



Munich Personal RePEc Archive

The Anticipatory Effect of Nonverbal Communication on Generosity

Brook, Rebecca and Servátka, Maroš

New Zealand Experimental Economics Laboratory, University of
Canterbury, MGSM Experimental Economics Laboratory,
Macquarie Graduate School of Management

8 December 2015

Online at <https://mpra.ub.uni-muenchen.de/68260/>
MPRA Paper No. 68260, posted 15 Dec 2015 15:00 UTC

The Anticipatory Effect of Nonverbal Communication on Generosity

Rebecca Brook^a and Maroš Servátka^b

December 8, 2015

Abstract: Is nonverbal communication capable of affecting economic outcomes? We study the effect of anticipated approval and disapproval, expressed through emoticons, on generosity and show that it discourages selfish behavior. In our experiment subjects play a one-shot dictator game at the end of which the recipient can respond to the allocation by drawing an emoticon and sending it back to the dictator. While the observed effect of nonverbal communication is somewhat weaker than the anticipation of a verbal response, our results provide evidence that people are willing to trade-off pecuniary gains to avoid disapproval or seek approval of their peers and that the sheer anticipation of receiving a response, even nonverbal, is sufficient to change their behavior.

Keywords: approval, disapproval, nonverbal communication, emotion, experiment, fairness, generosity, dictator game,

JEL codes: C91, D03, D63, D64

^a New Zealand Experimental Economics Laboratory, University of Canterbury, email: rab184@uclive.ac.nz.

^b Corresponding author. MGSM Experimental Economics Laboratory, Macquarie Graduate School of Management, Sydney, Australia; email: maros.servatka@mgsm.edu.au ; tel. +61-2-98507813.

Introduction

Is nonverbal communication capable of affecting economic outcomes? Anecdotal evidence suggests it might be, as power companies in the US have incorporated nonverbal feedback into approaches to reduce household power consumption and conserve energy.¹ In the UK, regional councils implemented speed signs displaying a smiling face when people are driving at or below the speed limit and a frowning face if they are speeding. The signs were able to decrease the number of drivers exceeding the speed limit by 53% (Sadler, 2009). Yet little is known about the mechanisms through which nonverbal communication influences decisions as in everyday life it is often combined with verbal expressions of, say, encouragement or expectations. In this paper we focus on one such mechanism and ask whether nonverbal cues are sufficient means of expressing approval and disapproval and whether this effect is anticipatory and deters selfish behavior.

The use of wordless signals and cues such as facial expression, body posture, or eye contact play a prominent role in communication. Burgoon et al. (1996) estimate that almost two-thirds of the meaning of a social encounter is derived from nonverbal cues. The introduction of internet and mobile devices has resulted in new ways of how individuals and businesses communicate, with the face-to-face communication or phone calls being replaced by emails, texts, and messages via social networks. An important factor lacking from messages transcribed into text and transferred online is the non-verbal component; without being able to see the facial expression it can often be hard to convey the meaning and the tone. As a result the recipient of such messages might perceive them in ways the sender did not intend. This deficiency led to an introduction of *emoticons* (or *emoji*), which are pictorial representations of human emotions, in online communication.² Their use is common in social network sites, such as Facebook, where people often post information in expectation of obtaining an approval ('like') from their peers. It is 'smiley' and 'frowning' face emoticons that US power companies use to nudge people to conserve energy and UK regional councils to slow down speeding drivers, through creating anticipatory approval and disapproval effects.

¹ Opower produces energy consumption reports that are sent out to each household. The report contains feedback on the general energy consumption and includes a section where the consumption is rated using emoticons. This scheme has been successful in increasing energy efficiency as households reduce their energy consumption in anticipation of the nonverbal feedback on their energy reports (Stern, 2013).

² Their increased use culminated in 2014 when the word of the year, for the first time, was not actually a word but an emoticon; specifically the red love heart emoji featured in the Apple keyboard (The Washington Post, 2014).

To the best of our knowledge, there are no economic studies exploring the impact of nonverbal cues, despite their prominence in communication. The vast majority of existing studies on the effects of communication on economic decisions deal with either free-form or stylized messages (see Crawford, 1998 for a survey). This research shows that messages are, for example, capable of increasing cooperation (e.g. Charness and Dufwenberg, 2006), coordination (e.g. Cooper et al., 1992; Blume and Ortmann, 2007), enforcing social norms and preventing opportunistic behavior through informal non-monetary sanctions (e.g., Masclet et al., 2003; Rege and Telle, 2004).

Ellingsen and Johannesson (2008) and Xiao and Houser (2009) show that anticipated verbal messages expressing emotions and approval/disapproval promote fair behavior even in one-shot dictator game settings. Both experiments identify the crucial roles of approval seeking and disapproval avoidance in norm enforcement, which have been confounded with reactions to informal sanctions in repeated game experiments. However, the effect of nonverbal communication cannot be inferred from the effect of messages in either of these two experiments. While messages certainly add some element of emotional expression, the emotion conveyed by the nonverbal component of communication is lacking. Xiao and Houser interpret the increase in observed generosity of dictators as an avoidance of the ‘sharp-tongue’, yet this could have been an avoidance of disapproval in general. If this is the case, then the anticipation of a disapproving nonverbal cue may be enough to deter people from acting in a selfish manner. The one-shot dictator game design thus provides a natural setting for studying the effects of nonverbal communication on deterring selfish behavior and for the relative comparison with the impact of verbal communication.

Experimental design and procedures

The experimental design consists of three conditions implemented in an across-subject design. The *Baseline condition* is a standard dictator game in which the randomly assigned dictator, (player A in the instructions) is endowed with \$10 and the recipient (player B) with \$0. The dictator can send any whole dollar amount between \$1 and \$10 to the randomly paired recipient or do nothing and keep both endowments unchanged. The recipient has no decision to make, thus the final allocation is entirely decided by the dictator.

The *Emoticon condition* is the same as Baseline except for an added stage at the end of the dictator game, where the recipient is given the opportunity to respond to the dictator's decision. After the decision is revealed to the recipient, the recipient can draw an emoticon and send it to the dictator. All stages are announced before the game begins, thus the dictator knows that the recipient can respond to her decision prior to deciding on an amount to be sent to the recipient. The recipient is free to draw any emoticon, however the subjects are warned in the instructions that foul and/or threatening emoticons are prohibited. The emoticon drawing form for this stage includes an empty circle into which the recipient can draw an emoticon.

The *Message condition* is the same as Baseline except for an added stage at the end of the dictator game, where the recipient is given the opportunity to respond to the dictator's decision using a freeform written message. This is a replication of Ellingsen and Johannesson (2008) and Xiao and Houser (2009) that allows us to compare the effects of nonverbal communication with verbal. Just as in the *Emoticon condition*, all stages are announced before the game begins. The message form includes a blank sheet of paper with lines into which the recipient can write a message.³

Our experimental design yields the following three testable hypotheses regarding the amount sent by dictators to their paired recipient:

Hypothesis 1: Emoticon > Baseline

Hypothesis 2: Message > Baseline

Hypothesis 3: Emoticon = Message

The experiment was conducted in the New Zealand Experimental Economics Laboratory at the University of Canterbury, with 188 undergraduate students serving as subjects. The participants were selected randomly from the database using ORSEE (Greiner, 2015). An experimental session lasted 25 minutes on average, including the initial instruction period and the private payment of subjects. The subjects earned an average of 10 New Zealand Dollars

³ The goal of the current experiment is not to identify the incremental effect of nonverbal communication in a situation where a person can use both messages and nonverbal cues. Design exploring such question would include both a message form and an emoticon form and explicitly mention this in the instructions. We are interested in comparing the effects of 'pure' verbal communication with nonverbal. This is not to say that no emoticons were drawn on message forms; in fact there were 12/32 recipients who used an emoticon, however, the instructions emphasized that the recipients would write messages, which is what arguably drove the anticipation of dictators.

(NZD) including a NZD 5 show up fee.⁴ All sessions were run under a single-blind protocol, in which there was full anonymity between subjects, however the experimenter could track subjects' decisions and identities.

Results

Table 1 summarizes subject behavior and Figure 1 shows the distribution of amounts sent by dictators in our three conditions. The statistical tests are presented in Table 2.

Table 1. Summary statistics

Data	Baseline (<i>n</i> = 30)	Emoticon (<i>n</i> = 32)	Message (<i>n</i> = 32)
Average amount sent	2.67 [2.15]	3.44 [1.93]	4.09 [2.37]
Median amount sent	3	4	5
Frequency of positive amount sent	70% {21}	84.4% {27}	84.4% {27}
Average positive amount sent	3.81	4.07	4.85
Frequency of emoticons sent	-	96.9% {31}	-
Frequency of messages sent	-	-	100% {32}

Standard deviations in brackets. Number of dictators in braces.

Emoticons were drawn by all but one of the recipients in the Emoticon condition. These emoticons portrayed an array of different emotions, ranging from frowning and crying faces to smiling and winking faces (see the appendix). The amounts sent in Emoticon are weakly significantly higher than in Baseline ($p=0.093$), supporting Hypothesis 1 that anticipated non-verbal communication is capable of deterring selfish behavior. However, we do not find any effect of non-verbal communication on the frequency of sending a positive amount ($p=0.147$) or the proportion of equal splits ($p=0.379$). The effect on the proportion of splits that give the recipient at least 40% of the pie is marginally statistically insignificant ($p=0.104$).⁵

⁴ At the time of the experiment the minimum wage in New Zealand was \$14.25/hour.

⁵ We categorized emoticons as positive, neutral, or negative expressions. The average amount sent by dictators who received a positive emoticon in return was \$4.67, neutral \$2.63, and negative \$0.20. The differences between amounts given for each emotional category were all statistically significant: positive vs. negative $p=0.0002$, positive vs. neutral $p=0.0004$ and negative vs. neutral $p=0.0122$.

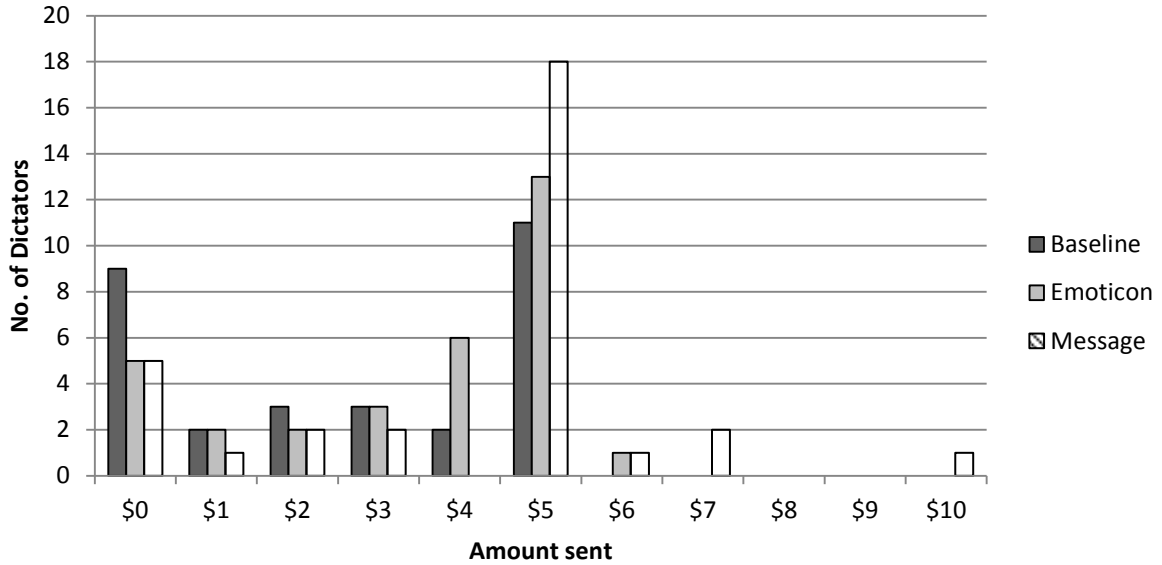


Figure 1. The distribution of amount sent by dictators

We find the effect of anticipated verbal communication on preventing selfish behavior to be stronger than the effect of non-verbal communication. We replicate the main results by Ellingsen and Johannesson (2008) and Xiao and Houser (2009) and find the amounts sent in Message to be significantly higher than in Baseline ($p=0.006$), supporting Hypothesis 2 that *ex post* messages result in a ‘sharp tongue’ avoidance effect. This is also true conditional on sending a positive amount ($p=0.010$) as well as for the equal splits (0.011) and splits that give the recipient at least 40% of the pie. We do not find any effect on the frequency of sending a positive amount ($p=0.147$).

While verbal communication increases the average amounts sent by more than non-verbal communication, this difference is marginally statistically insignificant for all data ($p=0.109$), providing some support for Hypothesis 3 that the anticipatory effects of verbal and non-verbal communication do not differ. There is no difference in the frequency of sending a positive amount ($p=1.000$) or splits that give the recipient at least 40% of the pie ($p=0.793$). However, we observe weakly significantly more equal splits in Message than in Emoticon (0.077) and also a statistically significant difference in amounts sent conditional on the amount being positive ($p=0.031$).

Table 2. Tests for anticipated disapproval effects

Data	Mann-Whitney Test		Fisher's Exact Test of Proportions		
	All data	Positive amount sent	Frequency of positive amount sent	Frequency of 'fair splits'	
				$\geq 5:5$	$\geq 6:4$
Emoticon vs. Baseline	-1.32 (0.093) ^a	-0.48 (0.316) ^a	(0.147) ^a	(0.379) ^a	(0.104) ^a
Message vs. Baseline	-2.54 (0.006) ^a	-2.37 (0.010) ^a	(0.147) ^a	(0.011) ^a	(0.039) ^a
Emoticon vs. Message	1.60 (0.109)	2.16 (0.031)	(1.000)	(0.077)	(0.793)

p-values in parentheses. ^a One-sided test.

Discussion

Nonverbal cues are powerful tools in communication. Facial expression, body language, and gestures help convey the meaning of verbal messages and underline their tone. As such, they can have a nontrivial impact on economic decisions of agents and outcomes of interactions; however the channels through which they operate are not fully understood. In the current paper we isolate the anticipatory effect of emotion expression through the use of emoticons and show that even on its own it is capable of discouraging selfish behavior. While the observed effect is somewhat weaker than the anticipation of a verbal response, our experiment provides evidence that people are willing to trade-off pecuniary gains to avoid disapproval or gain approval of their peers and that the sheer anticipation of receiving a response, even nonverbal, is sufficient to change their behavior.

While our results shed light on the design on mechanisms that curb opportunistic behavior, our experiment focuses only on a particular type of nonverbal communication and one channel through which it operates. Moreover, as a first step, we study the impact of nonverbal communication in isolation. To better understand its potential, the follow up research needs to explore other types of nonverbal cues and their interaction with verbal messages.

Acknowledgements: Financial support was provided by the New Zealand Experimental Economics Laboratory at the University of Canterbury.

References

- Apple Inc. (2015). *Use emoji (emoticons) on your iPhone, iPad, and iPod touch*. Retrieved May, 26, 2015, from <https://support.apple.com/en-nz/HT202332>
- Blume, A., & Ortmann, A. (2007). The Effects of Costless Pre-play Communication: Experimental Evidence from Games with Pareto-ranked Equilibria. *Journal of Economic Theory*, 132, 274 - 90.
- Burgoon, J. K., Buller, D. B., & Woodall, W. G. (1996). *Nonverbal communication: The unspoken dialogue*. New York: McGraw-Hill.
- Charness, G., & Dufwenberg, M. (2006). Promises and partnership. *Econometrica*, 74(6), 1579-1601.
- Crawford, V. (1998). A survey of experiments on communication via cheap talk. *Journal of Economic Theory*, 78 (2), 286-298.
- Cooper, R., DeJong, D.V., Forsythe, R., & Ross, T.W. (1992). Communication in coordination games. *Quarterly Journal of Economics* 107 (2), 739-771.
- Ellingsen, T., & Johannesson, M. (2008). Anticipated verbal feedback induces altruistic behavior. *Evolution and Human Behavior*, 29(2), 100-105.
- Greiner, B. (2015). "Subject pool recruitment procedures: Organizing experiments with ORSEE," *Journal of the Economic Science Association*, 1(1), 114–125
- Masclet, D., Noussair, C., Tucker, S., & Villeval, M-C. (2003). Monetary and nonmonetary punishment in the voluntary contributions mechanism. *The American Economic Review*, 93(1), 366-380.
- Rege, M., & Telle, K. (2004). The impact of social approval and framing on cooperation in public good situations. *Journal of Public Economics*, 88(7/8), 1625-1644.
- Sadler, M. (2009, June 23). Smile power 1: smiley faces save lives [Web blog message]. Retrieved from <http://infomagination.typepad.com/blog/2009/06/smile-power-1-smiley-faces-save-lives.html>
- Stern, M. (2013). *A Little Guilt, a Lot of Energy Savings*. Retrieved from http://www.slate.com/articles/technology/the_efficient_planet/2013/03/opower_using_smiley_faces_and_peer_pressure_to_save_the_planet.html
- The Washington Post. (2014). *The word of the year isn't even a word*. Retrieved from

<http://www.stuff.co.nz/life-style/life/64551334/The-word-of-the-year-isn-t-even-a-word>

Xiao, E., & Houser, D. (2009). Avoiding the sharp tongue: Anticipated written messages promote fair economic exchange. *Journal of Economic Psychology*, 30(3), 393-404.

Appendix 1. *Baseline Instructions*

Instructions

Thank you for coming. Each of you will receive a \$5 show-up fee, to be paid in cash at the end of the session. You will now have a chance to earn additional money. Earnings are confidential: only you and the experimenter will know the amount of money you make.

The purpose of this session is to study how people make decisions in a particular situation. From now until the end of the session, unauthorized communication of any nature with other participants is prohibited. If you violate this rule we will have to exclude you from the experiment and from all payments.

Roles and Pairing:

Every participant has been assigned randomly to a role; the role you have been assigned is written in the top-right corner of this sheet. You have been randomly and anonymously paired with someone in this room. You will not know your partner's identity, nor will he/she know yours. Furthermore, these identities will not be revealed after the session is completed.

The Decision:

The decision concerns two people, Person A and Person B. Person A's task is to divide \$10 between themselves and their matched Person B. Total earnings for each person at the end of the experiment depends on the decision made by Person A. This decision is made only once.

The Experiment:

Stage 1: Person A chooses the division

Person A will be given a Decision Form; he/she will indicate the dividing option he/she wishes to choose by circling it on the decision form. After this choice is made the experimenter will collect all of the Decision Forms.

Stage 2: Person B receives Person A's decision

Person A's decision will be revealed to his/her randomly matched Person B. Person B's will then go one at a time to the payment desk where he/she will privately be paid a \$5 show-up fee plus his/her earnings from the decision.

Stage 3: Person A's are paid

Person A's will then go one at a time to the payment desk where he/she will privately be paid a \$5 show-up fee plus his/her earnings from the decision.

Once you have been paid you are free to leave, we ask that you do not wait around outside the lab. Thank you for participating. If you have any questions, please raise your hand and the experimenter will come to you to answer your question privately.

Appendix 2. Emoticon Instructions

Instructions

Thank you for coming. Each of you will receive a \$5 show-up fee, to be paid in cash at the end of the session. You will now have a chance to earn additional money. Earnings are confidential: only you and the experimenter will know the amount of money you make.

The purpose of this session is to study how people make decisions in a particular situation. From now until the end of the session, unauthorized communication of any nature with other participants is prohibited. If you violate this rule we will have to exclude you from the experiment and from all payments.

Roles and Pairing:

Every participant has been assigned randomly to a role; the role you have been assigned is written in the top-right corner of this sheet. You have been randomly and anonymously paired with someone in this room. You will not know your partner's identity, nor will he/she know yours. Furthermore, these identities will not be revealed after the session is completed.

The Decision:

The decision concerns two people, Person A and Person B. Person A's task is to divide \$10 between themselves and their matched Person B. Once the decision is made by Person A their randomly matched Person B will then have the opportunity to respond to this decision by drawing an emoticon (emotional-icon) to send back to Person A. Please note: written messages and foul and/or threatening emoticons are not allowed. Total earnings for each person at the end of the experiment depends on the decision made by Person A. This decision is made only once.

The Experiment:

Stage 1: *Person A chooses the division*

Person A will be given a Decision Form; he/she will indicate the dividing option he/she wishes to choose by circling it on the decision form. After this choice is made the experimenter will collect all of the Decision Forms.

Stage 2: *Person B receives Person A's decision*

Person A's decision will be revealed to his/her randomly matched Person B, he/she will then have the opportunity to respond by drawing and sending an emoticon (emotional-icon) to his/her randomly matched Person A. After all Person B's have finished, the experimenter will collect the Emoticon Drawing Forms.

Stage 3: *Person A receives Person B's drawing, Person B's are paid*

Person A will be given the Emoticon Drawing Form from their randomly matched Person B. Person B's will then go one at a time to the payment desk where he/she will privately be paid a \$5 show-up fee plus his/her earnings from the decision.

Stage 4: *Person A's are paid*

Person A's will then go one at a time to the payment desk where he/she will privately be paid a \$5 show-up fee plus his/her earnings from the decision.

Once you have been paid you are free to leave, we ask that you do not wait around outside the lab. Thank you for participating. If you have any questions, please raise your hand and the experimenter will come to you to answer your question privately.

Appendix 3. Message Instructions

Instructions

Thank you for coming. Each of you will receive a \$5 show-up fee, to be paid in cash at the end of the session. You will now have a chance to earn additional money. Earnings are confidential: only you and the experimenter will know the amount of money you make.

The purpose of this session is to study how people make decisions in a particular situation. From now until the end of the session, unauthorized communication of any nature with other participants is prohibited. If you violate this rule we will have to exclude you from the experiment and from all payments.

Roles and Pairing:

Every participant has been assigned randomly to a role; the role you have been assigned is written in the top-right corner of this sheet. You have been randomly and anonymously paired with someone in this room. You will not know your partner's identity, nor will he/she know yours. Furthermore, these identities will not be revealed after the session is completed.

The Decision:

The decision concerns two people, Person A and Person B. Person A's task is to divide \$10 between themselves and their matched Person B. Once the decision is made by Person A their randomly matched Person B will then have the opportunity to respond to this decision by writing a message to send back to Person A. Please note: foul and/or threatening messages are not allowed. Total earnings for each person at the end of the experiment depends on the decision made by Person A. This decision is made only once.

The Experiment:

Stage 1: *Person A chooses the division*

Person A will be given a Decision Form; he/she will indicate the dividing option he/she wishes to choose by circling it on the decision form. After this choice is made the experimenter will collect all of the Decision Forms.

Stage 2: *Person B receives Person A's decision*

Person A's decision will be revealed to his/her randomly matched Person B, he/she will then have the opportunity to respond by writing and sending a message to his/her randomly matched Person A. After all Person B's have finished, the experimenter will collect the Message Forms.

Stage 3: *Person A receives Person B's message, Person B's are paid*

Person A will be given the Message Form from their randomly matched Person B. Person B's will then go one at a time to the payment desk where he/she will privately be paid a \$5 show-up fee plus his/her earnings from the decision.

Stage 4: *Person A's are paid*

Person A's will then go one at a time to the payment desk where he/she will privately be paid a \$5 show-up fee plus his/her earnings from the decision.

Once you have been paid you are free to leave, we ask that you do not wait around outside the lab. Thank you for participating. If you have any questions, please raise your hand and the experimenter will come to you to answer your question privately.

Appendix 4. Decision Form

Decision Form

As a Person A, I choose to give to Person B (Please circle only one option):

\$0 \$1 \$2 \$3 \$4 \$5 \$6 \$7 \$8 \$9 \$10

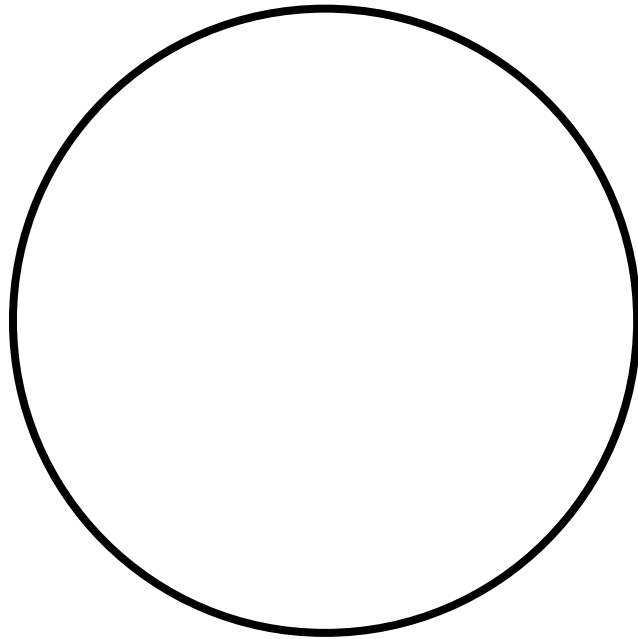
That is,

Person A gets \$____ , Person B gets \$____

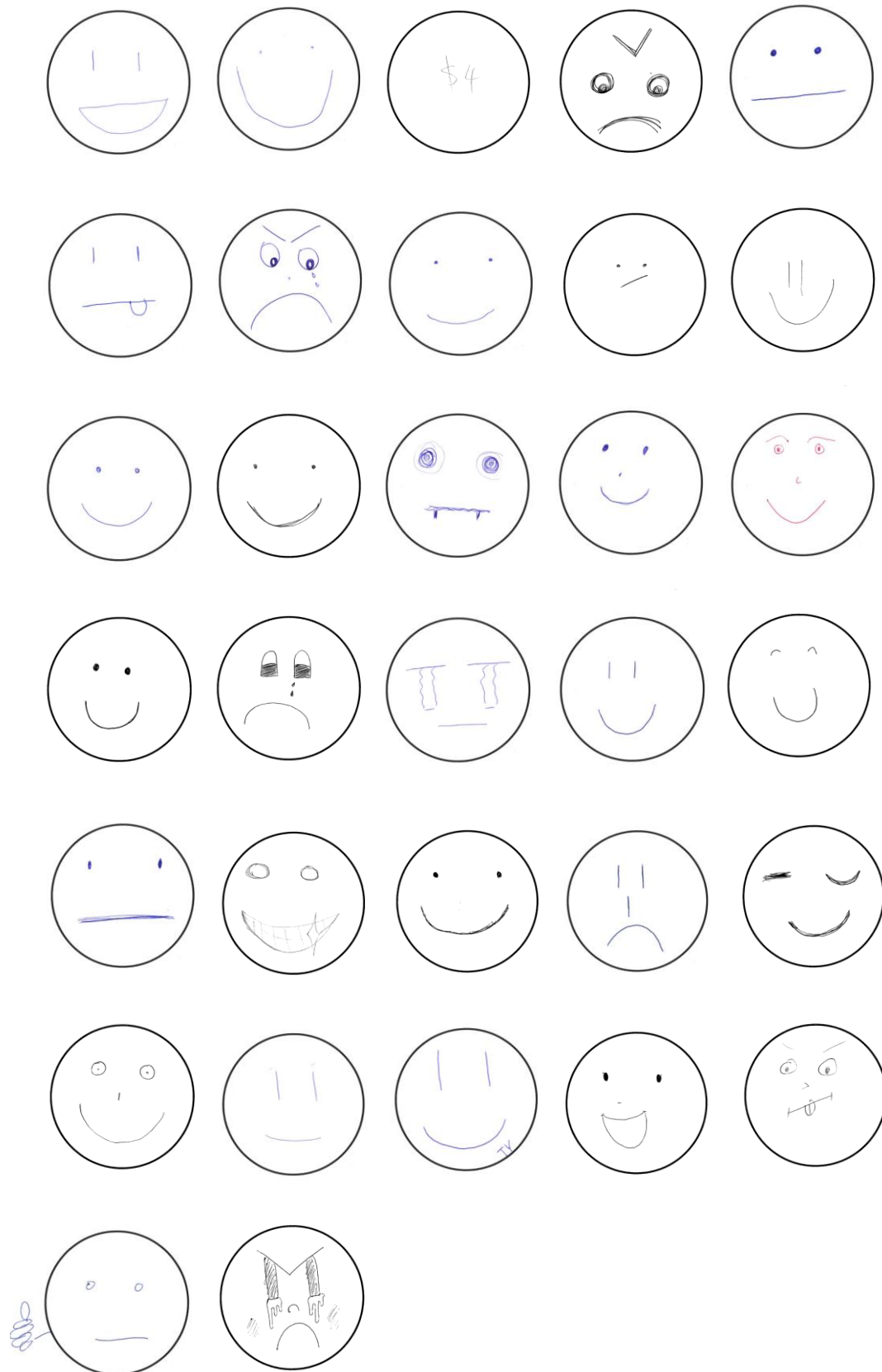
**If you circle more than one option or if you do not circle any option, you will be paid only the \$5 show up fee.*

Appendix 5. Emoticon Drawing Form

Emoticon Drawing Form



Appendix 7. Emoticon Drawings



Appendix 8. Freeform Messages

I was worried for a second because I can't control anything. I'm kinda a control freak sometimes... Then, I decided to just relax because I might meet someone nice, like you! Thank you very much! =)

Cheers bro!!

More than nothing :)

That makes me feel bad :(Thanks for being awesome though!!!

I hope you have good use for this money ☺ It's tough being a uni student I know! Us experimenting haha it's a hard life. Have a good day ☺

I guess you need the money? I totally understand though 70/30 is fair enough ☺ atleast you didn't leave me with \$0 Thanks and have a nice day!

Deal!!!

This is a fair decision as we both end up with the same amount. It makes sense to choose the middle number. However if a higher payment was chosen would it benefit both of us or just one same goes for a lower payment.

Thank you for being so kind... my faith in humanity has been restored. P.s spend it on something good atleast. From poor student.

Hey, thanks for splitting the money! Have a good day ☺

Very much appreciated, you are clearly a kind and honest person and I wish you many years of good health for you and your family ☺

An explanation as to why you decided to give no amount is all I seek. I am sure I will understand if the motive is constructive.

Thank you for your kind generosity to evenly share the money between partners. I appreciate your decision to share.

I guess this was an experiment to see how much you would take when you don't know who you were taking from. So thanks for not being entirely selfish but I suppose you did get the advantage picking Person A. I think I will spend my winnings on a hot chocolate. Enjoy your day and congratulations on making \$4 extra dollars than me.

Thank you kind stranger! Nice to know that there are still good people like yourself in this world. Have a wonderful day and know you have surprised me and restored my faith in humanity. I will leave smiling and hope you do too! All the best =) All you need is love...

Thanks, friend ☺

I'm a poor student, I hope you feel bad

Dear, Thank you and have a nice afternoon ☺

Thanks yo. Would have done the same. Haha

Prefer A \$0 B \$10 but OK

Hello, Thanks! Very kind of you to share ☺Have a good day. B

Thank you, I would have been happy with a 50/50 split though

You get \$5, I get \$5

Hi person A I'll accept the \$5. I would love to have \$10. But oh well

How desperate are you for money at the moment mate?

You are a fair and just person. Thanks for making this decision. Cheers mate!!!

Probably would've done the same if I was Person A but would've liked a 50/50 split, but yeah fair enough

Thanks for equally sharing the amount. I hope you have a nice day!

It's okay. I still love you.

Thank you very much

Fair - Done deal

Good choice!! I wish you a very good day!!! ☺
