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Appealing to altruism: an alternative strategy to address the health workforce crisis in developing countries?

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Abstract

Background—Recruitment and retention of health workers is a major concern. Policy initiatives emphasize financial incentives, despite mixed evidence of their effectiveness. Qualitative studies suggest that nurses especially may be more driven by altruistic motivations, but quantitative research has overlooked such values. This paper adds to the literature through characterizing the nature and determinants of nurses' altruism, based on a cross-country quantitative study.

Methods—An experimental 'dictator game' was undertaken with 1064 final year nursing students in Kenya, South Africa and Thailand between April 2007 and July 2008. This presents participants with a real financial endowment to split between themselves and another student, a patient or a poor person. Giving a greater share of this financial endowment to the other person is interpreted as reflecting greater altruism.

Results—Nursing students gave over 30% of their initial endowment to others (compared with 10% in similar experiments undertaken in other samples). Respondents in all three countries showed greater generosity to patients and the poor than to fellow students.

Conclusions—Consideration needs to be given to how to appeal to altruistic values as an alternative strategy to encourage nurses to enter the profession and remain, such as designing recruitment strategies to increase recruitment of altruistic individuals who are more likely to remain in the profession.

Keywords

economics; health services

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Introduction

The recruitment and retention of health-care workers rank amongst the top concerns for health systems worldwide.[1–4] Low- and middle-income countries (LMICs) have become especially vulnerable to health worker migration, both internally from rural to urban areas and externally to high-income countries.[5–7] Factors associated with the decision to migrate (both internally and externally) have been commented upon, researched and the subject of various policy initiatives in recent years.[7–10] Although this work has identified a number of factors, such as the importance of appropriate working conditions, the role of supportive management and community integration, policy initiatives to address migration continue to emphasize the role of financial incentives, even though the (limited) evaluations of such strategies show mixed results.[8,11–13]

In contrast, surveys and qualitative studies suggest that nurses especially are not completely driven by, or interested in, monetary incentives, as their professional identity more directly relates to vocational (‘helping the community’) and altruistic (‘serving others’) motivations.[14–16] A greater understanding of the role that such values may have is critical to the future management of human resources within health care. There is clearly a need to understand better the specific forms that such values take, the role they play, and the level of influence that they have, in order to design effective interventions to attract new workers to the profession, retain existing workers and encourage the return of those who have left the profession or the country.[17]

However, quantitative research on nurses’ employment decisions, and interventions to encourage greater enrolment, retention and return of nurses to the public sector have tended to focus on objective job characteristics, such as workload or the level of remuneration,[18] and have overlooked the role of personal values, such as altruism.[19] This paper adds to this literature through characterizing the nature and determinants of nurses’ altruism, based on a cross-country quantitative study utilizing novel experimental economic field experiments with nursing students in three LMICs.

Study sites

The study described here was embedded in a cohort study of nurses undertaken in Kenya, South Africa and Thailand, as described elsewhere.[20] Three different countries were involved to allow us to test for the generalizability of results and conclusions, as there is reason to suspect that locally internalized national norms influence altruism.[21] Thailand and South Africa are comparable middle-income economies, whereas the population in Kenya enjoys relatively less wealth (according to the International Monetary Fund, in 2010 the GDP/capita adjusted for purchasing power parity was US$9187 in Thailand, US$10 498 in South Africa and US$1662 in Kenya). Whilst Thai society is often depicted as placing a lot of importance on harmony,[22] social and political tensions are strong in Kenya, as shown in the postelection violence of 2007–08, and in South Africa, where the heritage of apartheid is still, to a certain extent, shaping individual behaviours.[23]

Nurses make up the backbone of the health-care workforce within these countries, reflecting the reliance upon nurses to deliver services in most LMICs. According to WHO Statistics 2011, nurses and midwives represent over 80% of health-care professionals in South Africa and Thailand and 90% in Kenya. Each country is also facing a severe shortage of nurses, and facing challenges from internal and external migration. Against the backdrop of poor health outcomes, international emigration[24,25] and limited financial resources, Kenya is suffering from a critical shortfall of health-care professionals, particularly in rural areas,[26] and is largely dependent on donors for human resource policy interventions.[27] Although South Africa and Thailand are both middle-income countries with higher per capita health

expenditure, they both face challenges to recruit and retain sufficient numbers of skilled health workers, particularly in rural posts.[25,28–30]

We used a multistage stratified cluster sampling strategy to obtain the samples of nurses taking part in the study. Provinces within each country were purposely selected from rural and urban strata, and nursing colleges were subsequently selected from each province until the required sample size was achieved. All students nearing the end of their training as professional nurses at the selected colleges were invited to participate in the study. Of the total sample of 1064 nurses, 377 were from 8 nurse training institutions in South Africa, 342 from 3 training institutions in Kenya and 345 from 4 nursing colleges in Thailand. The data collection period spanned from April 2007 to July 2008.

Experimental methods

A ‘dictator game’ (DG) is a standard technique within experimental economics for detecting the presence and power of altruism in decision-making.[31] The game presents participants with a real financial endowment to split between themselves and someone else.[32] A greater share of this financial endowment given to the other person is interpreted as reflecting greater altruism, following standard economic theory.[33]

To date, the DG has mostly been used to try and understand why, and under what circumstances, individuals depart from the traditional self-interested hypothesis made by economic models. In particular, economists have looked into the influence of various individual characteristics or how changing simple features of the game itself influence individual altruism.[34] The vast majority of this research has been carried out with economics or business students, in the laboratories of American and European universities, although a seminal paper looking at social values across different remote small societies[35,36] has suggested that differences in economic and social organization may shape social preferences. To date, only one study has been carried out with nursing students,[37] showing that nurses were more generous than real estate brokers.

The DG is typically played anonymously, meaning that participants never learn the identity of the recipient with whom they are matched. In the specific DG applied here, respondents chose 1 of 11 possible ways to split their initial allocation of money: R100 in South Africa (~£6.60 at that time), B200 in Thailand (£3.10) and KSh200 in Kenya (£1.60). The amounts were selected so that the maximum payoff to the participant from the DG was equivalent to the daily starting wage of a nurse in each country. Note that the participant received the sum they did not allocate to the recipient in just one of the three games (as outlined below), to be chosen randomly. Thus, each participant had to decide *a priori* the allocation they would make if paired with each of the three different recipients, but were aware that only one of these decisions (randomly selected) would determine their payments.

The administration of the game followed standard procedures to ensure anonymity of responses and was presented in a local language (English and Thai).[38] Respondents effectively played three consecutive DGs, where they had to decide how to divide their initial allocation of money between themselves and a fellow student first, then with a patient as recipient and finally with a poor person. No details were provided about recipients other than these labels. The student recipient conforms to the traditional neutral and anonymous beneficiary used in such experiments and thus provides a control for assessing altruistic motives with respect to the other two recipients, who were chosen to appear more ‘deserving’ and elicit more generosity.[39] Payoffs to recipients were given later through donations to different institutions: a contribution to scholarships for students, to health-care projects for patients and to charities for poor populations.

Following the games, all participants completed a questionnaire which asked about basic socio-demographic characteristics (age, gender, ethnicity, marital status, number of children) and included several simple attitudinal questions to provide a survey measure of their motivations and personal values. Questions from the World Values Survey (http://www.worldvaluessurvey.org/) and the British Social Attitude Survey (http://www.esds.ac.uk/government/bsa/) were used and adapted to the LMIC context.

Data analysis

In experimental economics, the interpretation of the DG is that the money relinquished by respondents playing the role of dictator can be equated to a measure of their altruism. Therefore, in our study, three measures of altruism (A_1, A_2 and A_3) were computed, for the three different framings of the recipients, where A_j is the proportion of money given to the recipient j.

In the analysis, we first provide a descriptive summary of the results, showing the average proportion of the initial endowments relinquished by participants, as well as the proportion of respondents who decided to share nothing with recipients.

Since this basic analysis does not control for potential serial correlation existing in the three consecutive choices, or for potential individual confounding factors, we performed a multivariable analysis to analyse the determinants of altruism and compare altruistic choices between nurses. The empirical approach can be summarized as follows:

$$\mathrm{A}_{ij}=\beta X_i+\delta Z_i+\mu_i$$

where the dependent variable A_{ij} denotes the measure of individual i's altruism for framing j. Explanatory variables X_i are socio-demographic characteristics common throughout the three countries (age, gender and whether the respondent has a child), and Z_i are measures of individual values [extrinsic motivation and altruism (two index measures were constructed using Principal Component Analysis of attitudinal questions. For extrinsic motivation, we used agreement scores given by respondents to the following three statements: 'I chose my profession because I can earn money', 'I chose my profession because other people value it', 'I chose my profession because I can always find a job'. For altruism, we used responses to the following statements: 'Criminals should receive help rather than punishment' 'Helping others with my time or money is very important to me', 'Personally assisting people in trouble is very important to me')], with μ_i a vector of residuals. This choice of explanatory variables was dictated by restrictions imposed by differences across countries (e.g. the 'ethnicity' variable was different in each country), as well as by a willingness to test some of the hypotheses from the experimental literature, such as the existence of greater altruism amongst women.[40] Furthermore, the inclusion of the two survey-based constructs aimed to serve as tests of the internal validity of the experimental measures: we anticipated a positive correlation between experimental and survey measures of altruism and a negative correlation between extrinsic motivation and altruism. Unlike intrinsic motivation which is derived by the enjoyment of a given task, extrinsic motivation is defined as motivation that is driven by a (external) particular outcome or reward.[41,42]

We run a pooled model (see Table 3) that investigates simultaneously which factors determine the donations made to the two more deserving recipients (the poor and the patient), in all three countries, excluding and including socio-demographic variables.

A Tobit regression was used to estimate the model, in order to correct for the censored nature of the dependent variable (by definition comprised between 0 and 1). We used a

random-effects Tobit regression model to control for the potential correlation between the three choices.

Results

Table 1 provides a descriptive summary of the decisions made by respondents. The direction of responses appears to match *a priori* expectations, with respondents in all three countries showing greater generosity to patients and the poor than fellow students. Further, although in all countries a proportion of respondents behaved particularly selfishly and gave nothing to the recipient, this was far less the case for patients and the poor. However, this analysis does not control for potential confounding factors.

Table 2 provides further analysis of the determinants of the share of money given to the recipients in the different framings. This indicates that several socio-demographic variables seem to be associated with altruism. More altruistic decisions appear to be associated with those aged 35 years or more, being female (in the poor framing) or having children (in the poor framing). This concurs with other studies, where the age effect is well established[31] and females are found to be more altruistic.[31] In this context, however, it suggests that perhaps appeals to altruism, and incentives based on altruism, might struggle to gain traction on younger and/or male nurses. It also appears that the attitudinal questions about motivation and altruism are correlated in the expected direction; respondents who are more sensitive to extrinsic motivating factors tend to give less to the second player, whatever the framing, and survey measures of altruism were associated with a greater proportion of money being relinquished in the DG. Finally, the characteristics that are significant determinants of altruism seem to differ slightly across the three different framings. Age is particularly significant for the student framing, but less so for the other two framings. Gender appears significant in only one of the framings, as does having children.

Table 3 presents the results of a pooled model that investigates simultaneously which factors determine the donations made to the two more deserving recipients (the poor and the patient), in all three countries. Model I excludes selected socio-demographic variables and Model II includes them. The coefficient associated with the patient framing is significant and negative in both models, implying a lower level of moral obligation felt by respondents towards patients compared with poor recipients (giving them 6.9% less on average). Again, it is interesting to consider what this might this mean in terms of any appeals to altruism or incentives to encourage altruism. For instance, that it might be better to not frame such appeals or incentives directly with reference to patients, or to distinguish between encouraging altruistic behaviour towards patients and more ‘deserving’ categories, such as the poor. Further, the models in Table 3 support a role for local norms, as South African respondents appear more selfish than Thai respondents towards patients (giving them 9.5/9.6% less). We could not detect any difference between the Kenyan and Thai nursing students in their relative treatment of patients and poor recipients.

Discussion

Main finding of this study

The results indicate that altruism may be a significant feature within the decision-making processes of nursing students, who gave over 30% of their initial endowment in the experiment in all cases. To put this in context, participants in similar experiments undertaken in other population groups on average relinquish <10%.[23,43] This would fit with the more qualitative and anecdotal evidence concerning the importance of altruism for those who enter the medical professions.[16,44]

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Although the importance of altruism in this context appears relatively generalizable, given that the finding was consistent across three quite different LMICs, analysis also demonstrated some significant differences between countries. South African and Kenyan respondents appear less generous which may be explained by similar societal norms in these countries within the context of wide inequalities and less solidarity in comparison with Thai society for instance, where harmony is a more intrinsic core value.[22] The findings concerning patients may also reflect the historical development of nursing in South Africa, and studies have highlighted the sometimes negative attitudes of nurses towards patients.[45,46] That there are variations between countries makes it imperative to establish in more detail the specific level of altruistic motivation likely to prevail within the country and context of concern, such that incentive packages may be more effectively designed.

What is already known on this topic

There are various factors associated with the recruitment and retention of health-care workers outlined in the literature.[47–49] However, although qualitative studies suggest nurses may be driven by personal factors, such as altruistic motivations,[16] quantitative studies typically focus on factors such as remuneration,[12,50,51] which policy tends to follow. This study bridges the literature by quantitatively assessing the importance of altruism.

What this study adds

This study adds an important element to the debate on human resources for health, providing a novel quantitative assessment of the presence and role of altruistic motivations in decisions undertaken by nursing students. In contrast to the qualitative and survey literature, which forms most of the evidence concerning health worker motivations and incentives, the methodology used in this study undertook to establish some core motivational aspects of the participant's values.

Analysis demonstrates the existence of strong altruistic motives amongst nurses, which might suggest that developing incentives that nurture or are more aligned to such motivations may prove more successful than packages that only appeal to selfish motivations, such as remuneration. Clearly developing policies that reflect these incentives is the next step, and beyond the bounds of this paper. However, one may imagine, for instance, that recruitment strategies could introduce processes, such as attitudinal surveys along the lines of the World Values Survey and the British Social Attitude Survey as used in the study, to assess intrinsic motives and attitudes to increase recruitment of altruistic individuals more likely to remain in the profession. Another possibility is to increase the emphasis on elements that appeal to altruism in advertising, continuing professional education programmes and other activities targeted at nursing students and professionals. Provided they are not 'innate' and these values can be encouraged, the nursing curriculum could also pay greater attention to promoting and nurturing these values before students graduate and make career choices, with the aim to further reinforce the desirability of remaining within the profession.

Although not directly assessed, it is possible that altruism is also of significance in determining nurse migration, since concern for others may reflect concern for local populations that the nurse has been exposed to. However, migration is not inconsistent with strong levels of altruism, as 'caring' could be satisfied by working with any form of patient group in a number of countries. Thus, specific appeal to more geographic altruism (as opposed to wealth or health status, as here) needs to be explored in further research.

Limitations of this study

There are of course some caveats to place on the analysis; principally that it is possible that the observed 'generosity' of respondents might have stemmed from differences in experimental conditions compared with other studies, or because care for the recipient's welfare is not actually the primary motive for giving[52,53] (although, as Table 2 indicated, it was significantly associated with a more attitudinal assessment of underlying altruistic values). It is also the case that this study was focused upon the decisions made by nurses and not other health workers. Although qualitatively the decisions made by nurses may align more with those of other health professionals rather than other labour markets, the quantitative results of this study cannot be inferred to apply to those other than nurses at present. Clearly, however, given the potential magnitude of the result, such research is required.

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References

1. WHO. World Health Report 2006. World Health Organization; Geneva, Switzerland: 2006.
2. Joint Learning Initiative. Human Resources for Health: Overcoming the Crisis. Global Equity Initiative, Harvard University; Cambridge, MA: 2004.
3. Pond B, Mcpake B. The health migration crisis: the role of four Organisation for Economic Cooperation and Development countries. Lancet. 2006; 367:1448–55. [PubMed: 16650654]
4. Anyangwe SC, Mtonga C. Inequities in the global health workforce: the greatest impediment to health in sub-Saharan Africa. Int J Environ Res Public Health. 2007; 4:93–100. [PubMed: 17617671]
5. Dussault G. Not enough there, too many here: understanding geographical imbalances in the distribution of the health workforce. Hum Resour Health. 2006; 4:12. [PubMed: 16729892]
6. Liese, B.; Blanchet, N.; Dussault, G. The Human Resource Crisis in Health Services in Sub-Saharan Africa. World Bank; Washington: 2003.
7. Buchan J, Sochalski J. The migration of nurses: trends and policies. Bull World Health Org. 2004; 82:559–636.
8. Chopra M, Munro S, Lavis JN, et al. Effects of policy options for human resources for health: an analysis of systematic reviews. Lancet. 2008; 371:668–74. [PubMed: 18295024]
9. Zurn P, Vujicic M, Lemiere C, et al. A technical framework for costing health workforce retention schemes in remote and rural areas. Hum Resour Health. 2011; 9:8. [PubMed: 21470420]
10. Vujicic M, Zurn P, Diallo K, et al. The role of wages in the migration of health care professionals from developing countries. Hum Resour Health. 2004; 2:3. [PubMed: 15115549]
11. World Health Organization. Increasing Access to Health Workers in Remote and Rural Areas through Improved Retention: Global Policy Recommendations. Geneva, Switzerland: 2010.
12. Wilson N, Couper I, De Vries E, et al. A critical review of interventions to redress the inequitable distribution of healthcare professionals to rural and remote areas. Rural Remote Health. 2009; 9:1060. Epub 2009 June 12. [PubMed: 19530891]
13. Sempowski IP. Effectiveness of financial incentives in exchange for rural and underserviced area return-of-service commitments: systematic review of the literature. Can J Rural Med. 2004; 9:82–8. [PubMed: 15603680]
14. Miers ME. Career choices in health care: Is nursing a special case? A content analysis of survey data. Int J Nurs Stud. 2007; 44:1196–209. [PubMed: 16793043]
15. Prater L, Mcewen M. Called to nursing: perceptions of student nurses. J Holist Nurs. 2006; 24:63–9. [PubMed: 16449750]

16. Kingma M. Economic incentive in community nursing: attraction, rejection or indifference? Hum Resour Health. 2003; 1(1):2. [PubMed: 12904253]
17. Zurn P. Imbalance in the health workforce. Hum Resour Health. 2004; 2:13. [PubMed: 15377382]
18. Antonazzo E. The labour market for nursing: a review of the labour supply literature. Health Econ. 2003; 12:465–78. [PubMed: 12759916]
19. Shaw HK, Degazon C. Integrating the core professional values of nursing: a profession, not just a career. J Cult Divers. 2008; 15:44–50. [PubMed: 19172979]
20. Blaauw D, Erasmus E, Pagaiya N, et al. Policy interventions that attract nurses to rural areas: a multicountry discrete choice experiment. Bull World Health Organ. 2010; 88:350–356. [PubMed: 20461141]
21. Henrich J, Mcelreath R, Barr A, et al. Costly punishment across human societies. Science. 2006; 312:1767–70. [PubMed: 16794075]
22. Komin S. Culture and work-related values in Thai organizations. Int J Psychol. 1990; 25:681–704.
23. Van Der Merwe WG, Burns J. What's in the name? Racial identity and altruism in post-apartheid South Africa. S Afr J Econ. 2008; 76:266–75.
24. Kirigia JM, Gbary AR, Muthuri LK, et al. The cost of health professionals' brain drain in Kenya. BMC Health Serv Res. 2006; 6:89. [PubMed: 16846492]
25. Clemens MA, Pettersson G. New data on African health professionals abroad. Hum Resour Health. 2008; 6:1. doi:10.1186/1478-4491-6-1. [PubMed: 18186916]
26. Mullei K, Mudhune S, Wafula J, et al. Attracting and retaining health workers in rural areas: investigating nurses' views on rural posts and policy interventions. BMC Health Serv Res. 2010; 10:S1. [PubMed: 20594367]
27. Adano U. The health worker recruitment and deployment process in Kenya: an emergency hiring program. Hum Resour Health. 2008; 6:19. [PubMed: 18796157]
28. Wibulpolprasert S, Pengpaibon P. Integrated strategies to tackle the inequitable distribution of doctors in Thailand: four decades of experience. Hum Resour Health. 2003; 1:12. [PubMed: 14641940]
29. Xaba, J.; Phillips, G. Final report Pretoria. Democratic Nursing Organisation of South Africa (DENOSA); South Africa: 2001. Understanding nurse emigration.
30. Johnson J. Stopping Africa's medical brain drain. BMJ. 2005; 331:2–3. [PubMed: 15994662]
31. Camerer, C. Behavioral Game Theory: Experiments in Strategic Interaction. Princeton University Press; Princeton, NJ: 2003.
32. Forsythe R, Horowitz J, Savin NE, et al. Fairness in simple bargaining experiments. Games Econ Behav. 1994; 6:347–69.
33. Andreoni, J.; Harbaugh, WT.; Vesterlund, L. Altruism in Experiments. New Palgrave Dictionary of Economics; Basingstoke: 2007.
34. Engel, C. Dictator Games: A Meta Study. Max Planck Institute for Research on Collective Goods. 2010. MPI Collective Goods Preprint No. 2010/07
35. Henrich J, Boyd R, Bowles S, et al. 'Economic Man' in cross-cultural perspective: behavioural experiments in 15 small-scale societies. Behav Brain Sci. 2005; 28:795–855. [PubMed: 16372952]
36. Henrich J, Boyd R, Bowles S, et al. In search of Homo Economicus: experiments in 15 small-scale societies. Am Econ Rev. 2001; 91:73–9.
37. Jacobsen KJ, Eika KH, Helland L, et al. Are nurses more altruistic than real estate brokers? J Econ Psych. 2011; 32:818–31.
38. Frohlich N, Oppenheimer J, Moore JB. Some doubts about measuring self-interest using dictator games: the cost of anonymity. J Econ Behav Organ. 2001; 46:250–71.
39. Aguiar F, Brañas-Garza P, Miller LM. Moral distance in dictator games. Judgment Decis Mak. 2008; 3:344–54.
40. Croson R, Gneezy U. Gender differences in preferences. J Econ Lit. 2009; 47:1–27.
41. Bénabou R, Tirole J. Intrinsic and extrinsic motivation. Rev Econ Stud. 2003; 70:489–520.
42. Deci E, Koestner R, Ryan R. A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. Psychol Bull. 1999; 125:627–68. [PubMed: 10589297]

43. Eckel CC, Grossman PJ. Altruism in anonymous dictator games. Games Econ Behav. 1996; 16:181–91.
44. Brewer G. Individual conceptions of public service motivation. Public Adm Rev. 2000; 60:254–64.
45. Marks, S. Divided sisterhood: class and gender in the South African nursing profession. Macmillan; London: 1994.
46. Fassin D. The elementary forms of care: An empirical approach to ethics in a South African Hospital. Soc Sci Med. 2008; 67:262–70. [PubMed: 18455286]
47. Kline DS. Push and Pull Factors in International Nurse Migration. J Nurs Scholarsh. 2003; 35:107–11. [PubMed: 12854289]
48. Lehmann U, Dieleman M, Martineau T. Staffing remote rural areas in middle- and low-income countries: a literature review of attraction and retention. BMC Health Serv Res. 2008; 8:1–10. [PubMed: 18173837]
49. Willis-Shattuck M, Bidwell P, Thomas S, et al. Improving motivation and retention of health professionals in developing countries: a systematic review. BMC Health Serv Res. 2008; 8
50. Barnighausen T, Bloom D. Financial incentives for return of service in underserved areas: a systematic review. BMC Health Serv Res. 2009; 9:86. [PubMed: 19480656]
51. Henderson L, Tulloch J. Incentives for retaining and motivating health workers in Pacific and Asian countries. Hum Resour Health. 2008; 6:18. [PubMed: 18793436]
52. Lazear, E.; Malmendier, U.; Weber, R. Sorting and social preferences. Carnegie Mellon University, Department of Social and Decision Sciences; 2009. Paper 97http://repository.cmu.edu/sds/ [6 August 2012, date last accessed]
53. List JA. On the interpretation of giving in dictator games. J Political Econ. 2007; 115:482–493.

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Table 1

Average proportion of the initial allocation given to the recipient in the DG game, by framing and by country

	Thailand **(n = *342*)**	***Kenya*** **(n = *345*)**	***South Africa*** **(n = *377*)**
Student recipient			
Average donation	0.36 (0.010)	0.36 (0.011)	0.34 (0.010)
% who shared nothing	13.5	13.0	8.5
Patient recipient			
Average donation	0.47 (0.011)	0.46 (0.013)	0.38 (0.011)
% who shared nothing	4.0	5.5	1.2
Poor recipient			
Average donation	0.54 (0.012)	0.53 (0.015)	0.53 (0.013)
% who shared nothing	1.3	2.6	0.9

Note: standard errors are given in parentheses.

Table 2

Determinants of the proportion of the initial allocation given to the recipients in the DG game, for different framings

	Student recipient	Patient recipient	Poor recipient
South Africa	−0.076* (0.031)	−0.209*** (0.033)	−0.149*** (0.039)
Kenya	−0.075** (0.025)	−0.123*** (0.026)	−0.122*** (0.030)
Extrinsic motivation	−0.014* (0.006)	−0.021*** (0.006)	−0.018** (0.007)
Altruism	0.023*** (0.006)	0.025*** (0.007)	0.030*** (0.008)
Male	−0.027 (0.020)	−0.026 (0.021)	−0.077** (0.024)
Does not have a child	0.005 (0.029)	−0.049 (0.031)	−0.096** (0.036)
Aged 20–24 years	−0.100*** (0.025)	−0.082** (0.027)	−0.045 (0.031)
Aged 25–29 years	−0.089*** (0.026)	−0.052 (0.027)	−0.015 (0.031)
Aged 30–34 years	−0.080** (0.025)	−0.060* (0.026)	−0.038 (0.031)
Constant	0.474*** (0.029)	0.636*** (0.031)	0.722*** (0.036)
Observations	1,052	1,052	1,052
Log-likelihood	−71.23	−67.17	−235.8
Log-likelihood null model	−96.43	−113.2	−262.0

Note: for the age dummy variable, the reference category is individual aged 35 years old and more. Standard errors are given in parentheses;

*** $P < 0.001$,

** $P < 0.01$,

* $P < 0.05$.

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Table 3

Random-effects Tobit model of the determinants of the proportion of the initial allocation given to recipients

	Model I	Model II
Constant	0.551*** (0.014)	0.530*** (0.040)
South Africa	−0.010 (0.019)	−0.042* (0.021)
Kenya	−0.014 (0.020)	−0.043 (0.022)
Patient recipient	−0.069*** (0.011)	−0.069*** (0.011)
Patient recipient × SA	−0.095*** (0.016)	−0.096*** (0.016)
Patient recipient × Kenya	−0.008 (0.016)	−0.008 (0.016)
Male		−0.056** (0.021)
Single		−0.039 (0.020)
Age		0.003** (0.001)
Observations	2128	2128
Log-likelihood	−75.58	−60.67
Chi^2	322.5***	352.7***

Note: South Africa and Kenya are relative to Thailand, and the patient recipient is relative to poor recipients. Standard errors are given in parentheses.

*** $P < 0.001$,

** $P < 0.01$,

* $P < 0.05$.