2 3 4 5 6 7

Not at all important — Extremely important

3) How much of a cost do you think it would be for Linda to help Jennifer? Cost need not refer only to financial cost, but also to *relative* cost. For example, if someone asked a student to babysit and he or she had an exam the next day, it would be more costly to him or her at that time than if he or she were asked when there was no exam. Circle one number on the scale below to indicate how costly it would be for Linda to lend the money.

1 2 3 4 5 6 7

No cost at all — Extremely costly

4) How upset would Linda be if Jennifer did not pay her back?

1 2 3 4 5 6 7

Not at all upset — Extremely upset

5) How much of a benefit would Jennifer gain if Linda gave her the money?

1 2 3 4 5 6 7

No benefit at all — Extremely beneficial

6) In terms of a percentage, what do you think the chances are of Linda lending Jennifer the money? (Choose from 0 to 100%)

Your answer: _____

7) What do you think Linda will do and why do you think that?

_____

_____

_____

_____

8) How many brothers and sisters do you have? _____

Appendix C
General Information Form

To assist in our analyses, we would like to ask you some general questions that will help us interpret our results.

1. Age _____ 2. Sex: M F (Circle one)

3. Marital status: _____

4. Do you have any children? Y N
   If yes, what are their ages? _____

5. How many siblings do you have? _____
   What are their ages? _____

6. How many people are in your immediate family (including yourself?):
_____

For the following two questions concerning relatives, count only those with whom you have had some contact with, whether it be in person, or through mail, phone, or other means, during the past year.

6. Number of relatives: _____

7. Approximately what percentage of your relatives live in the following areas:

Percent in Lower Mainland _____
Percent in BC _____
Percent in Canada _____
Percent in North America _____
Percent in other continents _____

8. On average, how often do you interact with your immediate family? (circle one)

A) Every or nearly every day
B) A few times a week
C) A few times a month
D) A few times a year
E) Once a year
F) Once every few years

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8. On average, how often do you interact with your other relatives? (circle one)

A) Every or nearly every day

B) A few times a week

C) A few times a month

D) A few times a year

E) Once a year

F) Once every few years

9. How many close friends do you have? _____

10. How many casual friends do you have? _____

11. On average, how often do you interact with your friends? (circle one)

A) Every or nearly every day

B) A few times a week

C) A few times a month

D) A few times a year

E) Once a year

F) Once every few years

12. What is your occupation?: _____

13. What is the highest level of education you have attained?:

_____

14. What is your citizenship?: _____

15. What is your ethnic background?: _____

Appendix D

Social Exchange Study

This is a study about the exchanges we have with other people, in the sense of giving and/or receiving something. In the following questionnaire you will be asked questions about single instances of exchange in which you **gave** something to another person. You will be asked about items that you have given to people in a particular relationship category. The following paragraph will explain more about exchanges.

Items of Exchange

Items or commodities of exchange vary greatly. Material items, such as money or gifts, are just one kind of exchange item. There are many other less concrete items that are involved in exchanges such as: doing things for someone, doing things with someone, helping in any way, spending your time with or for someone, behaving in a certain way or treating him/her a certain way, talking, giving social approval, and being caring, loyal, and/or supportive. These are just some examples to give you an idea of what exchange items can be.

Just as the type of exchange item may vary, so may the cost, value, and importance of it. A person may give a great deal of help to someone or just a little. An exchange item may be small or large.

In this study we are interested in all types of exchange items, small or large. If you have any questions at any time, please do not hesitate to ask them.

YOUR QUESTIONNAIRE

In your questionnaire, we are interested in items that you have **given** to others. Please list as many **instances** as you can in which you have given something to someone in the relationship category, written at the top of your sheet, **within the last 6 months.** You will be given 4 minutes to write down the instances you recall. You do not need to write a lot down, just a brief description of what was given in each particular instance. For example, "I bought Sarah a coffee."

Remember that items of exchange may include non-material items.

Please stop here and wait for further instruction

Your Relationship Category is: Friends

Please describe below as many instances as you can of giving something to a friend within the past 6 months. You do not have to fill in the entire table, use it as you need to. Please ask for extra sheets if you need more space. Do not list more than one instance on a single line. Please list the friend's first name and age in the first column. You may list the same person more than once. Ignore the columns to the right (Q1-Q8) for now. For our purposes, include only individuals to whom you are unrelated, with whom you have a platonic relationship, and with whom you've been friends for at least 1 year.

Name & age	Instance where you gave something	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8

Name	Q9	Q10	Q11	Q12	Q13	Q14	15	Q16	Q17

Question 18

Question 19

Appendix F - Questions About The Instances

Now we want to ask you a few questions regarding the instances that you have written down and the individuals involved. Please answer the following questions in the boxes of the appropriate columns on the previous sheets, to the right of each particular instance. Keep this sheet handy as a reference when filling in the boxes.

Question 1

For each instance listed, we would like to know if it was a one time occurrence, for example, a birthday gift, or if it was part of something that is ongoing, for example a daily ride to work. If the item was something you gave only once, put a 1 in the box next to the item. If you gave the item more than once, choose a number from the scale below that best describes how often you gave it:

2 a few times a year
3 about once a month
4 a few times a month
5 around once a week
6 on a regular basis, almost every day

Question 2

For each item listed, please rate how valuable you believe that item was to the recipient.

1	2	3	4	5	6	7
Not at all valuable						Extremely valuable

Question 3

For each instance, use the following scale to indicate how much of a cost it was for you to give what was exchanged. The type of cost we are referring to is relative cost. For example, it would seem more costly to help someone babysit if you had a midterm to study for than if you didn't have one.

1	2	3	4	5	6	7
No cost at all						Extremely costly

Question 4

For each instance, please use the scale below to indicate how reluctant you were to give the item to the person:

1	2	3	4	5	6	7
Not at all reluctant						Extremely reluctant

Question 5

For each item for which you have not yet been repaid, please indicate the likelihood, in terms of a percentage, of being repaid (by the person to whom you gave the item). 0% means he or she definitely will not and 100% means he or she definitely will. If you have already been repaid, please write an "R" in the appropriate box.

Question 6

For each person listed, for each item given, please indicate how **important** it is(was) to you that he or she reciprocate(d):

1	2	3	4	5	6	7
Not at all important						Extremely important

Question 7

For each person listed, for each item given, please indicate how upset you would be if he or she did not (or had not) reciprocate(d): (whether or not you actually showed it)

1	2	3	4	5	6	7
Not at all upset						Extremely upset

Question 8

For each item listed, please rate how much of a benefit you believe that item was to the recipient.

1	2	3	4	5	6	7
Not at all beneficial						Extremely beneficial

Please answer the remaining questions on the back of the page on which you have been writing. Write the names of the people you listed in the first column. Put each person down only once, even if he or she is in your original list more than once.

Questions 9 to 12

For **each person** listed, please supply in the appropriate column the following information:

Q9: Marital status

Q10: Number of children

Q11: Number of children you guess he/she will have in the future, not including the ones he/she has now.

Q12: The person's relationship to you (be specific)

Question 13

For **each person** listed, please choose one of the following statements to indicate how often you think you will be dealing/associating with him or her in the future. You need not actually see the person to interact with him or her. For example you may contact him or her through phone or letter.

I will be dealing or interacting with this person probably:

1) Every or nearly every day
2) A few times a week
3) A few times a month
4) A few times a year
5) Once a year
6) Once every few years
7) Never again

Question 14

For **each person** listed, please indicate who has given more in the history of your relationship with him or her.

If you have given more, please write an **S** for self.
If he or she has given more, please write an **O** for other.
If you have both given equally, please write an equals sign =.

Question 15

For those people in the previous question for whom you have written **S**, please indicate the likelihood, in terms of a percentage, that the relationship will balance out in the future, i.e. the likelihood that the other person will make up for what he or she owes.

For those people in the previous question for which you have written **O**, please indicate the likelihood, in terms of a percentage, that the relationship will balance out in the future, i.e. that you will make up for what you owe.

Question 16

For each person, please the importance of your relationship with him or her. The higher the rating, the more strongly you feel that you would not want to give up the relationship.

1	2	3	4	5	6	7
Not at all important						Extremely important

Question 17

For each person listed, how willing would you be to give help to him/her if there were no chance of being repaid?

1	2	3	4	5	6	7
Definitely would not give help						Definitely would give help

Please answer Questions 18 and 19 in the space provided to the right of the table.

Question 18

Please describe the principles that guide your decisions about whether or not to pay these people back when they help you or give you things. When would you pay them back and when wouldn't you?

Question 19

Considering the group of people you have listed, when you give something to them, from whom do you expect to get repayment? For example do you expect it from the person to whom you gave, or from some other source?

Appendix G - Examples of Item Types

Personal/Emotional
- -I listened to her problems
- -Gave me advice about family problems

Money
- -Lent him money
- -Gave me $20

Material Items
- -Bought him a drink
- -Brought me a sweatshirt

Companionship
- -Went to library with her
- -Played pool together

Services
- -Gave him a ride
- -Made me dinner

Considerateness/Niceness
- -Said "Hi"
- -Gave me a kiss and hug on arrival from Mexico